

THE ALLIONIACEAE OF MEXICO AND CENTRAL AMERICA.

BY PAUL C. STANDLEY.

INTRODUCTION.

Only a short time has passed since the writer, at that time connected with the Agricultural College of New Mexico, published a paper upon the Allioniaceae of the United States with notes on Mexican species ^a, but since that time he has had access to a large amount of material not then available. The Mexican and Central American collections in the National Herbarium were not included in those loaned him for study in the preparation of the earlier paper. These specimens are essential to a proper understanding of the southern members of the family, including as they do the extensive collections made in the region by Rose, Nelson, Goldman, Conzatti, Pittier, Tonduz, and many others that are not fully represented elsewhere. In addition it has been possible to examine all the material in the Gray Herbarium and in the herbaria of the New York Botanical Garden and Columbia College, Capt. John Donnell Smith, Dr. E. L. Greene, the Academy of Natural Science of Philadelphia, the Arnold Arboretum, and the University of Pennsylvania. These collections include a great many historic specimens, especially the Gray Herbarium, where are found the types of the many species described by Gray and Watson. Although supposed duplicate type specimens of most of the species had been seen, it was impossible to be absolutely certain upon some points without examining the actual types. Some of the collections in the herbarium of the New York Botanical Garden are particularly valuable in the study of any Mexican group, and the Panama plants collected by Sutton Hayes, most fully represented there, added several new members of the Allioniaceae to our North American flora, notably the genus *Colignonia*.

When the earlier paper was published the material accessible was not sufficient to warrant the study of certain tropical genera such as *Neea* and *Pisonia*, which are treated here for the first time from the standpoint of Mexico and Central America.

^a *Contr. Nat. Herb.* 12: 303-389. *pl.* 28-48. *f.* 49-67. 1909.

In the course of the study of these larger collections much interesting information has been obtained regarding the Allioniaceae of the United States. This will be published in a later paper.

During the spring of 1910 the writer in company with Dr. J. N. Rose spent three months botanizing along the west coast of Mexico in the States of Sonora and Sinaloa and the Territory of Tepic. Although the season was not the best for the collection of herbaceous plants, many Allioniaceae were obtained, among them two new species, one of *Salpianthus* and one of *Boerhaavia*. An excellent suite of specimens was secured of *Pisonia capitata*, a plant but poorly represented in herbaria and often confused with *P. aculeata*. These two species well illustrate the value of field work, for, while in the herbarium it is often difficult to separate them, when growing they are distinguishable at a glance by the color of their flowers and the appearance of their leaves. At Mazatlan the fruits of a species of *Okenia* were secured in abundance. These, although apparently known to the authors of the genus, had not been collected since the original collection and none were to be found in any herbarium. Guaymas, Sonora, was among the places visited. It is a locality of special interest to the student of the genus *Boerhaavia*, because from its vicinity were obtained the types of no less than four species, while at least six other species have also been collected there. Unfortunately the season was so dry that few of the species were found in a growing state, but the dead plants of the previous season were to be seen everywhere. Some time was spent at the town of Alamos, Sonora, the type locality for two species of the same genus, but strangely enough, although several numbers of *Boerhaavia* were collected, neither of these two was secured. One of the species was found in several other localities later. Of the Allioniaceae reported from the west coast of the Mexican mainland all were collected except *Boerhaavia alamosana* and *Salpianthus purpurascens*. The latter has been found in the vicinity of Culiacan, Sinaloa, but was not seen by the writer.

The material of some of the Mexican species is very scanty and emphasizes the need of more extensive collecting in that vast territory. Still less satisfactory is that from Guatemala and Costa Rica, while of the Allioniaceae of Nicaragua, Honduras, and Panama practically nothing is known. There is much to be learned of the group through careful exploration and field study, which will doubtless add many species to our list, especially among the shrubby and arborescent genera.

The only treatment of the Mexican and Central American Allioniaceae heretofore published is to be found in Hemsley's *Biologia Centrali-Americana*^a issued in 1882. In that work 48 species are

^a Botany, vol. 3, pp. 1-9.

listed as occurring within our limits. In the present paper, owing chiefly to the more extensive exploration of the area, this number has been increased to 113. Hemsley listed 14 genera, while here the number given is 22, this principally due to a different conception of generic limits but partly because of more abundant material.

SYSTEMATIC TREATMENT.

ALLIONIACEAE Reichenb. Consp. Veg. 85. 1828.

Nyctaginaceae Lindl. Nat. Syst. ed. 2. 213. 1836.

Dr. Anton Heimerl^a has proposed the following division of the Allioniaceae into groups. His treatment is most satisfactory, and since it gives one a good general view of the family it is reproduced here.

I. **PISONIAE** Heimerl. Embryo straight, the cotyledons slightly recurved; flowers unisexual or hermaphrodite, usually with evident remains of the organs of the aborted sex; perianth usually not differentiated into two parts, that of the pistillate flowers closing at the summit and enveloping the fruit or adhering to its summit. Shrubs or trees, often armed with thorns; leaves opposite.—*Neea*, *Torrubia*, *Pisoniella*, *Pisonia*.

II. **BOLDOEAE** Heimerl. Embryo strongly curved; flowers hermaphrodite; perianth inconspicuous, green, persisting scarcely changed in fruit, not differentiated into a distinct upper and lower part. Plants not armed with thorns, herbaceous, or suffrutescent at the base; leaves alternate.—*Salpianthus*.

III. **MIRABILEAE** Heimerl. Embryo strongly curved; flowers hermaphrodite; perianth corolla-like and showy, enlarged and enveloping the fruit, or more or less evidently differentiated into two parts, the lower of which adheres to and envelops the fruit, the other deciduous from or persistent upon its summit. Herbs; leaves usually opposite.

A. **COLIGNONINAE** Heimerl. Perianth not adhering to the wall of the fruit, but enlarged and enveloping it at maturity, of like consistency throughout, finally pear-shaped, closed above; fruit without mucilaginous glands; anther cells almost spherical; cotyledons nearly alike; embryo spherical. Herbs with opposite leaves.—*Colignonia*.

B. **BOUGAINVILLEINAE** Heimerl. Perianth not adhering to the wall of the fruit, but enlarged and enveloping it at maturity, of the same thick consistency throughout, the lower part enlarging and enveloping the fruit, the upper drying and adhering to its summit; anther cells spherical to reniform; cotyledons more or less dissimilar but neither abortive; embryo linear-oblong; fruit adnate to the bracts and falling with them. Thorny, woody vines with alternate leaves.—*Bougainvillea*.

C. **ABRONIINAE** Heimerl. Perianth evidently differentiated into two parts of different consistency, the upper part thin, salverform, deciduous, the lower thick, enlarging and forming wings or ribs which adhere to the fruit, without mucilaginous glands; stigma linear; anther cells oblong; embryo oblong or ellipsoidal, the inner cotyledon abortive. Herbs with opposite leaves.—*Tripterocalyx*, *Abronia*.

D. **BOERHAAVIINAE** Heimerl. Perianth evidently differentiated into two parts of different consistency, the upper part thin, deciduous, the lower thick, enlarging and persisting as a coat of the anthocarp, often containing mucilaginous glands; stigma spherical or hemispherical; anther cells almost spherical; embryo spherical, ellipsoidal, or obovoid, the inner cotyledon not abortive. Herbs with opposite leaves.—*Okenia*, *Selinocarpus*, *Wedeliella*, *Nyctaginia*, *Allionia*, *Quamoclidion*, *Hesperonia*, *Mirabilis*, *Acleisanthes*, *Boerhaavia*, *Cyphomeris*, *Commicarpus*, *Anulocaulis*.

^a *Jahresb. Oberrealsch. Fünfhaus* 23: repr. 15-17. 1897.

KEY TO THE GENERA.

- Embryo straight; flowers mostly unisexual, sometimes hermaphrodite; shrubs or trees.
- Staminate perianth tubular to almost spherical; stamens included. (Stems unarmed)..... 1. *NEEA* (p. 382).
- Staminate perianth campanulate; stamens exerted.
- Fruit fleshy, not glandular. (Stems unarmed). 2. *TORRUBIA* (p. 385).
- Fruit dry and hard, bearing numerous glands along its angles.
- Flowers hermaphrodite, umbellate; stems unarmed; low shrubs; stigma depressed-capitate 3. *PISONIELLA* (p. 385).
- Flowers unisexual, corymbose; climbing or erect tall shrubs, or trees; stems armed with thorns or unarmed; stigma penicillate..... 4. *PISONIA* (p. 386).
- Embryo strongly curved; flowers hermaphrodite; plants herbaceous, or sometimes suffrutescent at the base.
- Perianth inconspicuous, green, persisting scarcely changed in fruit, not differentiated into a distinct upper and lower part. (Leaves alternate)..... 5. *SALPIANTHUS* (p. 391).
- Perianth corolla-like and showy, enlarged and enveloping the fruit, more or less evidently differentiated into two parts, the lower of which adheres to and envelops the fruit, the other deciduous from or persistent upon its summit.
- Perianth not adhering to the wall of the fruit but enlarged and enveloping it at maturity.
- Leaves opposite; herbs; embryo spherical; fruit not adhering to the bracts.... 6. *COLIGNONIA* (p. 394).
- Leaves alternate; thorny, woody vines; embryo linear-oblong; fruit adnate to the bracts and falling with them. 7. *BOUGAINVILLEA* (p. 394).
- Perianth evidently differentiated into two parts of different consistency, part persisting as a coat of the anthocarp. (Leaves opposite.)
- Stigma linear; inner cotyledon abortive; lower part of the perianth without mucilaginous glands; anther cells oblong.
- Wings of the fruit hyaline, completely encircling the fruit; flowers usually tetramerous; stamens 4. 8. *TRIPTEROCALYX* (p. 395).
- Wings, when present, thicker and opaque, not completely encircling the fruit but interrupted above and below; flowers pentamerous; stamens 5 or more... 9. *ABRONIA* (p. 395).

Stigma spherical or hemispherical; inner cotyledon not abortive; lower part of the perianth often with mucilaginous glands; anther cells almost spherical.

Stamens 9 to 17; peduncles lengthening in age and penetrating into the earth.....10. OKENIA (p. 396).

Stamens 1 to 5; peduncles slightly if at all elongated in age and not penetrating into the earth.

Anthocarp with 5 or fewer thin, scarious wings. (Perianth almost campanulate to salverform with a long tube; involucre of a few small and inconspicuous bracts).....11. SELINOCARPUS (p. 398).

Anthocarp never with thin, scarious wings.

Anthocarp lenticular, usually with lateral, incurved teeth. (Flowers in 3's surrounded by an involucre which is 3-parted almost to the base)12. WEDELIELLA (p. 399).

Anthocarp never lenticular nor with marginal teeth, usually obpyramidal or ellipsoidal.

Flowers in many-flowered heads surrounded by an involucre of distinct, lanceolate bracts. (Perianth salverform with a long tube; stamens long-exserted, usually 5).....13. NYCTAGINIA (p. 400).

Flowers not in many-flowered heads surrounded by an involucre of distinct bracts, usually 1 to 3 or sometimes 10 together, each flower subtended by 1 to several bracts or the bracts united.

Involucre gamophyllous.

Anthocarp constricted at the base, hence obovoid, prominently 5-ribbed; involucre enlarged and membranous in fruit. (Involucre 1 to 5-flowered; perianth campanulate or nearly so)14. ALLIONIA (p. 401).

Anthocarp oblong or ellipsoidal, smooth or somewhat 5-angled, but never prominently 5-ribbed; involucre not noticeably enlarged in fruit.

Involucres 3 to 10-flowered. (Perianth with a long but thick tube)....15. QUAMOCLIDION (p. 410).

Involucres 1-flowered.

Perianth campanulate; anthocarp smooth.....16. HESPERONIA (p. 411).

Perianth salverform, often with a long and slender tube; anthocarp slightly 5-angled.....17. MIRABILIS (p. 413).

Involucre polyphyllous (the bracts often unequal).

- Flowers usually solitary; bracts persistent, herbaceous; anthocarp oblong or obovoid (truncate). (Perianth with a conspicuous, often very long, tube; stamens 5).....18. *ACLEISANTHES* (p. 417).
- Flowers usually more than one, approximate, rarely solitary; bracts scarious, deciduous; anthocarp narrowed or constricted at the base.
- Anthocarp with 5 or fewer angles or ribs (obpyramidal or clavate); perianth campanulate.....19. *BOERHAAVIA* (p. 418).
- Anthocarp 10-ribbed or striate; perianth not campanulate.
- Anthocarp asymmetrical (clavate, without conspicuous mucilaginous glands); flowers in racemes..... 20. *CYPHOMERIS* (p. 428).
- Anthocarp symmetrical; flowers not in racemes.
- Anthocarp clavate, with conspicuous stalked mucilaginous glands; flowers umbellate; plants with weak, reclining, or clambering stems often woody at the base; leaves scattered evenly along the stems.....21. *COMMICARPUS* (p. 428).
- Anthocarp turbinate or biturbinate, without conspicuous stalked, mucilaginous glands; stems stout, erect, herbaceous; leaves mostly basal.....22. *ANULOCAULIS* (p. 430).

1. *NEEA* Ruiz & Pavon.

Neea Ruiz & Pav. Fl. Peruv. Chil. Prodr. 52. pl. 9. 1794.

Type species, *Neea verticillata* Ruiz & Pav.

The genus consists of about 30 species besides those described here. Two are found in the West Indies, the others in South America, principally in Brazil and Peru. One or two are known from Colombia.

Hemsley cites three plants of the genus from our region, none of them under a specific name. The three numbers cited are Sutton Hayes's 112 and 359 from Panama, and Linden's 1606 from Teapa, Tabasco. None of these has been seen in the preparation of the present paper. The specimen from Tabasco is likely to be one of the species described from Mexico, or possibly *N. psychotrioides*, while those from Panama should be either *N. psychotrioides* or undescribed species.

KEY TO THE SPECIES.

- Leaves tomentose beneath.....1. *N. fagifolia*.
- Leave glabrous beneath.
- Leaf blades 11 cm. wide or more, sharply caudate.....2. *N. pittieri*.
- Leaf blades less than 7 cm. wide, not caudate.

Leaf blades large, 80 to 190 mm. long, elliptic-lanceolate or oblanceolate, slightly acuminate or attenuate at the apex. (Branches of the inflorescence comparatively stout).....3. *N. psychotrioides*.

Leaf blades smaller, 17 to 70 mm. long.

Staminate perianth appearing strigillose, almost spherical; leaf blades obtuse or acutish.....4. *N. sphaerantha*.

Staminate perianth viscid-puberulent, not appearing strigillose, oblong; leaf blades acute.

Leaf blades thin; petioles about 3 mm. long; peduncles 60 to 70 mm. long, slender....5. *N. tenuis*.

Leaf blades thick and leathery; petioles 4 to 10 mm. long; peduncles 15 to 30 mm. long, stout.....6. *N. choriophylla*.

1. *Neea fagifolia* Heimerl, Jahresb. Oberrealsch. Fünfhaus 23: repr. 39. 1897.

Type locality, "America centralis, Nicaragua." Type collected at Granada by Oersted.

Young branches sparingly tomentulose, becoming glabrate, the internodes short, leafy at the apex; leaves opposite, elliptic-lanceolate, 42 to 57 mm. long, 22 to 28 mm. wide, attenuate at both ends, cuneately narrowed to a petiole, 6 to 8 mm. long, shortly acuminate at the apex, the apex acutish, widest in the middle, above shining and almost glabrous, below densely tomentose, thin; inflorescence on a slender peduncle 20 to 30 mm. long, shortly pyramidal, the branches slender; perianths sessile or on very short pedicels, ellipsoidal, 5 mm. long, shortly but distinctly attenuate at both ends, with 5 acute teeth at the mouth, glabrous; stamens 6, unequal, half as long as the perianth.

The writer has seen no material of this species. The description is adapted from that of Doctor Heimerl.

2. *Neea pittieri* Standley, sp. nov.

Branches stout, roughened, glabrous; leaf blades ovate to elliptic-oblong, 17 to 24 cm. long and 11 to 13 cm. wide, sharply caudate at the apex, with a narrowly triangular and very acute tip 15 to 20 mm. long, rounded or obtuse at the base and somewhat unequal, glabrous, thin, with conspicuous lateral veins, on a petiole 10 to 16 mm. long; inflorescence an open corymb 11 cm. broad, with stout, divaricate, puberulent branches, on a stout peduncle 7 cm. long; staminate flowers about 9 mm. long, tubular or ellipsoidal, with 5 ovate, acuminate teeth at the mouth, on pedicels about 2 mm. long; stamens 5 to 10, very unequal, the longest filaments 4.5 or 5 mm. long, glabrous, anthers 1.5 to 2 mm. long.

Type in the U. S. National Herbarium, no. 578028, collected on the mountains about the Valley of Tufts, Costa Rica, at an altitude of 1,000 meters, by Mr. H. Pittier (no. 16097). The very large and wide leaves with their caudate apices are very different from those of any of the other species treated here, while the flowers are considerably larger.

3. *Neea psychotrioides* J. D. Smith, Bot. Gaz. 16: 199. 1891.

Type locality, "Escuintla," Guatemala.

Specimens examined:

GUATEMALA: Escuintla, alt. 330 meters, March, 1890, *J. D. Smith* 2069 (type); same locality, April, 1892, *J. D. Smith* 2474; Rio Ocosito, Depart. Quezaltenango, alt. 75 meters, April, 1892, *J. D. Smith* 1475; Cubilquitz, Alta Verapaz, alt. 350 meters, July, 1907, *Tuerckheim* 616; Cubilquitz, June, 1902, *Tuerckheim* 8280; same locality, July, 1903, *Tuerckheim* 8449.

COSTA RICA: Forêts de Tsaki, Talamanca, alt. 200 meters, April, 1895, *Tonduz* 9581.

HONDURAS: San Pedro Sula, Depart. Santa Barbara, alt. 240 meters, September, 1888, *Thieme* 5423.

This appears to be a most variable species in the size of the staminate perianth and in the form of the inflorescence; there is considerable variation in the leaf outline as well. The material cited possibly represents more than one species, but if so they are so closely related that with such insufficient material it seems unwise to attempt to separate them.

Closely related to *Neea psychotrioides*, but apparently distinct, is a specimen collected by John Hart at Bocas del Toro, Panama (no. 168). It may be a South American species.

4. *Neea sphaerantha* Standley, sp. nov.

Branches slender, grayish, smooth, glabrous; leaf blades oblong or oval to elliptic-oblong, 17 to 53 mm. long and 9 to 20 mm. wide, thin, glabrous, obtuse or acutish at the apex, rounded or broadly cuneate at the base, on slender petioles 4 to 10 mm. long; inflorescence a rather open corymb with but few branches, 40 mm. broad or less, on a slender glabrous peduncle 22 to 40 mm. long; branches of the inflorescence glabrous or sparingly puberulent, the bractlets thick and mostly lanceolate; staminate flowers almost spherical, 4 to 5 mm. long, about 3.5 mm. wide, short-pedicel, nervulose (appearing minutely strigillose), obscurely 4-toothed at the apex; stamens 6, unequal, slightly more than half as long as the perianth; pistillate flowers and fruit not seen.

Type in the Herbarium of the Field Museum of Natural History, no. 278505, collected at Izamal, Yucatan, by G. F. Gaumer (no. 697). A most distinct species in its nervulose perianths and obtuse or only acutish leaf blades which are not so much narrowed at the base as in the related species. What appear under a low-power lens to be minute appressed hairs are really minute, light-colored nerves.

5. *Neea tenuis* Standley, sp. nov.

PLATE 74.

Branches slender, smooth, brownish, glabrous; leaves opposite in pairs or verticillate in 4's, the blades lanceolate-elliptic, 44 to 50 mm. long and 14 to 19 mm. wide, attenuate at the apex, acutish at the base, thin, glabrous, on petioles 3 mm. long; inflorescence a loose corymb, the branches very slender, almost capillary, flexuous, glabrous or with a sparse, appressed, rufescent pubescence, about 35 mm. high and 40 mm. wide; peduncles very slender, glabrous, 60 to 70 mm. long; bractlets subulate; staminate perianth 3 to 4 mm. long, oblong, glabrous or nearly so; stamens 6, one-third as long as the perianth, the filaments unequal; pistillate flowers and fruit not seen.

Type in the Gray Herbarium, collected by Botteri about Orizaba, State of Veracruz, Mexico. From *N. psychotrioides* the plant differs in its smaller leaves on short petioles, slender branches, and long and very slender peduncles.

The photograph is of the type sheet.

6. *Neea choriophylla* Standley, sp. nov.

Branches stout, pale grayish or brownish, smooth and glabrous; leaf blades elliptic-oblong, thick and leathery, glabrous, 45 to 70 mm. long and 20 to 30 mm. wide, acuminate, the tips being 7 to 15 mm. long, broadly cuneate at the base, on stout petioles 4 to 10 mm. long; inflorescence a narrow, rather compact corymb 20 mm. broad or less, on a glabrous or puberulent peduncle 15 to 30 mm. long; branches of the inflorescence rufescent-puberulent, stout; bractlets narrowly triangular, minute, 3 or 4 at the base of each flower; pistillate flowers tubular, 3 mm. long or less, minutely and sparingly puberulent, 4-toothed at the apex; stigma fimbriate, the style slightly exerted; staminate flowers not seen.

Type in the U. S. National Herbarium, no. 571766, collected in Yucatan by G. F. Gaumer (no. 761). The very thick leaves of this plant are strikingly different from those of any other species treated here, although they suggest those of some of the South American species. The leaf outline, too, is very different from that of the related species.



NEEA TENUIS STANDLEY.

2. **TORRUBIA** Vell.

Torrubia Vell. Fl. Flum. 139. 1825.

Type species, *Torrubia opposita* Vell.

The genus is represented in the West Indies by a number of species. Representatives are found in various parts of South America as well. Hemsley did not recognize *Torrubia* as distinct from *Pisonia*, but he cited *Pisonia pacurero*, properly a member of this genus, from Guatemala. That species is a Venezuelan one and the writer has seen no Central American material that could be referred to it.

1. ***Torrubia costaricana*** Standley, sp. nov.

A small tree; twigs slender, greenish gray, smooth and glabrous; leaf blades elliptic or narrowly oblanceolate, 80 to 110 mm. long and 20 to 34 mm. wide, dull green, glabrous, long-acuminate at the apex, tapering at the base to a slender petiole 5 to 10 mm. long; staminate inflorescence rather densely corymbose, 25 to 35 mm. wide, on a slender, almost glabrous peduncle 25 to 30 mm. long; perianth narrowly campanulate, 2 mm. long, almost glabrous, on a stout, puberulent pedicel; stamens 5, twice as long as the perianth; pistillate inflorescence and fruit not seen.

Type in the herbarium of Capt. John Donnell Smith, collected in the forests about Nicoya, Costa Rica, in May, 1900, by A. Tonduz (no. 13927). The collector states that the perianth is white and that the flowers are fragrant. The species is related to *Torrubia inermis*, but the very different leaves alone are sufficient to distinguish it.

3. **PISONIELLA** Standley, gen. nov.

Pisonia section *Pisoniella* Heimerl, in Engl. & Prantl, Pflanzenfam. 3^{1b}: 29. 1889.

Low shrubs with numerous forking or rarely opposite branches; leaves entire, petioled, opposite; inflorescence of numerous axillary, long-peduncled, many-flowered umbels; flowers hermaphrodite, narrowly campanulate; stamens 6 to 8, exserted; style depressed-capitate; perianth enlarging in age and becoming hardened and leathery, inclosing the fruit, becoming 5-angled and producing from each angle a row of papillose, viscous glands.

Type species, *Boerhaavia arborescens* Lag.

Although originally described as a species of *Boerhaavia* the type of the genus has usually been placed in the genus *Pisonia*, to which it is more closely related. The fruit is very similar to that of *Pisonia*, but the inflorescence, the style, and the habit of the plant are very different. Several times the type species has been described under the genus *Boerhaavia*. It does possess certain relationships with *Commicarpus scandens*, that being, no doubt, of the group to which it was referred. The fruit, however, is such as to exclude the plant from the genus *Commicarpus*. Unfortunately it has been impossible to get mature fruit of either species to determine the form of the embryo. It is to be expected that it will be straight or but slightly curved as in the species of *Pisonia*.

KEY TO THE SPECIES.

Stems and leaves puberulent and more or less glandular; leaf blades short-acuminate, rounded at the base or subcordate.. 1. *P. arborescens*.
Stems and leaves glabrous; leaf blades long-acuminate, attenuate or acuminate at the base. (South America.)..... *P. glabrata*.

1. ***Pisoniella arborescens*** (Lag. & Rodr.) Standley.

Boerhaavia arborescens Lag. & Rodr. Ann. Cienc. Nat. 4: 257. 1801.

Pisonia hirtella H. B. K. Nov. Gen. & Sp. 2: 217. 1817.

Boerhaavia octandra S. Wats. Proc. Amer. Acad. 26: 145. 1891.

Type locality, "Salvatierra," Guanajuato, Mexico.

Specimens examined:

OAXACA: Valley of Oaxaca, alt. 1,560 to 2,040 meters, October 2, 1894, *Nelson* 1515; Oaxaca Valley, alt. 1,500 meters, November 7, 1894, *C. L. Smith* 790; Tlacolula et San Dionicio, August 4, *Andrieux* 128; Etna, September 19, 1895, *L. C. Smith* 798.

MEXICO: 1844, *Galeotti* 587; Guadalupe, Valley of Mexico, August 24, 1903, *Rose & Painter* 6535; Guadalupe, October 11, 1861, *Bourgeau* 518; Cerro de Guadalupe, alt. 2,250 meters, September 15, 1903, *Pringle* 11697; Chapultepec, February, 1903, *Purpus* 58; near the city of Mexico, *Bustamente y R.*; 1838, *Vischer*; City of Mexico, *Bilimek* 197; Valley of Mexico, *Schaffner* 184; Ixtepeji, October, 1844, *Galeotti* 587.

HIDALGO: Banks and ledges, Dublán, alt. 2,040 meters, September 16, 1902, *Pringle* 11142; Coxcatlan, September, 1909, *Purpus* 4210.

QUERÉTARO: Near Querétaro, August, 1906, *Rose & Rose* 11151; Querétaro, November 21, 1827, *Berlandier*.

VERA CRUZ: Orizaba, 1853, *Müller* 913.

GUANAJUATO: Ravine near Guanajuato, 1891, *Dugès* 299.

JALISCO: Rocky banks of river, Falls of Juanacatlan, October 2, 1891, *Pringle* 3879.

In Central Mexico the shrub is known by the common name of *jazmincillo*, possibly because of the resemblance of the whitish flowers open at night to those of some of the jasmynes.

Here may be introduced for convenience a related South American type:

PISONIELLA GLABRATA (Heimerl) Standley, sp. nov.

Pisonia hirtella glabrata Heimerl, Ann. Cons. Jard. Genève 5: 196. 1901.

Type locality, "Sorata," Bolivia.

Specimens examined:

BOLIVIA: Vicinity of Cochabamba, 1891, *Bang* 1063; without definite locality, *Bang* 1809; Sorata, alt. 2,400 meters, February, 1886, *Rusby* 2500.

ARGENTINA: Sierra de Tucuman, February, 1874, *Lorentz & Hieronymus* 776.

This, the only other species of the genus, is well differentiated from *P. arborescens* by its lack of pubescence and its different leaves. The two species occupy distinct areas, neither being known to occur in the southernmost part of Mexico, in Central America, or in any of the intervening countries of South America.

4. *PISONIA* L.

Pisonia L. Sp. Pl. 1026. 1753.

Calpidia Du Petit-Thou. Veg. Isles Austr. Afr. 37. pl. 10. 1806.

Pallavia Vell. Fl. Flum. 151. 1825.

Tragularia Koen.; Roxb. Fl. Ind. 217. 1832, as synonym.

Type species, *Pisonia aculeata* L.

The type species of *Pallavia* is *Pisonia aculeata*.

The genus as generally understood is a rather large one, its representatives being found in various parts of North and South America, the West Indies, Africa, Asia, and Australia, as also on many of the islands of the Pacific. It consists of several well-defined groups, some of which deserve generic rank. *Torrubia*, which has been here included, was restored by Dr. N. L. Britton several years ago.

KEY TO THE SPECIES.

- Staminate flowers very narrowly campanulate, 5 mm. long (subcapitate)..... 1. *P. donnellsmithii*.
 Staminate flowers broadly campanulate, 3 mm. long or less.
 Anthocarp 14 to 20 mm. long, the glands along its angles
 in more than one row..... 2. *P. macranthocarpa*.

Anthocarp 7 to 14 mm. long, the glands in a single row.

Staminate inflorescence with 10 flowers or fewer; peduncles 2 or more together..... 3. *P. fasciculata*.

Staminate inflorescence with numerous flowers, the peduncles solitary.

Staminate flowers in compact corymbs 10 to 22 mm. in diameter, dark red.

Leaves broadly rounded or obtuse, orbicular or obovate, usually densely pubescent on both surfaces; spines mostly curved.. 4. *P. capitata*.

Leaves acute or acutish, oblanceolate, mostly glabrous; spines straight..... 5. *P. flavescens*.

Staminate flowers in loose, open corymbs 25 to 60 mm. broad; flowers yellowish green.

Leaves not oblanceolate, 25 to 85 mm. long... 6. *P. aculeata*.

Leaves oblanceolate, 110 to 150 mm. long:..... 7. *P. grandifolia*.

1. *Pisonia donnellsmithii* Heimerl in herb.

Branches stout, yellowish, unarmed, glabrous or the youngest sparingly pubescent, densely leafy; leaf blades bright green, thin, elliptic to oblanceolate, 30 to 55 mm. long, 12 to 28 mm. wide, acutish or acute, cuneate at the base, glabrous except on the principal veins, there tomentulose, on tomentulose petioles 4 to 8 mm. long; staminate flowers subumbellate, the heads 2 cm. broad or less, the flowers on short viscid-puberulent pedicels 1 mm. long or less; peduncles 22 to 30 mm. long; perianth 5 mm. long, very narrowly campanulate, minutely puberulent without, 5-lobed at the mouth, the lobes obtuse; pistillate flowers and fruit not seen.

Type in the U. S. National Herbarium, no. 1810, collected at Los Verdes, Department of Amatitlan, Guatemala, at an altitude of 1,050 meters, October, 1893, by Heyde & Lux (no. 6301).

The species was given this name by Doctor Heimerl in the National Herbarium and has been used by him in correspondence but, apparently, has never been published. The plant can not well be compared with any other species of the genus, its dense inflorescence and peculiar perianth setting it off from all the rest. Possibly, when the fruit and pistillate flowers are known it will be found that it does not belong in the genus *Pisonia*. The specimens were distributed as *Pisonia macranthocarpa*, it being believed that they represented the staminate inflorescence of that plant. The mere form of the leaves should make such a view untenable and besides this the writer has seen reliable staminate material of *P. macranthocarpa* elsewhere, showing it to be far different from these specimens.

2. *Pisonia macranthocarpa* J. D. Smith, Bot. Gaz. 20: 293. 1895.

Pisonia aculeata macranthocarpa J. D. Smith, Bot. Gaz. 16: 198. 1891.

Pisonia aculeata pedicellaris Griseb.; Heimerl, Bot. Jahrb. Engler 21: 633. 1896.

Pisonia pedicellaris Griseb.; Heimerl, Jahresb. Oberrealsch. Fünfhaus 23: repr. 32. 1897.

Type locality, "Escuintla," Guatemala.

Specimens examined:

NICARAGUA: 1853-56, C. Wright.

COSTA RICA: Environs de Nicoya, December, 1900, Tonduz 13783; pâturages de Nuestro Amo, llanos de Turrúcares, January, 1902, Pittier 1522, alt. 700 meters.

GUATEMALA: Escuintla, Depart. Escuintla, alt. 330 meters, April, 1890, J. D. Smith 2091, type; same locality, alt. 330 meters, February, 1892, J. D. Smith 1230; Aguascalientes, Depart. Santa Rosa, January 24, 1908, Kellerman 7077; Paso de Lelha, Valley of Copan, alt. 550 meters, January, 1907, Pittier 1819; vicinity of Zacapa, Depart. Zacapa, alt. 200 to 400 meters, 1906-7, Pittier 1734a.

SALVADOR: 1905, *Renson* 241

MEXICO: Near Llano Grande, Providencia, Chiapas, December 13, 1906, *Collins & Doyle* 72.

The plant is said to be a small thorny tree with greenish flowers. It differs from *P. aculeata* in its much larger fruit and usually straight spines. The leaves, too, are more narrowed at the base and the petioles more or less margined. The branches are a deep reddish brown, while in *P. aculeata* they are usually much paler or even grayish. *P. pedicellaris* was based upon Cuban specimens; the species is found in Jamaica as well. Some of the Cuban specimens have the spines curved, but the Central American specimens seem to have them uniformly straight.

3. *Pisonia fasciculata* Standley, sp. nov.

Branches reddish or yellowish, smooth and glabrous, armed with few rather stout, straight spines 3 or 4 mm. long; leaf blades elliptic, acute, 35 to 40 mm. long, tapering at the base to closely puberulent petioles 4 or 5 mm. long; staminate flowers in 5 to 10-flowered clusters, subumbellate, the cluster 1 cm. or less in diameter, on a slender, viscid peduncle 12 mm. long, 2 to 5 clusters in an axil; perianth 2 to 3 mm. long, narrowly campanulate, minutely glandular-puberulent, almost sessile; stamens 5, exserted 2 or 3 mm.; pistillate flowers and fruit not seen.

Type in the U. S. National Herbarium, no. 45190, collected in Nicaragua by Charles Wright, 1853 to 1856. There is a sheet of the same collection in the Gray Herbarium.

The subcapitate inflorescence and the occurrence of more than one peduncle at a node readily distinguish this species.

A specimen in the Gray Herbarium collected at Gualán, Guatemala, at an altitude of 125 meters, January 15, 1905, *Deam* 270, seems to be the same. This specimen has no spines and the flowers are more nearly sessile. The collector says that it is a tree 15 feet high.

4. *Pisonia capitata* (S. Wats.) Standley.

PLATE 75, B.

Cryptocarpus ? *capitatus* S. Wats. Proc. Amer. Acad. 24: 71. 1889.

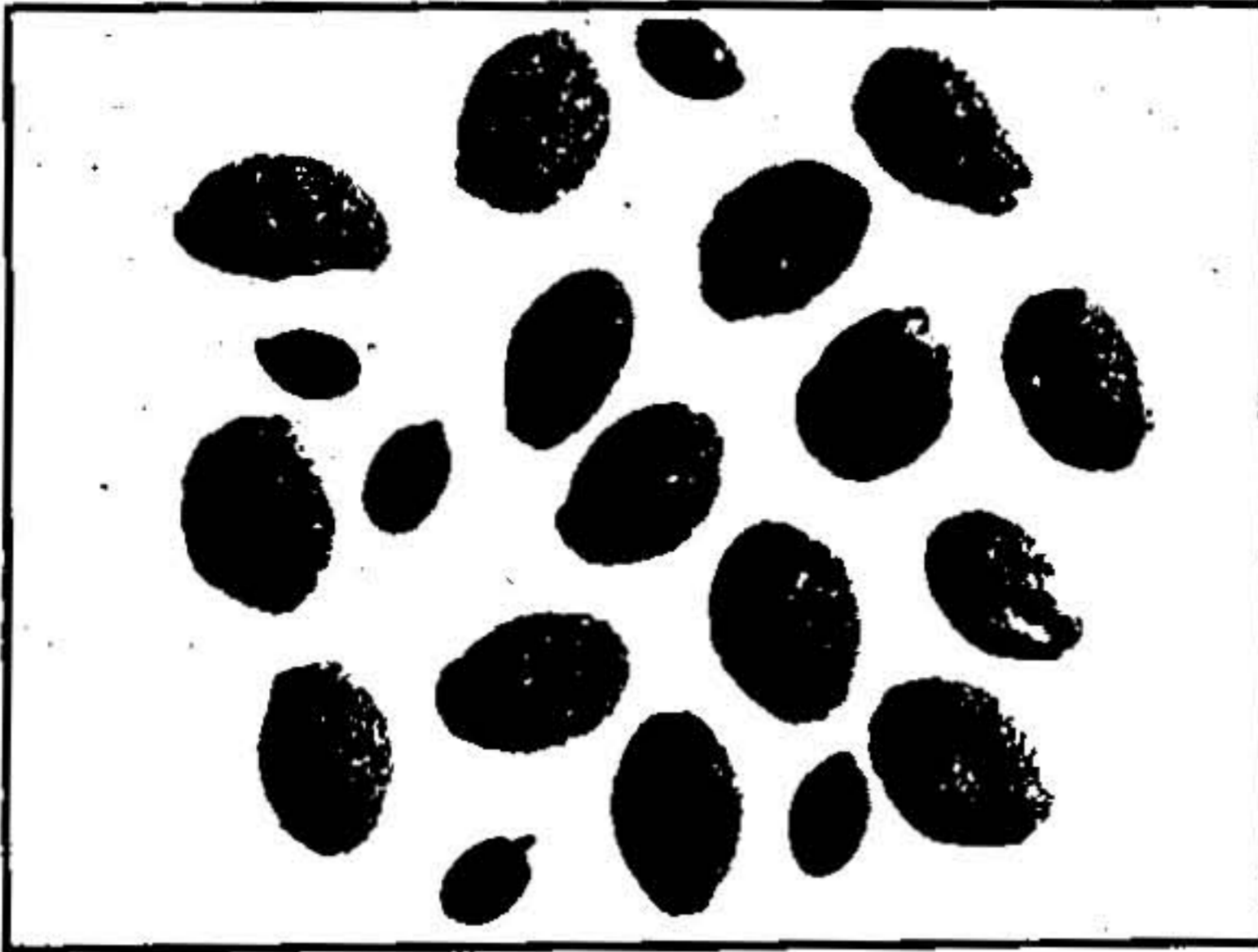
Type locality, "Near Guaymas," Sonora.

A low, densely branched shrub or small tree, 5 meters high or less, the branches often weak and clambering or spreading, armed with numerous stout, curved, or rarely straight spines 7 to 14 mm. long; older branches glabrous, grayish or yellowish, the younger ones densely pubescent; leaf blades orbicular to obovate, 20 to 60 mm. long, broadly rounded at the apex, rounded or tapering at the base, yellowish green, on petioles 6 to 16 mm. long; staminate flowers wine red, very fragrant, in dense corymbs 10 to 18 mm. in diameter, these not at all dissected but compact; staminate perianth 2 to 3 mm. long, with 5 obtuse lobes, densely viscid without; stamens 5, exserted 2 or 2.5 mm., the anthers conspicuous, buff; pistillate flowers in loose corymbs 10 to 18 mm. broad on peduncles 18 to 20 mm. long, tubular, reddish, densely viscid; style exserted about 1 mm., the stigma fimbriate; anthocarp prismatic, about 10 mm. long, rounded at the apex, narrowed near the base, the angles each with a single row of glands, the sides puberulent, the fruits arranged in a loose corymb 6 cm. or less in diameter, the branches viscid-pubescent.

Specimens examined:

SONORA: Guaymas, February 17, 1890, *Palmer* 175; Alamos, January 26, 1899, *Goldman* 298; Guaymas, April 1 and 2, 1891, *Palmer* 1759; near Navojoa, March 21, 1910, *Rose, Standley & Russell* 13144; near Los Ranchos, vicinity of Guaymas, April 23, 1910, *Rose, Standley & Russell* 15032; along an arroyo in hills beyond the railroad station, Alamos, March 16, 1910, *Rose, Standley & Russell* 12924; Guaymas, 1887, *Palmer* 647, type; Guaymas, June, 1897, *Rose* 1264.

SINALOA: Road from Culiacan to Las Flechas, February 21, 1899, *Goldman* 314; near Bacubirito, March 12, 1904, *Wm. Palmer* 1250; along an arroyo near San



A. FRUIT OF OKENIA HYPOGAEA SCHLECHT. & CHAM.



B. PISONIA CAPITATA (S. WATS.) STANDLEY.

Blas, March 22, 1910, *Rose, Standley & Russell* 13213; thickets near Villa Union, April 2, 1910, *Rose, Standley & Russell* 13896; thickets east of Mazatlan, April 1, 1910, *Rose, Standley & Russell* 13847; dry thickets near Rosario, April 14, 1910, *Rose, Standley & Russell* 14519; Mazatlan, 1902, *Purpus*; Rosario, June 20, 1897, *Rose* 1407.

TEPIC: Moist arroyo near Acaponeta, April 10, 1910, *Rose, Standley & Russell* 14317.

The most striking difference between this species and *Pisonia aculeata*, at least in the field, is the very different color of the flowers; those of that species are yellowish green, while those of *Pisonia capitata* are a deep red. The latter is a very handsome shrub, at least as to the staminate plant, while the flowers of *P. aculeata* are inconspicuous and scarcely noticeable against the leaves. The leaves of the two are different as well, those of *aculeata* being usually smooth, rather fleshy, and shining, while those of *capitata* are pubescent, of a yellowish green cast, not at all fleshy, and never shining. The two are somewhat different in habit as well.

The writer in the spring of 1910 visited the type locality of the species near Guaymas. This is the northern limit of its range and only a few individuals were to be seen. These were stunted and not typical of the species. They were growing in a sandy arroyo not far from the coast at Los Ranchos about 5 or 6 miles from Guaymas. Farther south the plant was observed in abundance. It was frequent in the hedges about towns, along arroyos, and in the dense thickets so characteristic of the vegetation of the west coast of Mexico. At Alamos the common name was given as *garrambullo*, and the fruits were said to be used to make a decoction for treatment of fever.

The photograph was taken at Alamos, Sonora, by E. A. Goldman.

5. *Pisonia flavescens* Standley, sp. nov.

Older branches dark gray, smooth, the younger ones brown or grayish; spines few, stout, straight, 6 to 7 mm. long; leaf blades oblanceolate, 40 to 65 mm. long, obtuse or usually acutish, attenuate to the base, almost glabrous, traces of pubescence sometimes persisting along the veins, yellowish green, on slender petioles half as long as the blades; staminate flowers in dense capitate corymbs 10 mm. in diameter or less, these on peduncles less than 10 mm. long and somewhat puberulent; perianth broadly campanulate, the diameter greater than the length, obtusely lobed, sparingly puberulous, not glandular; pistillate flowers not seen; anthocarp 10 mm. long, 5-angled, almost glabrous, each angle beset with a row of low and inconspicuous glands.

Type in the Herbarium of the University of California, no. 101930, collected at San José del Cabo, Baja California, in May, 1897, by Mr. T. S. Brandegee. This specimen consists of both flowering and fruiting branches. On the same sheet are flowering branches gathered by the same collector at the same locality in March, 1892. There is a sheet of the type collection in the herbarium of the New York Botanical Garden and a fragment in the National Herbarium. A fragment of the second collection is also to be found in the National Herbarium.

The proposed species is nearest *Pisonia capitata* but differs in its oblanceolate, acutish leaves and the much smaller heads of staminate flowers.

6. *Pisonia aculeata* L. Sp. Pl. 1026. 1753.

Pallavia aculeata Vell. Fl. Flum. 151. 1825.

Tragularia horrida Koen.; Roxb. Fl. Ind. 2: 217. 1832, as synonym

Pisonia monotaxadenia Wright & Sauv. Fl. Cub. 137. 1873.

Type locality, "In America meridionali."

Specimens examined:

YUCATAN: 1896, *Valdez* 57; 1895, *Millsbaugh* 305; Uxmal, *Caec. & Ed. Seler* 3881; Merida, 1865, *Schott* 143.

TABASCO: Comun en los bosques del camino de San Juan Bautista à Atasta, March 14, 1888, *Rovirosa* 127.

VERA CRUZ: Orizaba 1855, *Müller* 1245 and 1370.

TAMAULIPAS: Vicinity of Victoria, alt. 320 meters, February to April, 1907, *Palmer* 137.

MICHOACAN OF GUERRERO: Rives du Rio Coyaquilla, alt. 150 meters, February 6, 1899, *Langlassé* 833.

MEXICO: Valle de Córdoba, 1866, *Bourgeau* 2063.

OAXACA: Tuchitan, January 30, 1896, *Caec. & Ed. Seler* 1980; Cuicatlan, February 2, 1895, *L. C. Smith* 503; Oaxaca, 1896, *Caec. & Ed. Seler* 1620.

COLIMA: Colima, January and February, 1891, *Palmer* 1114; Acapulco, 1894-5, *Palmer* 404.

SINALOA: Along the edge of sand dunes north of Mazatlan, April 4, 1910, *Rose, Standley & Russell* 14000; thickets along the river, Guadalupe, April 18, 1910, *Rose, Standley & Russell* 14779.

TEPIC: Moist arroyo near Acaponeta, April 10, 1910, *Rose, Standley & Russell* 14318; south of Acaponeta, April 11, 1910, *Rose, Standley & Russell* 14416; San Blas, 1897, *Maltby* 28.

JALISCO: Roadside between San Sebastian and Las Palmas, alt. 150 to 750 meters, March 30, 1897, *Nelson* 4128.

COSTA RICA: Nicoya, 1896, *Cooper* 10384; forêts de Shirores, Talamanca, alt. 100 meters, February, 1895, *Tonduz* 9181.

GUATEMALA: Panzal, Baja Verapaz, 1907, *Tuerckheim* 1710.

HONDURAS: Rio Permejo, Santa Barbara, 1887, *Thieme* 5425.

The following specimens are noteworthy because of their leaves, which are densely pubescent beneath while usually very broad and obtuse; the young branches, too, are strongly pubescent:

OAXACA: Roadside between Llano Grande and Pinotepa, alt. 60 to 150 meters, February 19, 1895, *Nelson* 2342.

GUERRERO: El Limon, April 3, 1903, *Nelson* 6980.

MEXICO: Valle de Córdoba, March 14, 1866, *Bourgeau* 2063.

SINALOA: Road from Las Flechas to La Rostra, February 22, 1899, *Goldman* 320.

GUATEMALA: Naranjo, Depart. Escuintla, alt. 90 meters, March, 1892, *J. D. Smith* 2761.

Of all the species of *Pisonia* no other has so wide a range as this. In Mexico and Central America it is common in the warmer parts, usually occurring near the sea or along moist river bottoms. It is found in Florida, in most of the islands of the West Indies, in South America, in southern Asia, in the Philippine Islands, and in other islands of the Pacific. In some of these places it is thought to be introduced; especially is this probable in the case of the Philippines. Chance introduction is easy, for the viscid fruits attach themselves so readily to any object which touches them that they may easily be transported, either upon the bodies of animals or in packing or grain. The glands of the fruit maintain their viscosity for a long time, the fruit in some of the herbarium specimens collected fifty years ago being still viscid to the touch.

Coupled with the wide geographic range of the species is found, as is to be expected, great individual variation among the plants. The whole range of variation, perhaps is to be found among our Mexican specimens. Plants from other parts of the world are comparatively uniform, having commonly glabrous, somewhat fleshy, acute leaves. The Mexican specimens, however, exhibit peculiarities in the form and pubescence of the leaves as well as in the abundance and size of the fruit. So imperceptibly do the forms shade into each other that there seems to be no reliable means of separating them. Most of the strongly pubescent specimens that have been examined represent young growths and would probably become glabrous with age.

Various common names are applied to this species. In Michoacan and Guerrero it is known as *garabato prieto* or *uña del diablo*; in Tamaulipas as *coma de uña*; in Tabasco

as *uña de gato*; in Yucatan as *beeb*; and in Guatemala as *huele de noche*. An infusion of the bark and leaves is said to be used both internally and externally as a cure for inflammation of the joints and for venereal diseases.

7. *Pisonia grandifolia* Standley, sp. nov.

Branches dark reddish brown, stout, smooth and glabrous, armed with few short, slender, strongly curved spines; leaf blades 11 to 15 cm. long and 2.5 to 5 cm. broad, oblanceolate or elliptic, very thick, glabrous, obtuse, attenuate to the base; petioles stout, glabrous, 20 to 25 mm. long; staminate flowers in very loose, much branched corymbs 3 or 4 cm. in diameter; pedicels and peduncles sparingly appressed-puberulent; pistillate flowers and fruit not seen.

Type in the herbarium of Capt. John Donnell Smith, collected at Cubilquitz, Depart. Alta Verapaz, Guatemala, alt. 350 meters, February, 1901, by H. von Tuerckheim (no. 7954). While related to *P. aculeata* this is distinguished by the very large leaves which are different in outline, more obtuse, and tapering at the base.

5. **SALPIANTHUS** Humb. & Bonpl.

Salpianthus Humb. & Bonpl. Pl. Aequin. 1: 155 pl. 44. 1808.

Boldoa Lag. Gen. & Sp. Nov. 9. 1816.

Cryptocarpus H. B. K. Nov. Gen. & Sp. 2: 187. pl. 123. 1817.

Type species, *Salpianthus arenarius* Humb. & Bonpl.

The type species of *Boldoa*, apparently, is *B. purpurascens*.

The type of *Cryptocarpus* is *Cryptocarpus globosus*, which is a synonym of *Salpianthus purpurascens*. Another species of *Cryptocarpus* was described at the same time, *C. pyriformis*, but *C. globosus* was the first mentioned. Doctor Heimerl, while considering *Cryptocarpus globosus* a synonym of *Boldoa ovatifolia* and a member of the genus *Boldoa*, maintains the genus *Cryptocarpus* for the South American *Cryptocarpus pyriformis*. That species, evidently, should be made the type of a new genus.

Choisy^a gives as the place of publication of the genus *Boldoa* "Catal. H. Madr. 1803" and ascribes the genus to Cavanilles. The writer has attempted to locate this publication, but can find no trace of it. Doctor Barnhart suggests that the catalogue may have been seen by Choisy in manuscript form, but never has been published. If such a publication was ever issued the name *Boldoa* must, of course, take precedence over *Salpianthus*.

This genus, as treated here, may be divided into two sections, that containing *S. purpurascens* and that containing the three other species. There is some ground for treating these groups as separate genera, but they do not seem to be of sufficient importance to warrant such treatment here.

KEY TO THE SPECIES.

Perianth campanulate, little longer than the fruit, green, 3 mm.

long or less; leaf blades broadly ovate 1. *S. purpurascens*.

Perianth tubular, much exceeding the fruit, more or less colored, about 5 mm. long; leaf blades lance-ovate.

Stems strongly flexuose, the branching being almost equally dichotomous; inflorescence dense and compact, 30 cm. broad; flowers in slender racemes 5 cm. long or less, numerous; leaves usually sessile 2. *S. aequalis*.

Stems straight, not strongly flexuose, the branches alternate but not dichotomous; inflorescence much narrower; flowers in very short, few-flowered racemes; leaves petioled.

^a DC. Prodr. 13²: 438. 1849.

Perianth densely villous, especially in the throat, the hairs, however, rather short; teeth of the perianth very broadly triangular; stems more or less villous above 3. *S. arenarius*.

Perianth only puberulent and slightly viscid; teeth much longer, triangular; stems only puberulent above. (Leaves greener.) 4. *S. macrodontus*.

1. *Salpianthus purpurascens* (Cav.) Hook. & Arn. Bot. Beech. Voy. 508. 1841.

Boldoa purpurascens Cav.; Lag. Gen. & Sp. Nov. 10. 1816.

Boldoa ovatifolia Lag. loc. cit.

Cryptocarpus globosus H. B. K. Nov. Gen. & Sp. 2: 187. pl. 123. 1817.

Boerhaavia rhomboidea Humb.; Spreng. Jahrb. Gewächsk. 1³: 66. 1818.

Boldoa paniculata Mart. & Gal. Bull. Acad. Sci. Brux. 10¹: 356. 1842.

Cryptocarpus rhomboideus Moq. in DC. Prodr. 13²: 88. 1849.

Type locality, "Cuba." Type collected by Boldo.

Specimens examined:

OAXACA: Valley of Oaxaca, alt. 1,530 to 1,630 meters, September 20, 1894, *Nelson* 1268; near Huajuapán, alt. 1,720 to 2,000 meters, November 16, 1894, *Nelson* 1971; Oaxaca Valley, alt. 1,530 meters, October 1, 1894, *C. L. Smith* 771; Valley of Oaxaca, November 1, 1894, *L. C. Smith* 276.

VERA CRUZ: Barranca de Santa María, vicinity of Zacuapán, November, 1906, *Purpus* 2271; Orizaba, 1853, *Müller* 4158.

JALISCO: Waste places near Tequila, October 5, 1893, *Pringle* 4594.

SINALOA: Culiacán, September 22, 1904, *Brandege*; Ymala, 1891, *Palmer* 1733.

PUEBLA: Tehuacán, December, 1841, *Liebmann*.

MICHOACAN or GUERRERO: Petatlan, November 15, 1898, *Langlassé* 640.

COLIMA: Manzanillo, December, 1890, *Palmer* 950.

GUATEMALA: El Rancho, Depart. Jalapa, January 20, 1908, *Kellerman* 8011.

Additional specimens cited by Hemsley: Tepic, *Barclay*; Cordillera of Oaxaca, alt. 1,530 meters, *Galeotti* 582; plains of Tehuacán, alt. 1,530 meters, *Galeotti* 378.

There is a possibility that Lagasca's two names represent different species, but there is nothing to indicate this. The species has the distinction of having appeared three times in De Candolle's Prodrômus, twice in the Allioniaceae in the genus *Boldoa*, and once on page 88 of the same volume as a member of the Chenopodiaceae.

2. *Salpianthus aequalis* Standley, sp. nov.

Plants 75 to 100 cm. high, forming clumps, woody below; stems stout, reddish, striate, strongly flexuose, almost equally dichotomous, sparingly puberulent below, densely subvillous above, the white hairs of the pubescence giving the stems a grayish appearance; leaf blades 65 mm. long or less, elliptic-lanceolate, narrowed at both ends, blunt at the apex, cuneate at the base, usually sessile, puberulent on both surfaces, much paler beneath than above; flowers in dichotomously branching racemes 5 cm. long or less, these collected in a dense cyme 30 cm. broad; flowers on slender pedicels 5 mm. long or less; perianth 5 mm. long, slightly expanded above, abundantly villous, the teeth triangular and much broader than long; fruit compressed-spherical, black and shining.

Type in the National Herbarium, no. 385686, collected on the Monte de Charnaco, Michoacan or Guerrero, at an altitude of 810 meters, March 5, 1898, by E. Langlassé (no. 18). There is another sheet of the same collection in the Gray Herbarium. The collector states that the flowers are white, while he calls those of *S. arenarius* rose. In the dried specimens there does not seem to be any marked difference in color. He also states that the common name of the plant is *catharina*.

The peculiar method of branching immediately distinguishes this from the other closely related species of the genus. In none of the specimens of the other species do

we find any approach to the dichotomous method of branching. Other distinguishing characteristics are the dense and ample inflorescence, paler lower surface of the leaf blades, long racemes of flowers, and sessile leaves.

3. *Salpianthus arenarius* Humb. & Bonpl. Pl. Aequin. 1: 138. pl. 44. 1808.

Boldoa lanceolata Lag. Gen. & Sp. Nov. 10. 1816.

Type locality, "In arenosis maritimis mare Pacifici ad Acapulcum."

Specimens examined:

JALISCO: Fields, Tuxpan, February, 1904, *Purpus* 509.

COLIMA: Colima, 1891, *Palmer* 1204; Acapulco, 1894-5, *Palmer* 195; Acapulco, *Beechey*.

MICHOACAN or GUERRERO: San Geronimito, April 1, 1899, *Langlassé* 728; Las Salinas, alt. 5 meters, May 9, 1898, *Langlassé* 153.

OAXACA: Cañada, oberh. Totolapam, January 3, 1896, *Caec. & Ed. Seler* 1703; Tehuantepec, 1910, *Orcutt* 3291.

OF INDEFINITE LOCALITY: Pinotepa á lac de Tututepeque, *Galeotti* 586.

Langlassé, in connection with one of the specimens cited above, states that the common name of the plant is *susucua* and that it is used as a remedy for the sting of scorpions.

4. *Salpianthus macrodontus* Standley, sp. nov.

Stems 1 to 2 meters high, single or clustered, bright green, striate, much branched, usually herbaceous throughout, but often persisting for more than a year, finely puberulent throughout, rather more densely so above; leaf blades ovate or lance-ovate, 5 cm. long or usually less, acute, attenuate at the base to the slender petiole, bright green, puberulent on both surfaces; petioles half as long as the blades or less; inflorescence cymose or rarely racemose at the ends of the branches, loose and open, leafy; perianth 7 or 8 mm. long, slightly expanded above, purplish, becoming brown in age, puberulent; pedicels 2 mm. long or less; teeth of the perianth triangular, longer than broad, acute, whitish, thin and scarious, slightly puberulent like the rest of the perianth; stamens exerted about 5 or 6 mm.; fruit compressed-spherical, glabrous, black and shining.

Type in the U. S. National Herbarium, no. 636584, collected on cliffs along the sea near the signal station at Mazatlan, March 31, 1910, by *Rose, Standley & Russell* (no. 13752).

From the nearly related *S. arenarius* this species differs in having the teeth of the perianth twice as long, more acute, and not villous, the stems and leaves less pubescent, the leaves greener and more acute, and the petioles longer and more slender. The two species seem to have quite distinct ranges, the proposed species occurring to the north near the coasts of Sinaloa and Sonora, while *S. arenarius* occurs farther south.

Other specimens examined:

SINALOA: Vicinity of Culiacan, September 22, 1904, *Brandege*; Ymala, 1891, *Palmer* 1722; moist field near Villa Union, April 2, 1910, *Rose, Standley & Russell* 13959; sandy soil along river at Fuerte, March 27, 1910, *Rose, Standley & Russell* 13672; along an arroyo near San Blas, March 22, 1910, *Rose, Standley & Russell* 13212; dry hills, Culiacan, April 21, 1910, *Rose, Standley & Russell* 14945.

SONORA: Alamos, September, 1890, *Palmer* 310 and 720; vicinity of Alamos, March 16, 1910, *Rose, Standley & Russell* 12905; about 5 miles below Minas Nuevas, March 12, 1910, *Rose, Standley & Russell* 12689.

At San Blas, Sinaloa, the common name of the plant was given as *guayavilla*; this is said to be applied because the odor of the plant is similar to that of the cultivated "guayava." At Alamos the stems were seen used for the walls of the huts of some of the natives.

The plant seems to be common from Alamos, Sonora, south to Villa Union, Sinaloa, but was not observed farther south. It grows under various conditions, sometimes on dry hills, again in river valleys, sometimes along arroyos, or even in wet fields.

6. COLIGNONIA Endl.

Colignonia Endl. Gen. Pl. 311. 1837.

Type species, *Abronia parviflora* H. B. K.

A genus of four or five species, all South American. It has not been reported from North America before.

1. *Colignonia parviflora* (H. B. K.) Endl. Gen. Pl. 311. 1837.

Abronia parviflora H. B. K. Nov. Gen. & Sp. 2: 216. 1817.

Tricratus parviflorus Spreng. Syst. Veg. 1: 536.

Type locality, "Locis scopulosis in dorso Andium Popayensium prope Querchu."

Specimen examined:

PANAMA: Hayes.

7. BOUGAINVILLEA Commers.

Bougainvillea Commers.; Juss. Gen. 91. 1789.

Josepha Vell. Fl. Flum. 154. 1825.

Type species, *Bougainvillea spectabilis* Willd.

KEY TO THE SPECIES.

Stems and petioles, often the leaf blades, glandular-pubescent.....1. *B. spectabilis*.
Stems and petioles, as well as the leaf blades, glabrous or nearly so...2. *B. glabra*.

1. *Bougainvillea spectabilis* Willd. Sp. Pl. 2: 348. 1798.

Tricycla spectabilis Poir. Encycl. Suppl. 5: 358. 1817.

Bougainvillea bracteata Pers. Syn. Pl. 1: 418. 1805.

Bougainvillea brasiliensis Wied-Neuw. Reis. Bras. 1: 44. 1820.

Josepha augusta Vell. Fl. Flum. 154. 1825.

Bougainvillea virescens Choisy in DC. Prodr. 13²: 437. 1849.

Type locality, "In Brasilia."

Specimens examined:

MEXICO: City of Mexico, winter of 1892-3, Mrs. D. H. Sheldon.

SONORA: Cultivated at Hermosillo, March 9, 1910, Rose, Standley & Russell 12548.

HONDURAS: Ruatan Island, Bay of Honduras, 1886, Gaumer 134.

SALVADOR: Renson 113.

GUATEMALA: Sombrerito, Depart. Santa Rosa, alt. 1,250 meters, March, 1894.

Heyde & Lux 6370.

One of the handsomest of cultivated plants, this is perhaps the most common ornamental in Mexico. It decorates the *patios* of the poorest houses as well as those of the most elaborate ones. It is not native in any part of Mexico but may possibly be so in parts of Central America.

2. *Bougainvillea glabra* Choisy in DC. Prodr. 13²: 437. 1849.

Bougainvillea spectabilis glabra Hook. Curtis's Bot. Mag. pl. 4810. 1854.

Bougainvillea rubicunda Schott; Rohrb. in Mart. Fl. Bras. 14²: 351. 1872.

Type locality, "In locis elevatis prov. Rio de Janeiro," Brazil. Type collected by Gaudichaud (no. 423).

Specimens examined:

YUCATAN: 1896, Valdez 9.

SALVADOR: Santa Ana, Depart. Santa Ana, alt. 650 meters, November, 1892,

Shannon 5002.

GUATEMALA: Sepacuité, December 12, 1904, Goll 152.

The glabrous *Bougainvillea* perhaps hardly deserves specific rank. It is impossible to draw any sharp line between the two forms. Like *B. spectabilis* it is not a native of any part of North America, unless it is the southernmost region, but it is widely cultivated and sometimes seems to have escaped.

8. TRIPTEROCALYX Hook.

Tripterocalyx Hook. Journ. Bot. Kew Misc. 5: 261. 1853.

Cycloptera Nutt.; A. Gray, Amer. Journ. Sci. II. 15: 319. 1853, not Endl. 1841.

Apaloptera Nutt.; A. Gray, loc. cit.

Type species, *Abronia micrantha* Torr.

1. *Tripterocalyx cyclopterus* (A. Gray) Standley, Contr. Nat. Herb. 12: 329. 1909.

Abronia cycloptera A. Gray, Amer. Journ. Sci. II. 15: 319. 1853, excluding synonyms.

Abronia carnea Greene, Pittonia 3: 343. 1898.

Type locality, "On the Rio Grande, New Mexico." Type collected by Charles Wright (no. 1712).

Specimens examined:

CHIHUAHUA: Sandhills near Paso del Norte (Ciudad Juárez), 1885, Pringle 75; Sabinal, Sierra Madre, alt. 1,290 meters, September 29, 1903, Jones.

9. ABRONIA Juss.

Abronia Juss. Gen. 448. 1789.

Tricratus L'Her.; Willd. Sp. Pl. 1: 807. 1799.

Type species, *Abronia umbellata* Lam.

The *Abronias* are known in Mexico under the names of *alfombrilla de los arenales* and *alfombrilla de la playa*. The roots of *A. maritima* are said to be eaten sometimes by the Indians.

KEY TO THE SPECIES.

- Stems erect or strongly ascending; perianth greenish white. 1. *A. fendleri*.
 Stems prostrate or merely ascending; perianth purplish red.
 Flowers of a deep, dark red; fruit strongly coriaceous. 2. *A. maritima*.
 Flowers much paler, purplish red; fruit with thin walls and wings.
 Anthocarp not winged but 5-lobed. 3. *A. torreyi*.
 Anthocarp 5-winged.
 Wings of the fruit much narrowed below, the body strongly ribbed or pitted; leaf blades not sinuate-margined. 4. *A. villosa*.
 Wings of the fruit slightly if at all narrowed below, the body smaller and not ribbed or pitted; leaf blades more or less sinuate.
 Leaf blades only slightly sinuate; plant stout; fruit 10 to 12 mm. long, its wings thin. . . . 5. *A. platyphylla*.
 Leaf blades strongly sinuate, narrower; fruit 7 mm. long or less, its wings comparatively thick. . . 6. *A. gracilis*.

1. *Abronia fendleri* Standley, Contr. Nat. Herb. 12: 324. pl. 43. 1909.

Type locality, "Santa Fe, New Mexico." Type collected in 1847, Fendler 739.

Specimens examined:

CHIHUAHUA: On sandhills near Paso del Norte (Ciudad Juárez), September 20, 1886, Pringle 794.

As stated when the species was published, the plants from the southern part of the Rio Grande Valley are not typical *fendleri* and may be specifically distinct. The

southern form is marked by its more erect, less branched habit, yellowish green leaves, more strongly pubescent stem, and narrower and firmer fruit. The plants are common upon the sandy mesas bordering the Rio Grande Valley in this region, but do not occur in the valley itself. They spring up in late summer after the rains, seldom or never becoming diffuse and spreading like the more northern plant.

2. *Abronia maritima* Nutt.; S. Wats. in Brewer & Wats. Bot. Cal. 2: 4. 1880.

Type locality, "On the sea coast from Santa Barbara to San Diego," California.

Specimens examined:

BAJA CALIFORNIA: All Saints Bay, May 15, 1885, *Greene*; San Martin Island, 1889, *Pond*; San Quentin Bay, February, 1889, *Palmer* 721; Socorro, May 7, 1886, *Orcutt*; without locality, *Diquet*; Cape San Quentin, May 10, 1885, *Greene*; La Playa de Santo Tomás, July 17, 1885, *Orcutt*; San Bartólome Bay, 1911, *Rose* 223; San Joséf, 1911, *Rose* 559.

SONORA: Near Guaymas, February 22, 1904, *Palmer* 1210.

SINALOA: Altata, April 18, 1910, *Rose, Standley & Russell* 14836; Altata, June 15, 1897, *Rose* 1347.

TEPIC: Maria Magdalena Island, May 28, 1897, *Maltby* 174.

The type of this species is not to be found in the herbarium of the Philadelphia Academy of Science, at least no specimen of the plant accessible to Nuttall is there. There is however, a specimen of *Hesperonia californica* from "St. Barbara, prope maris, N. Calif.," given, in Nuttall's handwriting, the specific name of *maritima* and referred to the genus *Calymenia*. Is it possible that Doctor Watson misunderstood Nuttall's application of the name *maritima* and referred it wrongly to the genus *Abronia*?

3. *Abronia torreyi* Standley, Contr. Nat. Herb. 12: 319. pl. 38. 1909.

Type locality, "Mesilla, Donna Ana County, New Mexico." Type collected by E. O. Wooton in 1897 (no. 11).

Specimens examined:

CHIHUAHUA: Sandy soil, Rio Grande Valley, Juárez, alt. 2,310 meters, May 5, 1901, *Pringle* 9465; sandhills near Paso del Norte (Ciudad Juárez), May 5, 1885, *Pringle* 77; sandhills below El Paso (Ciudad Juárez), 1846, *Wislizenus* 93; Ciudad Juárez, 1905, *Purpus*.

4. *Abronia villosa* S. Wats. Amer. Nat. 7: 302. 1873.

Type locality, "Arizona."

Specimens examined:

SONORA: Mesa near La Grulla, January 3, 1904, *MacDougal*.

5. *Abronia platyphylla* Standley, Contr. Nat. Herb. 12: 314. pl. 33. 1909.

Type locality, "Del Mar, California." Type collected by T. S. Brandege, May 12, 1894.

Specimens examined:

BAJA CALIFORNIA: Los Angeles Bay, 1887, *Palmer* 604; San Quentin Bay, February, 1889, *Palmer* 735.

6. *Abronia gracilis* Benth. Bot. Voy. Sulph. 44. 1844.

Type locality, "Bay of Magdalena," Baja California.

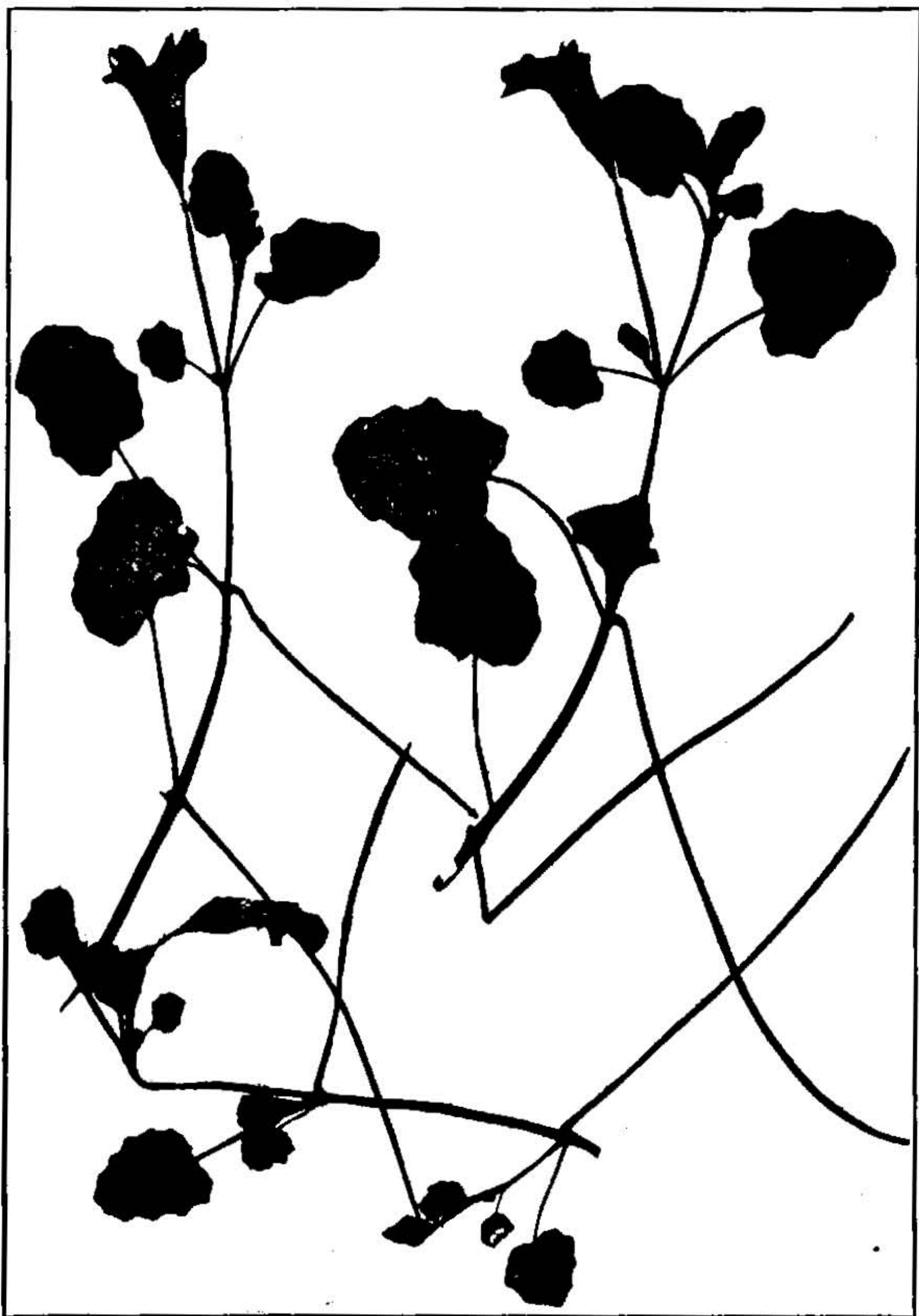
Specimens examined:

BAJA CALIFORNIA: Sandy plains, Calmalli, 1898, *Purpus* 81; San Bartólome Bay, 1889, *Pond*; Magdalena Island, 1889, *Brandegee*; Abrejos Point, 1876, *Streets*; San Ramon, 1886, *Orcutt*; Magdalena Bay, *Bryant*; Magdalena Island, 1911, *Rose* 315; San Bartólome Bay, 1911, *Rose* 198.

10. OKENIA Schlecht. & Cham.

Okenia Schlecht. & Cham. *Linnaea* 5: 92. 1830.

Type species, *Okenia hypogaea* Schlecht. & Cham.



OKENIA GRANDIFLORA STANDLEY.

KEY TO THE SPECIES.

- Perianth about 55 mm. long..... 1. *O. grandiflora*.
 Perianth 35 mm. long or less.
 Leaves strongly undulate, very unequal at the base; lobes of the
 perianth deeply cleft..... 2. *O. hypogaea*.
 Leaves entire, equal at the base; lobes of the perianth shallowly
 retuse..... 3. *O. rosei*.

1. *Okenia grandiflora* Standley, sp. nov.

PLATE 76.

Stems stout, viscid-villous, the internodes 5 to 8 cm. long; leaf blades oblong or oblong-ovate, 17 to 52 mm. long, 17 to 45 mm. wide, thin, rounded or obtuse at the apex, unequal and truncate or subcordate at the base, with strongly undulate margins, glabrous or sparingly pilose above, villous beneath along the veins, the opposite leaves strongly unequal; petioles stout, 20 to 60 mm. long, densely villous and viscid; involucre of 3 triangular-ovate bracts 3 mm. long, very viscid and villous; perianth 55 mm. long, the limb 40 mm. wide, the tube very narrow at the base but soon widening above, the limb rather deeply lobed, sparingly villous without; stamens about 15, unequal, strongly curved upward; peduncles 55 to 60 mm. long at anthesis, soon lengthening to 20 cm. or more, stout, strongly villous; fruit not seen.

Type in the Gray Herbarium, collected by Mr. C. G. Pringle in the barranca of Tequila, in the State of Jalisco, July 4, 1893 (no. 5444). Apparently the plant was not obtained in quantity, for this collection has not been seen in any other herbarium. In addition to being strikingly different in the size of its flowers and less obtrusively in some minor particulars, such as the number of stamens, this plant occurs in a very different habitat from that of *O. hypogaea*, the latter being invariably maritime.

The photograph is of the type specimen.

2. *Okenia hypogaea* Schlecht. & Cham. *Linnæa* 5: 92. 1830.

PLATE 75, A.

Type locality, "In collibus arenosis prope Vera Cruz." Type collected by Schiede and Deppe (no. 107).

Specimens examined:

OAXACA: Chiltepec, 1890, *Rovirosa* 726.

VERA CRUZ: Type collection in the Bernhardt Herbarium of the Missouri Botanical Garden; 1910, *Orcutt* 3293.

COLIMA: Acapulco, 1895, *Palmer* 490; Colima, 1897, *Palmer* 39 and 40.

SINALOA: Altata, September 2, 1904, *Brandege*; sand dunes along the beach north of Mazatlan, April 4, 1910, *Rose, Standley & Russell* 14006.

Although first collected so long ago, no member of the Allioniaceae has been so little collected or is so poorly represented in collections. In some of the larger herbaria no material at all is to be found. In general appearance specimens simulate *Wedeliella*, and possibly they have been neglected by collectors who confused them with these common plants.

The writer has examined a specimen of the type collection in the herbarium of the Missouri Botanical Garden. It accords well with specimens collected along the coast in various parts of Mexico. Unfortunately, no fruit is present. Because of the peculiar fruiting habit of the genus, exactly like that of the peanut, the fruit is usually left underground when the plants are pulled up. The authors of the genus seem to have had fruit, for they describe it as having ten longitudinal ribs. If this statement is true; the plant of the Pacific beaches is different from that found on the eastern coast, for its fruit is smooth. Doctor Heimerl states that he has seen no fruit of the genus in any European herbarium.

In April, 1910, the writer found one or two growing plants on the dunes of pure sand that line the coast north of Mazatlan, Sinaloa. These were merely individuals that had persisted from the previous season, the plant being an annual. The dead

branches were found everywhere in the greatest abundance, often reaching a length of two meters and subdividing profusely. By digging down in the sand to a depth of 6 inches or more large numbers of the fruits were found. These are about 12 mm. long, brown, and smooth. The seed is oblong, about 7 mm. long, surrounded by a thick, spongy pericarp. The fruits and seeds shown in the plate (facing p. 388) were photographed from specimens obtained at Mazatlan.

Seeds were brought to Washington and planted with successful results. The plants bloomed in about four weeks from the time of sowing. The young plants show a cruciform method of branching; their stems and leaves are very viscid. The peduncles at first are short but elongate rapidly, turn downward, and penetrate the sand to a depth of several inches. The flowers are rather handsome, their size sufficient to make them conspicuous, but the plants are not adapted to use as ornamentals because they soon lose their leaves and become mats of coarse, awkward stems.

Besides the specimens cited from Mexico I have seen a collection from the coast of southern Florida, a notable extension of range. The species should be found on some of the islands of the West Indies, but so far it has not been reported.

3. *Okenia rosei* Standley, sp. nov.

Annual with prostrate, spreading stems; these slender, densely viscid and villous; leaf blades ovate to oblong, entire, truncate or rounded and equal at the base, rounded at the apex, of about the same color on both surfaces, pubescent to puberulent above and below; opposite leaves very unequal, the larger 20 to 32 mm. long and 13 to 22 mm. wide, the smaller ones about 10 mm. long and 8 mm. wide; petioles of larger blades 8 to 15 mm. long; peduncles at anthesis about 15 mm. long, but soon lengthening to 10 to 15 cm.; bracts lanceolate, 3 mm. long, with subulate tips, villous; perianth about 25 mm. long, very slender at the base for about 9 mm., then becoming much thicker and soon expanding into a limb 18 mm. in diameter, this 5-lobed, the lobes broadly oblong, shallowly retuse; perianth villous without; stamens about 9, unequal.

Type in the U. S. National Herbarium, no. 301784, collected by J. N. Rose at Bolaños, in the State of Jalisco, September 10 to 19, 1897 (no. 2845). The plant is closely related to *O. hypogaea*, but that is maritime, while this grows far inland. The leaves are entire instead of strongly undulate and are not extremely unequal at the base as in that species; the lobes of the perianth are only shallowly retuse instead of deeply cleft.

11. SELINOCARPUS A. Gray.

Selinocarpus A. Gray, Amer. Journ. Sci. II. 15: 262. 1853.

Type species, *Selinocarpus diffusus* A. Gray.

KEY TO THE SPECIES.

Leaves broadly ovate. (Perianth less than 10 mm. long)..... 1. *S. chenopodioides*.

Leaves linear or nearly so.

Perianth 10 mm. long or less, with scarcely any tube..... 2. *S. angustifolius*.

Perianth about 15 mm. long, with a conspicuous tube..... 3. *S. palmeri*.

1. *Selinocarpus chenopodioides* A. Gray, Amer. Journ. Sci. II. 15: 262. 1853.

Type locality, "Valleys from Providence Creek to the Rio Grande," Texas. Type collected by Charles Wright (no. 1707).

Specimens examined:

CHIHUAHUA: Dry calcareous bluffs, Ciudad Juárez, alt. 1,130 meters, September 26, 1902, *Pringle* 11143; plains near Chihuahua, August 18, 1885, *Pringle* 652; Santa Eulalia plains, August 18, 1885, *Wilkinson*.

2. *Selinocarpus angustifolius* Torr. Bot. Mex. Bound. 170. 1858.

Type locality, "Gravelly table land near Presidio del Norte," Texas.

Specimens examined:

COAHUILA: San Lorenzo de Laguna, 1880, *Palmer* 1119; Viesca, 1905, *Purpus* 1054; Mesillas near Saltillo, 1848, *Gregg* 535.

3. *Selinocarpus palmeri* Hemsl. Biol. Centr. Amer. Bot. 3: 6. 1882.

Type locality, "North Mexico, San Lorenzo de Laguna, Coahuila." Type collected by Dr. Edward Palmer in 1880 (no. 1118).

Only the type collection has been seen.

12. *WEDELIELLA* Cockerell.

Wedeliella Cockerell, *Torreyia* 9: 167. 1909.

Allionia L. Syst. ed. 10. 890. 1759, in part.

Wedelia Loefl.; Kuntze, Rev. Gen. Pl. 533. 1891, not *Wedelia* Jacq. 1760.

Type species, *Allionia incarnata* L.

KEY TO THE SPECIES.

- Involucre not viscid; perianth usually white (scarcely exceeding the involucre); teeth of the anthocarp very slender, 5 or 6 in each row; annual..... 1. *W. glabra*.
- Involucre densely viscid; perianth purplish red; teeth of the anthocarp stouter and broader, usually fewer; perennials.
- Perianth 11 to 13 mm. long (more than twice as long as the involucre); plant stout and densely viscid throughout; leaf blades densely pubescent on both surfaces..... 2a. *W. incarnata villosa*.
- Perianth less than 10 mm. long; plants more slender and less densely viscid; leaf blades often glabrous..... 2. *W. incarnata*.

1. *Wedeliella glabra* (Choisy) Cockerell, *Torreyia* 9: 167. 1909.

Allionia incarnata glabra Choisy in DC. Prodr. 13²: 435. 1849.

Wedelia glabra Standley, Contr. Nat. Herb. 12: 332. 1909.

Type locality, "Circa Mexicum." Type collected by Berlandier (no. 577).

Specimens examined:

MEXICO: Type collection; Chapultepec, September 21, 1869, *Bilimek* 167; Valley of Mexico, Guadalupe, June, 1865-6, *Bourgeau* 293; Guadalupe, July 18, 1867, *Bilimek* 167a.

AGUASCALIENTES: Near Aguascalientes, October 9, 1903, *Rose & Painter* 7733.

ZACATECAS: Near San Juan Capistrano, August 19, 1897, *Rose* 2438 and 3539.

SAN LUIS POTOSÍ: San Luis Potosí, 1879, *Schaffner* 175, 562; Media Luna near Rio Verde, June, 1904, *Palmer* 73.

OAXACA: De Matatlan á Tlacolula, alt. 1,600 meters, June, 1906, *Conzatti* 1468.

PUEBLA: Tlacuiloltepec, alt. 1,800 to 2,100 meters, August, 1909, *Purpus* 4008; Santa Lucia near San Luis Tultitlanapa, June, 1908, *Purpus* 3372; ? near Tehuacán, 1905, *Rose, Painter & Rose* 10165; Tehuacán, August 9, 1910, *Hitchcock*.

TAMAULIPAS: Vicinity of Victoria, 1907, *Palmer* 378.

COAHUILA: Near Saltillo, 1848, *Gregg* 466, 484; Saltillo, July 10 to 14, 1910, *Hitchcock*.

Possibly more than a single species is represented by the specimens listed, but the forms are very difficult of separation.

2. *Wedeliella incarnata* (L.) Cockerell, *Torreyia* 9: 167. 1909.

Allionia incarnata L. Syst. ed. 10. 890. 1759.

Allionia malacoides Benth. Bot. Voy. Sulphur 44. 1844.

Wedelia incarnata Kuntze, Rev. Gen. Pl. 533. 1891.

Type locality, "Juxta Cumana urbem, in silvis arenosis," Venezuela.

Specimens examined:

DURANGO: Durango and vicinity, 1896, *Palmer* 595; barren hills about Tlahualilo, alt. 1,000 meters, August 27, 1905, *Pittier* 486.

CHIHUAHUA: Vicinity of Chihuahua, alt. 1,300 meters, May, 1908, *Palmer* 194; Santa Eulalia Plains, July 24, 1885, *Wilkinson*; near Chihuahua, 1886, *Pringle* 1062.

COAHUILA: Saltillo and vicinity, April, 1898, *Palmer* 811; near Saltillo, November, 1902, *Palmer* 288.

TAMAULIPAS: Nuevo Laredo, September 28, 1897, *Rose* 3078.

SONORA: MacDougal Crater, Pinacate Mountains, November 14, 1907, *MacDougal* 30; rocky hill near Hermosillo, March 4, 1910, *Rose, Standley & Russell* 12353.

BAJA CALIFORNIA: Signal Mountain, May 6, 1894, *Schoenfeldt* 2952; Los Angeles Bay, 1887, *Palmer* 100; Cucopa Mountains, April 5, 1905, *MacDougal* 144; Agua Verde, 1911, *Rose* 916.

NUEVO LEÓN: Monterey, June 6 to 8, 1910, *Hitchcock*.

Allionia malacoides was described from specimens collected at Magdalena Bay in Baja California and it is not improbable that it is either specifically or subspecifically, distinct. The disposition of the specimens listed here is far from satisfactory to the author. It is certain that more than one form is represented, but with the material at hand it seems impossible to distinguish them definitely. Some of the plants have small, thick leaves, while others have larger, thinner ones. The fruit is variable in color and in form, especially in the number, shape, and size of the teeth. The size of the perianth varies considerably.

In Coahuila and San Luis Potosí the plant is known under the names of *yerba de la hormiga*, *yerba de buendia*, and *yerba del golpe*. The dried plants are sold in the markets of some of the cities to be used in the form of a hot decoction for the cure of diarrhoea.

2a. *Wedeliella incarnata villosa* (Standley) Cockerell, *Torreyia* 9: 167. 1909.

Wedelia incarnata villosa Standley, *Contr. Nat. Herb.* 12: 333. 1909.

Type locality, "Mesas and foothills in Arizona." Type collected in 1881 by C. G. Pringle.

Specimens examined:

CHIHUAHUA: Mexican Boundary line near Whitewater, June 18, 1892, *Mearns* 361; same locality, June 20, 1892, *Mearns* 368.

13. NYCTAGINIA Choisy.

Nyctaginia Choisy in DC. *Prodr.* 13²: 429. 1849.

Type species, *Nyctaginia capitata* Choisy.

A genus of two species, only one of which is known from Mexico.

1. *Nyctaginia capitata* Choisy in DC. *Prodr.* 13²: 429. 1849.

Boerhaavia aggregata Pavon; Choisy, loc. cit., as synonym.

Boerhaavia capitata Heimerl, *Jahresb. Oberrealsch. Fünfhaus* 23: repr. 28. 1897.

Type locality, "In Texas apud S.-Antonio de Biscar." Type collected by Berlandier.

Specimens examined:

CHIHUAHUA: Gallejo Springs between El Paso and Chihuahua, 1846, *Wislizenus* 111.

COAHUILA: Saltillo, 1848, *Gregg*; vicinity of Saltillo, June, 1898, *Palmer* 202; near Saltillo, November, 1902, *Palmer* 280; Sabinas, May 21, 1902, *Nelson* 6761.

NUEVO LEÓN: Monterey, *Edwards*.

DURANGO: Mapimi, October, 1898, *Palmer* 545; Santiago Papasquiario, 1896, *Palmer* 447; Papasquiario, August 7, 1898, *Nelson* 4668; El Oro, August 15, 1898, *Nelson*.

INDEFINITE LOCALITY: Cienega Grande east of Camargo, May 18, *Gregg* 264.

In very young specimens the flowers are cleistogamous and the heads on short peduncles in the axils of the lowest leaves, giving the plants a very different appearance from that usual later in the season.

The large fleshy roots are sliced and dried and used as a remedy for wind colic. About Saltillo the plant is known as *yerba blanca*.

14. ALLIONIA L.

Allionia L. Syst. Nat. ed. 10. 890. 1759.

Vitmania Turra; Cav. Icon. Pl. 3: 53. 1794, not *Vitmannia* Vahl. 1794.

Oxybaphus L'Her.; Willd. Sp. Pl. 1: 185. 1797.

Calyxhymenia Orteg. Hort. Matr. Dec. 5. 1797.

Calymenia Pers. Syn. Pl. 1: 36. 1805.

Mirabilis Heimerl in Engl. & Prantl, Pflanzenfam. 3^{1b}: 24. 1894, in part, not L.

Type species, *Allionia violacea* L.

The genus as published by Linnaeus consisted of two species, *violacea* and *incarnata*, the former cited first. The latter is the type of the genus *Wedeliella*. The genus *Allionia* was published without a specific combination by Loeffling in 1758. The plant described by that author was the one to which Linnaeus gave the name of *Allionia violacea*. Since Loeffling's description may not be readily accessible to all who may wish to consult it, it is reproduced here, as follows:

Allionia Loeffl. Iter Hisp. 181. 1758.

Radix

Caulis herbaceus, erectus, debilis, ramosus.

Folia opposita, cordata, acuta, integerrima, glabra, inferiora longe petiolata.

Flores in panicula ramosa, terminales, bracteolis brevibus.

Corolla majuscula purpureo-caerulea. (Hinc facie recedit a superiori planta,^a ut & corollae magnitudine.)

CAL. *Involucrum* commune monophyllum, laxum, quinquefidum: laciniis ovato-acutis, paulo inaequalibus, divisura una usque ad basin sectum, persistens.

Perianthium proprium nullum.

COR. aggregata triflora, aequalis, *propria* infundibuliformis s. obconica: ore erecto, quinquefido: laciniis exterioribus paulo longioribus.

STAM. *Filamenta* quatuor, setacea, corolla longiora ad unum latus flexa. *Antherae* subrotunda.

PIST. sing. *Germen* sub corollula, oblongum, obsolete octangulum, *Stylus* setaceus staminibus longior, *Stigma* multifidum, lineare.

PER. nullum.

SEM. solitaria, oblonga, quinquangula, tuberculis undique inaequalia, nuda.

A praecedente^a imprimis differt calyce & partim corolla.

Cumanensibus Jasminullo.

It has been doubted by some whether this description really refers to a plant of the Allioniaceae, on account of the phrase in the description of the involucre, "*divisura una usque ad basin sectum*." So far as we know this is true of no *Allionia*. However, it sometimes happens that one of the divisions of the involucre is more deeply cut than the others, and in the pressing of specimens the involucre might be torn so as to produce the effect described. Otherwise the diagnosis exactly fits the so-called *Allionia violacea*, and, so far as we know, no other plant.

Hemsley listed from our region nine species of the genus *Oxybaphus*: *aggregatus*, *angustifolius*, *cervantesii*, *cordifolius*, *glabrifolius*, *ovatus*, *violaceus*, *wrightii*, and *viscosus*. Four of these are listed here under the same specific names. *Oxybaphus angustifolius* is a synonym of *Allionia linearis*; *O. cervantesii*, *O. cordifolius*, and *O. ovatus* were probably wrong identifications; *O. wrightii* is *Allioniella oxybaphoides*.

^a *Wedelia* Loeffl.

In the present paper twenty-four species and subspecies are included, some of them additions of older species due to more extended exploration of the field, but most of them species described since the appearance of the *Biologia Centrali-Americana*, or new species first published in this paper.

The genus is well represented in Mexico, the number of species being only slightly less than that found in the United States. The species are most abundant in the northeastern part of the Republic, especially in the States of Chihuahua, Sonora, and Coahuila. In the extreme southern part and in Central America but two forms are known to occur, the rather cosmopolitan tropical species, *Allionia violacea* and *A. viscosa*. None of the species have been reported from the west side of the Sierra Madre.

KEY TO THE SPECIES.

- Perianth scarlet, with a conspicuous tube, bilobate. (Leaves linear)..... 1. *A. coccinea*.
- Perianth not scarlet, campanulate, not bilobate.
- Anthocarp glabrous.
- Leaves linear or linear-lanceolate.
- Stems and leaves glabrous..... 11. *A. glabra recedens*.
- Stems densely pilose-viscid above; leaves ciliate or pilose-viscid..... 12. *A. gausapoides*.
- Leaves not linear nor linear-lanceolate.
- Plants more than 1 meter high, much branched; stems pubescent throughout.
- Involucres 1-flowered; stems and leaves viscid; uppermost leaves conspicuously petioled..... 2. *A. viscosa*.
- Involucres 2 or 3-flowered; stems and leaves puberulent but not viscid; uppermost leaves almost sessile..... 3. *A. rotata*.
- Plants much lower and less branched; stems glabrous, at least below.
- Plants very slender, lax (stems often decumbent); leaves very thin, bright green, not fleshy.
- Leaf blades ovate, acute; stems without gland-tipped hairs..... 4. *A. violacea*.
- Leaf blades lance-ovate, obtuse; stems with numerous gland-tipped hairs above..... 5. *A. mollis*.
- Plants with stout, erect stems; leaves usually thick and fleshy, often glaucous.
- Involucres usually 3-flowered.
- Leaf blades 40 to 70 mm. long, cordate; inflorescence naked, corymbose..... 6. *A. cardiophylla*.
- Leaf blades 35 mm. long or less, truncate at the base; inflorescence leafy, irregularly paniced..... 7. *A. deltoidea*.
- Involucres 1-flowered.
- Inflorescence paniculate..... 8. *A. texensis*.
- Inflorescence corymbose.
- Leaf blades narrowly lanceolate, 3 times as long as broad; involucres 4 mm. high or less..... 9. *A. microchlamydea*.

Leaf blades lance-ovate, twice
as long as broad or less;
involucres about 6 mm.
high..... 10. *A. corymbosa*.

Anthocarp not glabrous.

Leaves linear or narrowly linear-lanceolate.

Leaves distinctly petioled, comparatively thin.. 13. *A. divaricata*.

Leaves sessile, thick and fleshy..... 14. *A. linearis*.

Leaves lanceolate or wider.

Inflorescence mostly axillary.

Stems hirsute..... 15. *A. aggregata*.

Stems viscid, not hirsute..... 16. *A. brandegei*.

Inflorescence terminal.

None of the leaves conspicuously petioled.

Plant stout; leaves linear-lanceolate, 55
mm. long and 17 mm. wide or less;
lobes of the involucre elliptic or
ovate, obtuse..... 17. *A. pseudaggregata*.

Plant smaller and more slender; leaves
linear-lanceolate, 27 mm. long
and 5 mm. wide or less; lobes of
the involucre lanceolate or ellip-
tic, acute..... 18. *A. trichodonta*.

All leaves except the uppermost conspicu-
ously petioled.

Stems more or less pubescent through-
out, densely so above.

Stems viscid-puberulent below..... 19. *A. coahuilensis*.

Stems subhirsute below..... 20. *A. greggii*.

Stems glabrous at least below.

Stems woody below (hispid above;
ribs of the fruit broad and
smooth)..... 21. *A. suffruticosa*.

Stems herbaceous throughout.

Involucres glabrate in age,
usually 1-flowered, 6 to
11 mm. high; ribs of the
fruit broad and smooth.. 22. *A. foliosa*.

Involucres densely viscid, 3-
flowered, about 6 mm.
high; ribs of the fruit
narrow and tuberculate.. 23. *A. melanotricha*.

1. *Allionia coccinea* (Torr.) Standley, Contr. Nat. Herb. 12: 339. 1909.

Oxybaphus coccineus Torr. Bot. Mex. Bound. 169. 1859.

Mirabilis coccinea Benth. & Hook. Gen. Pl. 3: 3. 1880.

Allionia linearis coccinea Jones, Contr. Western Bot. 10: 51. 1902.

TYPE LOCALITY: "Hill-sides, Copper Mines," New Mexico. Type collected by Charles Wright, no. 1723.

Specimens examined;

SONORA: San José Mountains, 1893, *Mearns* 1757; Santa Cruz Mountains, *Capt. E. K. Smith*.

This is so different from other species of the genus as to appear almost anomalous, which accounts for the fact that it has long been considered to belong to another genus, *Mirabilis*. It can not well be placed there, however, because it has 2 or 3

flowers in each involucre and the fruit is very prominently 5-lobed. The anthocarp differs decidedly from that of other species of *Allionia*, the ribs being much thicker, the intervening angles more acute, and the ribs of different shape. Because of its peculiarities Dr. Heimerl placed the species in a separate section of *Mirabilis* which he named *Mirabilopsis*. Another character, which seems not to have been noticed before, is that the perianth is bilabiate. By some these differences, taken with the characteristic coloring of the perianth, might be considered the basis for generic segregation. The plant, however, in habit and general appearance so closely simulates other species of the genus that it seems much better to leave it in *Allionia*.

2. *Allionia viscosa* (Cav.) Kuntze, Rev. Gen. Pl. 533. 1891.

Mirabilis viscosa Cav. Icon. Pl. 1: 13. pl. 19. 1791.

Calyxhymenia viscosa Orteg. Hort. Matr. Dec. 1: 6. 1797.

Calymenia viscosa Pers. Syn. Pl. 1: 36. 1805.

Vitmania viscosa Turra; Steud. Nom. Bot. 140. 1821, as synonym.

Oxybaphus viscosus L'Her.; Choisy in DC. Prodr. 13²: 430. 1849.

Type locality, "In Urbe Huanuco Imperii Peruani."

Specimens examined:

CHIHUAHUA: Hacienda de San Miguel, September, 1885, *Palmer* 233.

TAMAULIPAS: Vicinity of Victoria, 1907, *Palmer* 179.

JALISCO: Bolānos, September, 1897, *Rose* 2902.

GUANAJUATO: Guanajuato, December 9, 1898, *Deam* 173.

ZACATECAS: Zacatecas, October 3 and 4, 1910, *Hitchcock*.

OAXACA: Near Tamazulapam, alt. 2,000 to 2,150 meters, November 16, 1894, *Nelson* 1956; El Parian-Etla, November, 1898, *Gonzalez & Conzatti* 893.

MORELOS: Cuernavaca, January 18, 1866, *Bilimek* 388.

PUEBLA: Tehuacán, December, 1841, *Liebmann*; valley near Tehuacán, alt. 1,690 meters, August 23, 1901, *Pringle* 8600; near Tehuacán, August 1 and 2, 1901, *Rose & Hay* 5929; Tehuacán, August 9, 1910, *Hitchcock*.

HIDALGO: Chalk bluffs near Tula, alt. 2,090 meters, September 20, 1902, *Pringle* 11141.

Hemsley cites the following additional specimens: Real del Monte to Zacatecas, *Coulter* 1427; Puebla, *Andrieux* 126.

3. *Allionia rotata* Standley, Contr. Nat. Herb. 12: 347. 1909.

Type locality, "Azufrota near Saltillo." Type collected September 22, 1848, *Gregg* 511.

4. *Allionia violacea* L. Syst. ed. 10. 890. 1759.

Oxybaphus violaceus Choisy, Prodr. 13²: 432. 1849.

Oxybaphus violaceus parviflorus Choisy, loc. cit.

Mirabilis violacea Heimerl, Jahresb. Oberrealsch. Fünfhaus 23: repr. 23. 1897.

Type locality, Cumana, Venezuela.

Specimens examined:

YUCATAN: 1903, *Caec. & Ed. Seler* 3996; Chichen Itza, 1895, *Millsbaugh* 121; 1895, *Gaumer* 579.

GUATEMALA: Santa Rosa, Depart. Santa Rosa, alt. 770 meters, July, 1892, *Heyde & Lux* 3069; Casillas, Depart. Santa Rosa, alt. 1,230 meters, May, 1893, *Heyde & Lux* 4568; Guatemala, Depart. Guatemala, alt. 1,540 meters, May, 1892, *Shannon* 4718.

HONDURAS: San Pedro Sula, Santa Barbara, 1888, *Thieme* 5624.

COSTA RICA: Nicoya, 1900, *Tonduz* 13935; Nicoya, alt. 200 meters, May 22, 1903, *Cook & Doyle* 641; Bahia de Salmas, 1890, *Pittier* 2755.

SALVADOR: Vicinity of Izalco, Depart. Sonsonate, alt. 400 to 600 meters, February 14, 1907, *Pittier* 1926.

Hemsley gives the following additional locality in Mexico: Tehuantepec, *Andrieux* 127.

5. *Allionia mollis* Standley, sp. nov.

Slender, lax, much branched, about 80 cm. high; stems bright green, glabrous below, above sparingly beset with inconspicuous gland-tipped hairs; leaf blades deltoid-ovate, obtuse, subcordate at the base, thin, bright green, glabrous, on petioles almost as long as the blades; inflorescence slender and weak, few-flowered, corymbosely branched, leafy; involucre 3-flowered, about 5 mm. high, viscid, the lobes obtuse; fruit 3.5 mm. long, acute above, scarcely ribbed, glabrous, blackish brown.

Type in the National Herbarium, no. 460695, collected on ledges at El Salto, State of Mexico, altitude 2,150 meters, September 18, 1902, by C. G. Pringle (no. 11337). While closely related to *A. violacea* it may readily be distinguished by its narrower, obtuse leaves and by the numerous gland-tipped hairs of the stem, besides which it is a larger plant and more branched.

6. *Allionia cardiophylla* Standley, sp. nov.

Plants stout, 70 to 90 cm. high; stems glabrous below, more or less puberulent above and about the nodes, sparingly branched; leaf blades ovate, acute, cordate at the base, glabrous, rather thick and fleshy, on petioles one-fourth to two-thirds as long; petioles puberulous; inflorescence corymbose, the branches widely spreading; involucre almost 5 mm. high, hispidulous, mostly 3-flowered; fruit sometimes strigillose when young but becoming glabrous, conspicuously verrucose.

Type in the U. S. National Herbarium, no. 566116, collected 6 miles above Dominiquillo, Oaxaca, altitude 1,380 to 1,690 meters, October 30, 1894, by E. W. Nelson (no. 1830).

7. *Allionia deltoidea* Standley, sp. nov.

Stems slender, erect, 30 to 40 cm. high, much branched, the branches ascending, glabrous except about the inflorescence, there somewhat viscid, the pubescence disposed in 2 lines along the stem; leaf blades deltoid-ovate, 20 to 35 mm. long and 10 to 16 mm. wide, usually truncate at the base but sometimes subcordate, acute, glabrous or slightly puberulent, rather fleshy, bright green; petioles one-third to one-half as long as the blades, villous; inflorescence irregularly paniculate or cymose, sparingly branched; involucre 3-flowered, short-pedicel, some solitary in the axils of the leaves, about 7 mm. high, divided two-thirds of the way to the base or more, the lobes oblong-ovate, obtuse, abundantly white-villous especially along the margins; perianth about 9 mm. long and 15 mm. wide, almost or quite glabrous; fruit dark brown, 3 mm. long, the ribs narrow and tuberculate-roughened, the spaces between them rather broad and slightly rugulose transversely, glabrous or rarely minutely strigillose.

Type in the U. S. National Herbarium, no. 266904, collected by E. W. Nelson at La Ventura, Coahuila, August 2 to 5, 1896 (no. 3923). The plant suggests *A. melanotricha* but the glabrous fruit and the long, villous pubescence of the involucre readily distinguish it. From *A. cardiophylla* it may be separated by the smaller leaves not cordate at the base, the smaller size of the plant, and the larger flowers.

8. *Allionia texensis* (Coulter) Small, Fl. Southeast. U. S. 406. 1903.

Oxybaphus glabrifolius Torr. Bot. Mex. Bound. 168. 1859, not Vahl.

Allionia corymbosa texensis Coulter, Contr. Nat. Herb. 2: 351. 1894.

Oxybaphus texensis Weatherby, Proc. Amer. Acad. 45: 425. 1910.

Type locality, "Valleys near the Rio Grande, below El Paso," Texas.

A specimen in the Gray Herbarium collected at San Miguel El Grande, December, 1827, *Berlandier* 1314, certainly belongs here. Just where this particular locality is I have not been able to determine. The species was also collected by Dr. J. N. Rose at San Juan Capistrano, Zacatecas, August 22, 1897 (no. 2474).

9. *Allionia microchlamydea* Standley, sp. nov.

Plants 40 to 70 cm. high; stems glabrous below, sparingly viscid-puberulent above; leaf blades glabrous, 50 to 60 mm. long and 15 mm. wide or less, lanceolate, obtuse, subcordate at the base, rather thick and fleshy; lower leaves long-petioled and even

the uppermost with distinct although short petioles; inflorescence corymbosely much branched; involucre very numerous, short-pedicel, 4 mm. high or less, 1-flowered, rather densely hispidulous; fruit glabrous, almost 3 mm. long, irregularly rugulose.

Type in the U. S. National Herbarium, no. 470249, collected in rocky soil near Ixmiquilpan, Hidalgo, July, 1903, by C. A. Purpus (no. 429).

Additional specimens examined:

QUERÉTARO: Between El Ciervo and San Juan, August 29, 1905, *Altamirano* 1769.

Related to *A. corymbosa* but differing in its more numerous and smaller involucre and narrower leaves.

10. *Allionia corymbosa* (Cav.) Kuntze, Rev. Gen. Pl. 533. 1891.

Mirabilis corymbosa Cav. Icon. Pl. 4: 55. pl. 379. 1797.

Calyxhymenia glabrifolia Orteg. Hort. Matr. Dec. 5: pl. 1a. 1797.

Calymenia corymbosa Pers. Syn. Pl. 1: 37. 1805.

Oxybaphus glabrifolius Vahl. Enum. Pl. 2: 40. 1806.

Type locality, "Habitat in Nova Hispania."

Specimens examined:

HIDALGO: Near El Salto, September 16, 1903, *Rose & Painter* 7100; on Sierra de la Mesa, 1905, *Rose, Painter & Rose* 9102.

COAHUILA: Vicinity of Saltillo, June, 1898, *Palmer* 326.

SAN LUIS POTOSÍ: Vicinity of San Luis Potosí, 1878, *Parry & Palmer* 769; same locality, 1898, *Palmer* 644; San Luis Potosí, 1879, *Schaffner* 468.

AGUASCALIENTES: Near Aguascalientes, October 9, 1903, *Rose & Painter* 7732.

COAHUILA OR NUEVO LEON: 1880, *Palmer* 1112.

11. *Allionia glabra recedens* (Weatherby) Standley.

Oxybaphus glaber recedens Weatherby, Proc. Amer. Acad. 45: 425. 1910.

Type locality, "Chihuahua: between Casas Grandes and Sabinal." Type collected by E. W. Nelson (no. 6351), September 4-5, 1899, at an altitude of 1,550 to 1,700 meters.

Only the type collection has been examined from Mexico.

This well-marked form is found in New Mexico and Texas in the Rio Grande Valley, in the Pecos Valley of New Mexico, in various parts of western Texas, and in southwestern Kansas. It seems probable that the specimens collected by Pringle on sand hills near Paso del Norte, Chihuahua, in 1886 (no. 1126), belong here as well, although I have not seen the specimens since the publication of the subspecies. The involucre of the form are often 2-flowered, and in the National Herbarium is a specimen to which Dr. Heimerl gave the name *biflora* on this account. Very often, although not always, the flowers are cleistogamous. The species proper seems to be restricted to southeastern Utah and northeastern Arizona.

12. *Allionia gausapoides* Standley, sp. nov.

Stems slender, about a meter high, glabrate below, densely pilose-viscid above; leaf blades sessile, 6 cm. long or less, linear or narrowly linear-lanceolate, tapering at both ends, obtuse, thick and fleshy, somewhat glaucous, pilose throughout when young, ciliate at maturity; inflorescence loosely and openly cymose, with densely pilose-viscid branches; involucre few, clustered at the ends of the branches, 6 or 7 mm. high, densely pilose-viscid, the long pubescence black or tawny, the lobes ovate, acute, half as long as the involucre; flowers 3, the perianth 10 to 12 mm. long, glabrous; anthocarp ellipsoidal, constricted near the base, acute, 4 to 5 mm. long, glabrous, the ribs narrow and smooth, the intercostal spaces coarsely rugulose.

Type in the U. S. National Herbarium, no. 22688, collected in the region of San Luis Potosí, in 1878, by Parry & Palmer (no. 768). A plant unique in its combination of narrow leaves, glabrous fruit, and densely pilose stem and involucre.

13. *Allionia divaricata* Rydb. Bull. Torrey Club 29: 691. 1902.

Type locality, "Durango," Colorado.

Specimens examined:

DURANGO: Durango, 1896, *Palmer* 925; Durango, 1898, *Nelson* 4621.

14. *Allionia linearis* Pursh, Fl. Amer. Sept. 2: 728. 1814.*Calymenia angustifolia* Nutt. Gen. Pl. 1: 26. 1818.*Oxybaphus angustifolius* Sweet, Hort. Britt. 1: 334. 1827.*Oxybaphus angustifolius linearis* Choisy in DC. Prodr. 13²: 433. 1849.*Mirabilis angustifolia* MacM. Met. Minn. Val. 216. 1892.*Allionia bushii* Britton, Bull. Torr. Club 22: 223. 1895.*Mirabilis nyctaginea angustifolia* Heimerl, Jahresb. Oberrealsch. Fünfhaus 23: repr. 22. 1897.*Mirabilis linearis* Heimerl, Ann. Cons. Jard. Genève 5: 186. 1901.*Allionia montanensis* Osterhout, Muhlenbergia 1: 39. 1906.*Oxybaphus linearis* Robinson, Rhodora 10: 31. 1908.*Allionia petrophila* Standley, Contr. Nat. Herb. 12: 340. 1909.

Type locality, "In Upper Louisiana."

*Specimens examined:*CHIHUAHUA: Rocky hills near Chihuahua, September, 1886, *Pringle* 340.SAN LUIS POTOSÍ: Region of San Luis Potosí, 1878, *Parry & Palmer* 767.

I have lately had the opportunity of examining the type of this species in the Pursh herbarium, now in the herbarium of the Academy of Natural Sciences of Philadelphia. It was collected by Bradbury and bears the locality "Louisiana." Its leaves are rather wide and bright green; the inflorescence is rather sparse and narrow, some of the involucre being axillary; it resembles very much the plant named *Allionia glandulifera* by Prof. Aven. Nelson and I think that that species must be considered a synonym of *A. linearis*. The type of *Calymenia angustifolia* was also examined in the herbarium of the same institution. This and *A. linearis* are certainly the same. Specimens of the type collection of *A. petrophila* in the National Herbarium have manifestly pubescent fruit and it appears best to reduce that name to synonymy.

15. *Allionia aggregata* (Orteg.) Spreng. Syst. Veg. 1: 384. 1825.*Calyxhymenia aggregata* Orteg. Hort. Matr. Dec. 3: 81. pl. 11. 1798.*Mirabilis aggregata* Cav. Icon. Pl. 5: 22. pl. 437. 1797, as to name only.*Oxybaphus aggregatus* Vahl, Enum. Pl. 2: 41. 1806, in part.*Calymenia aggregata* Pers. Syn. Pl. 1: 37. 1805.*Allionia hirsuta aggregata* A. Nelson, New Man. Rocky Mount. 173. 1910.

Type locality, "In Nova Hispania." "Floret in Reg. Hort. Matrit. mense Augusto et Septembri e seminibus missis per D. Sessé."

No specimens of this have been seen. There is little doubt but that it is a young form of some of the Mexican species listed elsewhere. The plate illustrates a plant with axillary inflorescence, narrowly elliptic leaves, and hirsute stem. The only specimens seen by the writer that could be referred here were collected in the north-central part of the United States and are almost certainly immature or poorly grown plants of *Allionia hirsuta*. Professor Nelson has properly referred to them as a subspecific form of that species. True *A. aggregata*, however, is doubtless something very different.

16. *Allionia brandegei* Standley, Contr. Nat. Herb. 12: 346. 1909.

Type locality, "In the Providence Mountains, California." Type collected by T. S. Brandege, June 2, 1902.

*Specimens examined:*BAJA CALIFORNIA: Cantillas Mountains, July, 1884, *Orcutt*.**17. *Allionia pseudaggregata*** (Heimerl) Standley, Contr. Nat. Herb. 12: 356. 1909.*Mirabilis pseudaggregata* Heimerl, Ann. Cons. Jard. Genève 5: 183. 1901.*Mirabilis pseudaggregata subhirsuta* Heimerl, op. cit. 184.*Mirabilis pseudaggregata eglandulosa* Heimerl, loc. cit.*Allionia pseudaggregata subhirsuta* Standley, Contr. Nat. Herb. 12: 356. 1909.*Oxybaphus pseudaggregatus* Weatherby, Proc. Amer. Acad. 45: 425. 1910.

Type locality, "State of Chihuahua, cool slopes, Mts. near Chihuahua." Type collected by C. G. Pringle (no. 793).

Specimens examined:

CHIHUAHUA: Type collection.

SAN LUIS POTOSÍ: 1873, *Parry & Palmer* 763; San Miguelito Mountain near San Luis Potosí, 1876, *Schaffner* 177.

MEXICO: Valley of Mexico, Guadalupe, August 1, 1861, *Bourgeau* 651.

DURANGO: Durango, 1896, *Palmer* 267.

QUERÉTARO: Del Ciervo al cerro de la mesa, August 20, 1905, *Altamirano* 1591 and 1604.

Doctor Heimerl described the species as occurring in two forms, *subhirsuta* and *eglandulosa*. Both were described from Pringle's 793 and are to be considered as belonging to the same species, not even differing in a subspecific way. The two specimens from Querétaro are perhaps distinct; they have narrower leaves and more abundant pubescence than the type, while the involucre seem slightly different. The fruit is exactly the same, however, and it seems unwise to separate them, especially since the material is of unsatisfactory quality.

As a synonym of this species, with but little doubt, should be placed *Mirabilis aggregata* Cav.^a The plant figured has stems glabrous, at least below, lanceolate leaves, axillary inflorescence, and cleistogamous flowers. It is probably a young plant of this species. The name has been cited as a synonym of *Allionia decumbens* Nutt., which seems to have been based upon a young plant of *A. lanceolata* Rydb. or possibly even of *A. linearis*. No *Allionia* of the region from which *A. decumbens* was described extends into that part of Mexico where *Mirabilis aggregata* Cav. was found, hence the two can not be synonymous. Cavanilles gives the source of his plant as "In viciniis Sancti Augustini de las Cuevas in Nova Hispania." This locality is in the immediate vicinity of the City of Mexico, the locality where Bourgeau's specimen listed above was collected.

18. *Allionia trichodonta* Standley, Contr. Nat. Herb. 12: 354. 1909.

Type locality, "Ixmiquilpan, Hidalgo." Type collected in 1905 by C. A. Purpus.

Specimens examined:

HIDALGO: Type specimen.

19. *Allionia coahuilensis* Standley, Contr. Nat. Herb. 12: 347. 1909.

Oxybaphus coahuilensis Weatherby, Proc. Amer. Acad. 45: 425. 1910.

Type locality, "Saltillo, Coahuila." Type collected in 1898, *Palmer* 158.

Here can be placed, temporarily at least, Purpus's 3932, collected at the Cerro de Chicamale, Puebla, August, 1909.

20. *Allionia greggii* Standley, Contr. Nat. Herb. 12: 348. 1909.

Type locality, "San Antonio, near Saltillo." Type collected by Gregg, September 1, 1848 (no. 394b).

21. *Allionia suffruticosa* Standley, sp. nov.

Low, much branched; stems slender, woody below and glabrous, puberulous and viscid above; leaf blades small, yellowish green, glabrous, deltoid-ovate, acutish, all on slender petioles about one-fourth as long; inflorescence corymbosely branched, the rather few involucre 5 mm. high, 3-flowered, densely hispidulous, their lobes acute; perianth twice as long as the involucre, purplish red; fruit 5 mm. long, hirtellous, the ribs broad and smooth.

Type in the U. S. National Herbarium, no. 841004, collected at Los Naranjos, Oaxaca, June, 1908, by C. A. Purpus (no. 3378). I have seen no other *Allionia* with a truly woody stem. The plant in habit and general appearance strongly suggests some of the species of *Hesperonia*.

^a Icon. Pl. 5: 22. pl. 437. 1799.

22. *Allionia foliosa* Standley, sp. nov.

Stems slender, glabrous, 30 to 40 cm. high, branched at the base and sparingly above; leaves numerous, the internodes very short; blades thin, glabrous, ovate or lance-ovate, 40 to 60 mm. long and 18 to 30 mm. wide, rounded at the base, acute; petioles slender, 5 to 12 mm. long; inflorescence cymose with but few branches, these finely viscid-puberulent and furnished with numerous viscid, much reduced, bract-like leaves; involucre few, usually 1-flowered, conspicuously villous and ciliate when young, but becoming almost glabrous, the lobes ovate, acute, the whole 6 to 11 mm. high, on pedicels 4 to 6 mm. long; fruit 6 mm. long, finely puberulous, with broad and smooth ribs.

Type in the U. S. National Herbarium, no. 229205, collected by E. W. Nelson between San Gerónimo and La Venta, Oaxaca, altitude about 60 meters, July 13, 1895 (no. 2787). The plants suggest some of the forms that have passed as *Allionia floribunda*, but their inflorescence is very different; they are related to *A. latifolia*, but differ decidedly in the form of the leaves and involucre.

23. *Allionia melanotricha* Standley, Contr. Nat. Herb. 12: 351. 1909.

Mirabilis nyctaginea alpicola Heimerl, Jahresb. Oberrealsch. Fünfhaus 23: repr. 23. 1897.

Mirabilis nyctaginea cervantesii Heimerl, loc. cit., as to material, not *A. cervantesii* Steud.

Oxybaphus melanotrichus Weatherby, Proc. Amer. Acad. 45: 425. 1910.

Type locality, "Barfoot Park, in the Chiricahua Mountains, Arizona." Type collected by J. C. Blumer, 1907 (no. 1385).

Specimens examined:

SONORA: San José Mountains, August 3, 1893, *Mearns* 1586.

CHIHUAHUA: Near Colonia Garcia in the Sierra Madre, August 3, 1899, *Townsend & Barber* 244; near Colonia Garcia, August, 1899, *Nelson* 6177; mountains near Pilares, September 23, 1891, *Hartman* 743; Soldier Canyon, Sierra Madre, alt. 2,000 meters, September 16, 1903, *Jones*.

COAHUILA OF NUEVO LEÓN: 1880, *Palmer* 1111.

DURANGO: Vicinity of Durango, 1896, *Palmer* 261.

Allionia melanotricha is one of the most variable species of the genus. The leaves vary in outline from ovate-cordate to lance-oblong and cuneate at the base; the black hairs of the involucre, so characteristic in some parts of the range, are often lacking in specimens from other regions.

OTHER SPECIES REPORTED FROM MEXICO.

***Allionia cervantesii* (Sweet) Steud. Nom. Bot. ed. 2. 1: 50. 1840.**

More than once this species has been cited from Mexico and even from the United States. A large part of the material thus referred to is *Allionia melanotricha*; some, especially that from Mexico, is referable to other species. Sweet based his species upon cultivated plants grown from South American seed. Doctor Heimerl cites a specimen collected by Ehrenberg at "Minl. del Monte bei Huasca" as belonging to this species. The writer has seen no Mexican material that can be placed here.

***Allionia ovata* (Ruiz & Pav.) Standley.**

Calyzhymenia ovata Ruiz & Pav. Fl. Peruv. Chil. 1: 45. pl. 75. f. b. 1798.

Oxybaphus ovatus Vahl, Enum. Pl. 2: 41. 1806.

Allionia ovata Pursh is a very different plant, while it is long antedated by the name of Ruiz and Pavon. The proper combination under *Allionia* seems never to have been made.

Questioningly referred to Mexico by Choisy, but we have seen no specimens from North America. The species is South American.

Allionia cordifolia (Kunze) Kuntze, Rev. Gen. Pl. 533. 1891.

Mentioned by Choisy and Hemsley as occurring within our limits, but the species is a South American one and has not been collected in North America so far as our herbarium material shows.

Allionia linearifolia (S. Wats.) Kuntze, Rev. Gen. Pl. 533. 1891.

Oxybaphus linearifolius S. Wats. Proc. Amer. Acad. 17: 375. 1882.

Allionia gracillima Standley, Contr. Nat. Herb. 12: 340. 1909.

I have seen no specimens of this species from Mexico, but during the summer of 1910 Mr. J. C. Blumer collected excellent specimens in Arizona, only a few miles from the boundary. As he says in a letter received recently, the species will probably be found farther south, on the Mexican side of the boundary.

15. QUAMOCLIDION Choisy.

Quamoclidion Choisy in DC. Prodr. 13²: 429. 1849.

Type species, *Mirabilis triflora* Benth.

Quamoclidion as originally published consisted of two species, *Q. nyctagineum* and *Q. angulatum*. *Nyctago angulata* DC. was quoted as a synonym of the second species, which has never been identified. The specimens upon which it was based came from Mexico. It has been suggested that the plant is *Allioniella oxybaphoides*, but the description does not altogether agree with that genus nor has *Allioniella* ever been found in Mexico so far as can be determined. It is not improbable that it is found in some of the mountains of northern Chihuahua, but Choisy's specimens were collected by Mociño and Sessé much farther south.

According to the description the characters of the plant are: Stem slender; leaves petioled, cordate, acute, repand-angled; peduncles from axils of the upper leaves scarcely surpassing them; involucre 5-lobed, 3-flowered, campanulate; flowers sessile, reddish; perianth short-tubular, dilated and 5-toothed at the apex; stamens long-exserted; stigma multifid; fruit obovate, not rugose.

A tracing of Mociño and Sessé's drawing seems not to agree with Choisy's description in all particulars. It represents a plant with 1-flowered involucre. The lobes of the perianth are ovate and acute. In the dissection of the flower it is represented as having 5 stamens, while in other flowers upon the branches the number of stamens runs from 6 to 8. The drawing suggests an *Allionia*, but I have seen nothing that resembles it even remotely.

KEY TO THE SPECIES.

- Perianth 25 mm. long or less, with a very narrow limb. 1. *Q. triflorum*.
 Perianth 40 to 50 mm. long, with a broad and conspicuous limb.
 Fruit dark brown to black; stems glabrous, at least below. 2. *Q. multiflorum*.
 Fruit light brown, marked with 10 dark, vertical lines; stems
 usually pubescent throughout. 3. *Q. froebelii*.

1. **Quamoclidion triflorum** (Benth.) Standley, Contr. Nat. Herb. 12: 358. 1909.

Mirabilis triflora Benth. Pl. Hartweg. 23. 1839.

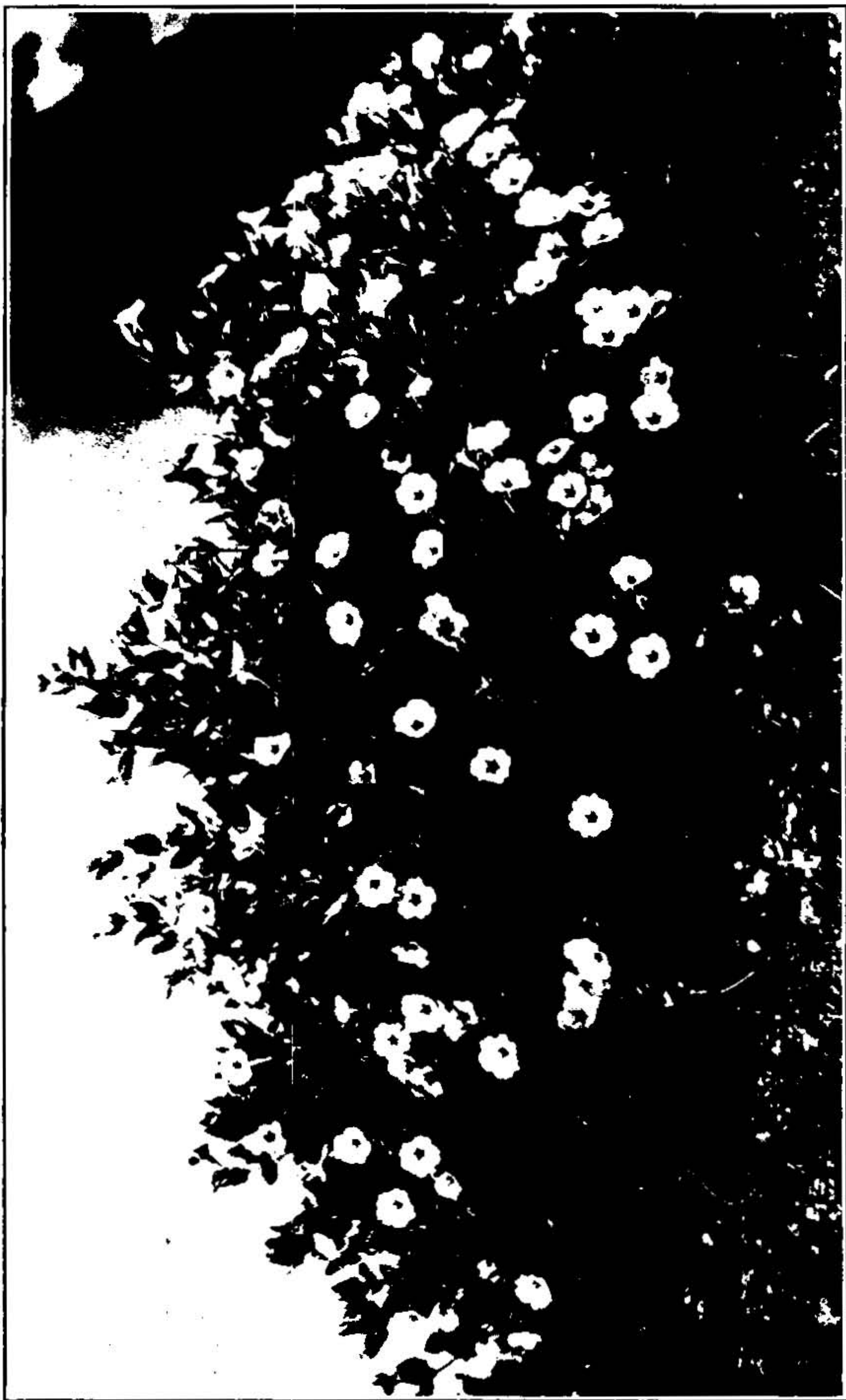
Quamoclidion nyctagineum Choisy in DC. Prodr. 13²: 429. 1849.

Type locality, Mexico.

Specimens examined:

BAJA CALIFORNIA: From Cerro Colorado to Rodriguez, alt. 245 to 430 meters, December 16, 1905, *Nelson & Goldman* 7324; from Miraflores to San Bernardo Ranch in Sierra La Laguna, alt. 735 meters, January 20, 1906, *Nelson & Goldman* 7414; Triunfo, October 24, 1890, *Brandege* 479; Pescadero, November, 1902, *Brandege*; Todos Santos, 1890, *Brandege*.

MEXICO: No locality given, *Hartweg* 197, type collection.



QUAMOCLIDIUM MULTIFLORUM TORR.

Although *Mirabilis triflora* Benth. was the type of Choisy's genus, in transferring the plant to *Quamoclidion* he changed the specific name so that his combination was *Quamoclidion nyctagineum*.

2. *Quamoclidion multiflorum* Torr.; A. Gray, Amer. Journ. Sci. II. 15: 321. 1853.

PLATE 77.

Oxybaphus multiflorus Torr. Ann. Lyc. N. Y. 2: 237. 1828.

Nyctagina? torreyana Choisy in DC. Prodr. 13²: 430. 1849.

Mirabilis multiflora A. Gray, Bot. Mex. Bound. 173. 1859.

Type locality, "About the forks of the Platte," Colorado.

No Mexican specimens of this species have been seen, but it certainly occurs in the Rio Grande Valley near Ciudad Juárez, Chihuahua. It is one of the most ornamental plants of the family, rivaling the related *Mirabilis jalapa*, and would lend itself well to cultivation.

The photograph was taken at Agricultural College, New Mexico, by E. O. Wooton and Paul C. Standley.

3. *Quamoclidion froebelii* (Behr) Standley, Contr. Nat. Herb. 12: 359. 1909.

Oxybaphus froebelii Behr, Proc. Calif. Acad. 1: 69. 1855.

Mirabilis multiflora pubescens S. Wats. Bot. Calif. 2: 2. 1880.

Mirabilis froebelii Greene, Bull. Calif. Acad. 1: 124. 1885.

Mirabilis multiflora froebelii M. E. Jones, Contr. Western Bot. 10: 49. 1902.

Type locality, "Culta e seminibus a J. Froebel prope Warner's Ranch lectis." Warner's Ranch was in southern California.

Specimens examined:

BAJA CALIFORNIA: Between the Tia Juana River and Laguna, June 9, 1894, E. A. Mearns 3506.

MEXICO: No locality given, Doctor Coulter 1327.

16. HESPERONIA Standley.

Hesperonia Standley, Contr. Nat. Herb. 12: 360. 1909.

Type species, *Mirabilis californica* A. Gray.

KEY TO THE SPECIES.

Fruit spherical.

Plants scabrate, especially on the leaves and inflorescence..... 1. *H. cedrosensis*.

Plants glandular-pubescent, never scabrate..... 2. *H. heimerlii*.

Fruit oblong or ellipsoidal.

Plants large and stout; leaves 5 cm. long or less; lobes of the involucre narrowly lanceolate..... 3. *H. tenuiloba*.

Plants smaller and more slender; leaves not more than half as large as in the above; lobes of the involucre triangular-lanceolate or ovate-lanceolate.

Plants glabrous throughout, or the young leaves with a few scattering hairs..... 4. *H. laevis*.

Plants not glabrous throughout, the stems at least sparingly pubescent.

Fruit almost 8 mm. long, narrow; flowers few and conspicuously pediceled..... 5. *H. oligantha*.

Fruit about 4 mm. long or less; flowers more numerous and on short and stout pedicels.

Flowers about 12 mm. long; fruit inconspicuously striate..... 6. *H. californica*.

Flowers about 2 cm. long; fruit dark brown, not at all striate..... 7. *H. polyphylla*.

1. *Hesperonia cedrosensis* Standley, Contr. Nat. Herb. 12: 362. 1909.

Type locality, "Cedros Island, Lower California." Type collected April 3, 1897, by T. S. Brandegee.

Specimens examined:

BAJA CALIFORNIA: San Benito Island, 1889, *Lieutenant Pond* 23; Cedros Island, March, 1889, *Palmer* 737; same locality, February, 1889, *Palmer*; San Quentin Bay, January, 1889, *Palmer* 640; Cedros Island, 1911, *Rose* 95.

This is easily distinguishable from all other species of the genus by its peculiar pubescence.

2. *Hesperonia heimerlii* Standley, sp. nov.

Stems stout, glaucous, glabrous, tortuous, much swollen at the nodes, with many divaricate branches; leaf blades deltoid-ovate, the largest 35 mm. long and 30 mm. wide, most of them smaller, thick and fleshy, cordate at the base, obtuse or acutish, usually glabrous but some of the uppermost glandular-puberulent; petioles half as long as the blades or those of the upper ones much shorter; involucre numerous, short-peduncled in the axils of the leaves or congested at the ends of the branches, 6 mm. high, cleft halfway to the base, the lobes triangular, densely glandular-pubescent; perianth 10 mm. long or less; fruit glabrous, spherical or slightly compressed vertically, 2.5 to 3 mm. in diameter, dark brown.

Type in the U. S. National Herbarium, no. 22626, collected by Dr. Edward Palmer at the south end of Guadalupe Island, Baja California, March 30, 1889 (no. 886). Additional material was collected by Dr. F. Franceschi on the same island in 1893, and by J. N. Rose in 1911 (no. 21).

The form of the fruit places this plant near *H. cedrosensis*, but the pubescence is very different. The specimens in the National Herbarium were labeled as a new species of *Mirabilis* by Doctor Heimerl.

3. *Hesperonia tenuiloba* (S. Wats.) Standley, Contr. Nat. Herb. 12: 363. 1909.

Mirabilis tenuiloba S. Wats. Proc. Amer. Acad. 17: 375. 1882.

Type locality, "San Bernardino County, California." Type collected by W. G. Wright in 1880.

Specimens examined:

BAJA CALIFORNIA: Signal Mountain, Colorado Desert, 1901, *Brandegee*; pass in Cucopa Mountains, April 7, 1905, *MacDougal* 170; base of Cucopa Mountains, April 5, 1905, *MacDougal* 125.

4. *Hesperonia laevis* (Benth.) Standley, Contr. Nat. Herb. 12: 363. 1909.

Oxybaphus laevis Benth. Bot. Voy. Sulph. 44. 1844.

Mirabilis laevis Curran, Proc. Calif. Acad. II. 1: 235. 1889.

Quamoclidion laeve Rydb. Bull. Torrey Club 29: 687. 1902, as to name, not material.

Type locality, "Bay of Magdalena," Baja California.

Specimens examined:

BAJA CALIFORNIA: Magdalena Bay, *Lung* 28; Magdalena Island, January 18, 1889, *Brandegee*.

5. *Hesperonia oligantha* Standley, Contr. Nat. Herb. 12: 363. 1909.

Type locality, "Calmalli, Lower California." Type collected in 1898, C. A. Purpus 82.

No further material of this species has been seen.

6. *Hesperonia californica* (A. Gray) Standley, Contr. Nat. Herb. 12: 364. 1909.

Oxybaphus glabrifolius crassifolius Choisy in DC. Prodr. 13²: 431. 1849.

Oxybaphus glabrifolius Torr. U. S. Rep. Expl. Miss. Pacif. 4: 131. 1857, not Vahl.

Mirabilis californica A. Gray, Bot. Mex. Bound. 173. 1859.

Oxybaphus californicus Benth. & Hook. Gen. Pl. 3: 4. 1880.

Type locality, none given.

Specimens examined:

BAJA CALIFORNIA: Aguaje de San Esteban, 25 miles north of San Ignacio, altitude 370 meters, October 5, 1905, *Nelson & Goldman*, 7202; northern Lower California, April 12, 1882, *Orcutt*.

6a. *Hesperonia californica microphylla* Standley, *Contr. Nat. Herb.* 12: 365. 1909
Type locality, "San Martin Island, Lower California." Type collected by T. S. Brandegee, March 12, 1897.

Specimens examined:

BAJA CALIFORNIA: Ensenada, April 26, 1893, *Brandegee*.

7. *Hesperonia polyphylla* Standley, *Contr. Nat. Herb.* 12: 364. 1909.
Type locality, "San Borga, Lower California." Type collected by T. S. Brandegee, May 6, 1889.

Specimens examined:

BAJA CALIFORNIA: Los Angeles Bay, 1887, *Palmer* 600.

17. **MIRABILIS L.**

Mirabilis L. Sp. Pl. 177. 1753.

Nyctago Juss. Gen. Pl. 90. 1789.

Type species, *Mirabilis jalapa* L.

The Mexican species of *Mirabilis* include almost the entire genus; a few other species have been described from South America.

KEY TO THE SPECIES.

- Stamens 3; anthocarp constricted near the base, viscid when moistened. (Perianth not expanding into a limb). 1. *M. watsoniana*.
- Stamens 5; anthocarp not constricted near the base, not viscid when moistened.
- Stamens twice as long as the perianth or more, the latter tubular or with a very narrow limb; lobes of the involucre obtuse.
- Perianth somewhat dilated at the base, 4 mm. in diameter, scarcely at all dilated above. 2. *M. pringlei*.
- Perianth not dilated at the base, 2 mm. or less in diameter, gradually dilated above. 3. *M. exserta*.
- Stamens considerably less than twice as long as the perianth; lobes of the involucre acute. (Limb of the perianth broader and more conspicuous.)
- Perianth trumpet-shaped, gradually dilated from base upward, 22 mm. long or less. (Angles of the anthocarp verrucose). 4. *M. urbani*.
- Perianth salverform, rather abruptly dilated into a spreading limb, 30 mm. long or more.
- Perianth 3 to 5 cm. long, red, yellow, or rarely white, the tube dilated upward, not conspicuously elongated.
- Leaves usually subcordate at the base; petioles short; involucre glabrate in age, 6 to 10 mm. long, the lobes oblong-lanceolate, long-acuminate, puberulent on the margins; tube of perianth glabrous or almost so; stamens equalling or longer than the perianth; style 35 to 50 mm. long. 5. *M. jalapa*.

- Leaves usually truncate at the base; petioles half to two-thirds as long as the blades in the lower leaves; involucre puberulent, finally 10 to 12 mm. long, the lobes ovate or lanceolate, shortly acuminate, ciliate; tube of perianth pilose; stamens 10 to 20 mm. longer than the perianth; style about 65 mm. long 5a. *M. jalapa odorata*.
- Perianth 10 to 15 cm. long, white; tube long-tubular, much elongated.
- Stems densely glandular above; leaf-blades glandular on both surfaces, the upper ones sessile, usually not long-attenuate 6. *M. longiflora*.
- Stems almost glabrous above, not glandular; leaf blades glabrous, all petioled, usually long-attenuate. (Tube of the perianth more slender) 7. *M. wrightiana*.

1. *Mirabilis watsoniana* Heimerl, Bot. Jahrb. Engl. 11: 84. pl. 2. f. 2a-2h. 1889.

Type locality, "In republica Guatemalensi Americae Centralis ad 'Cuesto de Solola.'" Type collected by Bernouilli & Cario, June, 1877 (no. 2616).

Plant with the habit of *M. jalapa*; a low herb, probably perennial; stems erect from a subdecumbent base, divaricately branched, above puberulent and densely leafy, below glabrate; leaf blades cordate or truncate at the base, acuminate and acute, the upper subtending the flowers subsessile, the others long-petioled, shortly attenuate to the petiole, thin, green on both surfaces, sparingly hirtellous on the margins, elsewhere glabrous; flowers clustered in cymes at the ends of the branches, on slender, pubescent peduncles; involucre 1-flowered, tubular-campanulate, unequally 5-toothed, hirtellous, after anthesis slightly enlarged; basal part of the perianth, including the ovary, obovate, sparingly hirtellous, 5-nerved, the upper part from the base to about the middle very narrowly tubular, above gradually dilated into a wide tube slightly constricted below the mouth, hirtellous without, with a scarcely expanded 5-lobed limb; stamens 3, like the style long-exserted, subequal; anthocarp small, dark, shorter than the involucre, obovate-pyramidal, above shortly apiculate, the apex itself obtuse, distinctly constricted above the broad, subtruncate base, 5-angled, the angles slightly tuberculate, elsewhere smooth, hirtellous, slightly viscid when moistened.

The above description is a translation of the original one, as I have seen no specimens of the plant. The species differs radically from all others of the genus in having but three stamens and in having the anthocarp constricted just above the base much as in *Allionia*. It was partly at least because of this plant that Doctor Heimerl merged the genera *Allionia* and *Mirabilis* into the one, *Mirabilis*. After examining the plate illustrating the plant, however, it does not seem to the writer that such a treatment is desirable. The species agrees with other members of the genus in the form of the involucre, shape of the perianth, number of flowers in the involucre, and especially in habit and general appearance, in the last two respects being entirely unlike any *Allionia*. For the species Doctor Heimerl^a founded the section *Watsonia* of the genus *Mirabilis*.

2. *Mirabilis pringlei* Weatherby, Proc. Amer. Acad. 45: 424. 1910.

Type locality, "Guerrero: under limestone cliffs, Iguala Cañon, alt. 915 m." Type collected by C. G. Pringle, July 23, 1907 (no. 10384).

Only the type specimen has been examined.

^a Jahresb. Oberrealsch. Fünfhaus Wien 23: repr. 20. 1897.

3. *Mirabilis exserta* Brandegee, Proc. Calif. Acad. II. 3: 165. 1891.

Type locality, "Summits of the spurs of Sierra de San Francisquito," Baja California.

Specimens examined:

BAJA CALIFORNIA: Type specimen; La Chuparosa, 1899, *Brandegee*.

4. *Mirabilis urbani* Heimerl, Oesterr. Bot. Zeitschr. 56: 250. 1906.

Type locality, "In Mexico australi ad San Salvador, 650 m. s. m." Type collected by E. Langlassé in 1898 (no. 240). The locality is either in Michoacan or Guerrero.

Specimens examined:

MICHOACAN or GUERRERO: Campo Morado, June 14, 1899, *Langlassé* 1058.

A plant closely related to *M. jalapa* but differing in the form of the involucre and anthocarp, and in the smaller perianth and more abundant pubescence.

5. *Mirabilis jalapa* L. Sp. Pl. 177. 1753.

Jalapa congesta Moench, Meth. Pl. 508. 1794.

Nyctago jalapae DC. & Lam. Fl. Franç. 3: 426. 1805.

Mirabilis planiflora Trautv. Bull. Sci. Acad. St. Pétersb. 6: 216. 1840.

Mirabilis ambigua Trautv. Linnæa 1841: Litt.-Ber. 97. 1841.

Mirabilis pubescens Zipp.; Spanoghe, Linnæa 15: 342. 1841.

Mirabilis jalapa ambigua Choisy in DC. Prodr. 13²: 428. 1849.

Mirabilis jalapa planiflora Choisy, loc. cit.

Mirabilis jalapa volcanica Standley, Contr. Nat. Herb. 12: 367. 1909.

Mirabilis jalapa gracilis Standley, loc. cit.

Mirabilis jalapa lindheimeri Standley, op. cit. 368.

Mirabilis jalapa ciliata Standley, loc. cit.

Type locality, "In India utraque."

Specimens examined:

COAHUILA: Saltillo, 1848, *Gregg* 344.

SAN LUIS POTOSÍ: Region of San Luis Potosí, 1878, *Parry & Palmer* 775.

DURANGO: Vicinity of Durango, 1896, *Palmer* 630 and 631.

MEXICO: Zocoalco près Mexico, 1861, *Bourgeau* 617; Pedregal, Valley of Mexico, alt. 2,270 meters, August 19, 1896, *Pringle* 6433.

YUCATAN: *Gaumer* 548.

OAXACA: Oaxaca Valley, alt. 1,530 meters, October 1, 1894, *C. L. Smith* 791;

Valley of Oaxaca, alt. 1,530 to 1,630 meters, September 20, 1894, *Nelson* 1314.

NUEVO LEÓN: Monterey, *Edwards & Eaton*.

CHIAPAS: Between San Richardo and Ocozucuantla, alt. 800 to 1,010 meters, August 18, 1895, *Nelson* 2987.

VERA CRUZ: Orizaba, *Botteri* 582.

TEPIC: Near Santa Teresa, August 8, 1897, *Rose* 2131.

SINALOA: Waste ground, Mazatlan, March 31, 1910, *Rose, Standley & Russell* 13767.

PANAMA: Gatun, March 4, 1905, *Cowell* 311.

Additional localities cited by Hemsley and by Heimerl:

GUATEMALA: Dueñas, alt. 1,530 meters, *Salvin*.

NICARAGUA: Realejo, *Sinclair*.

MEXICO: Bords de fossées près de Mexico, *Bourgeau* 616; environs de Mexico, *Berlandier* 521; Chapulco, *Liebmann; Ehrenberg* 169.

Mirabilis jalapa is an exceedingly variable species. There are noticeable differences in the form of the leaves, size of the perianth, and pubescence of stem, leaves, and anthocarp, but the amount of variation is so little that it seems hardly wise to maintain any of the forms even as subspecies with perhaps the exception mentioned below. Because of its frequency in cultivation the common four-o'clock has received

numerous names. Doubtless considerable variation is exhibited by cultivated plants, although these are not apparent in the rather scanty herbarium specimens made from such material. The color of the perianth is one of the most variable characters, ranging through purplish red, white, and yellow, and variegated forms combining these colors.

It was formerly believed that the home of the plant was Peru, whence one of its common names, "marvel of Peru." Heimerl inclines to the belief that the species is native of southern Mexico. From all reports it certainly seems to be indigenous in that region. In other parts of Mexico it has escaped from cultivation. In southern Texas and perhaps in Florida the plant appears to be native, while in other parts of the United States it is merely an escape.

The specific name of *jalapa* was given to the plant because it was believed that its root furnished the jalapa of commerce. This medicinal substance instead is supplied by the root of a plant of a different family. One of the most commonly cultivated ornamental plants of Mexico, the species is there known under several common names, *maravilla*, *arbolera*, *Don Diego de noche*, and *trompetilla*.

5a. *Mirabilis jalapa odorata* (L.) Heimerl, Bot. Jahrb. Engler 21: 616. 1896.

Mirabilis odorata L. Cent. Pl. 1: 7. 1755.

Mirabilis dichotoma L. Sp. Pl. ed. 2. 252. 1762.

Jalapa undulata Moench, Suppl. Meth. Pl. 196. 1802.

Nyctago hortensis Juss.; Roem. & Schult. Syst. Veg. 4: 1. 1819, as synonym.

Nyctago dichotoma Juss.; Roem. & Schult. Syst. Veg. 4: 1. 1819, as synonym.

Mirabilis parviflora Targ.-Tozz.; Steud. Nom. Bot. 535. 1821, as synonym.

Mirabilis divaricata Lowe, Trans. Cambridge Phil. Soc. 17. 1831.

Mirabilis procera Bertol. Nov. Comm. Acad. Bononiensis 3: 15. pl. 1. 1839.

Mirabilis divaricata uniflora Choisy in DC. Prodr. 13²: 428. 1849.

Mirabilis jalapa procera Choisy, loc. cit.

Type locality, "Habitat in America."

Specimens examined:

GUATEMALA: Escuintla, 1890, *J. D. Smith* 2019; Coban, Alta Verapaz, April, 1889, *J. D. Smith* 1731.

SALVADOR: *Renson* 195.

COSTA RICA: Paraiso, San José, 1896, *J. D. Smith* 6737.

The form is hardly worth maintaining even as a subspecies. Some of the specimens seem fairly distinct from *M. jalapa*, but all sorts of intermediate forms can be found, some of which can be referred equally well to the type or the subspecies. The latter is the common form of the West Indies. Ramírez and Alcocer give as the common names *arbolera*, *maravilla*, *maravilla silvestre*.

6. *Mirabilis longiflora* L. Vet. Akad. Handl. 176. pl. 6. f. 1. 1755.

Jalapa longiflora Moench, Meth. Pl. 508. 1794.

Nyctago longiflora DC. & Lam. Fl. Franç. 3: 426. 1805.

Mirabilis suaveolens H. B. K. Nov. Gen. & Sp. 2: 213. 1817.

Type locality, Mexico.

Specimens examined:

PUEBLA: Vicinity of San Luis Tultitlanapa, June, 1908, *Purpus* 3374.

OAXACA: Oaxaca, August 15, 1899, *Conzatti* 973.

MORELOS: Barranca near Cuernavaca, alt. 1,530 meters, July 27, 1896, *Pringle* 6377.

CHIHUAHUA: Gallejo Spring, 1846, *Wislizenus* 122.

FEDERAL DISTRICT: Ixtaccihuatl, 1903, *Purpus* 49.

VERA CRUZ: Esperanza, alt. 2,460 meters, August 14, 1891, *Seaton* 493.

GUANAJUATO: Guanajuato, 1880, *Dugès*.

Mirabilis suaveolens was described from specimens collected on hills near Guana-juato. It was said to resemble *M. longiflora*, but to have the stem and flowers more viscid and the leaf blades petioled. Undoubtedly it is a synonym of this species.

Quite as showy as *Mirabilis jalapa*, with its sweet-scented white and purple flowers. The plant is well known in Mexico, where it has received such names as *maravilla del jardín*, *pebete*, *suspiros*, *alzoyatic*, and *atzoyatl*, the last two being Aztec.

7. *Mirabilis wrightiana* A. Gray; Britton & Kearney, Trans. N. Y. Acad. Sci. 14: 28. 1894.

Type locality uncertain.

Specimens examined:

SONORA: Guadalupe Canyon, August 27, 1893, *Merton* 2052.

CHIHUAHUA: No locality given, September 10, 1891, *Hartman* 761; Santa Eulalia Plains, September 11, 1885, *Wilkinson*; between Colonia Garcia and Pratt's ranch below Pacheco, August 22-24, 1899, *Nelson* 6278.

COAHUILA: Canyon above Palomas, Saltillo, 1848, *Gregg* 331.

This species should perhaps be reduced to subspecific rank. It differs from *M. longiflora* principally in the amount of pubescence, and there are numerous intergrading forms.

ADDITIONAL SPECIES REPORTED FROM MEXICO.

Mirabilis hybrida Lepel. Ann. Mus. Paris 8: 481. 1806.

Mirabilis cordata Brouss.; Roem. & Schult. Syst. Veg. 4: 2. 1819.

A form described from cultivated material, thought to be a hybrid of *M. jalapa* and *M. longiflora*, since it combines the peculiarities of those two species. The only material seen has been that from cultivated plants in European gardens. It has been stated that the hybrid is found wild, but the writer has seen no such specimens.

Mirabilis tubiflora Fries; Heimerl, Jahresb. Oberrealsch. Fünfhaus 23: repr. 20. 1897.

This appears to be a nomen nudum. There is nothing to indicate to what plant it was applied.

Mirabilis oaxacae Heimerl, Jahresb. Oberrealsch. Fünfhaus 23: repr. 20. 1897.

The name alone was published by Heimerl^a in 1886. The final description gives simply the following information: "A subspecies or variety with the flowers long-tubular, the limb of the perianth narrow, the involucre short, the fruit more oblong (than in *M. jalapa*) was collected by Franco about Oaxaca in southern Mexico."

18. ACLEISANTHES A. Gray.

Acleisanthes A. Gray, Amer. Journ. Sci. II. 15: 259. 1853.

Pentacrophys A. Gray, loc. cit.

Type species, *Acleisanthes crassifolia* A. Gray.

Hemsley cites four species of the genus from Mexico, one of them *A. berlandieri*. The specimens upon the authority of which this species was included are here referred to *A. greggii*.

KEY TO THE SPECIES.

- Ribs ending above in conspicuous knobs or glands. (*Pentacrophys* A. Gray)..... 1. *A. acutifolia*.
 Rib not ending above in knobs or glands.
 Opposite leaves strongly unequal..... 2. *A. anisophylla*.
 Opposite leaves not strongly unequal.
 Leaves long-attenuate (triangular-lanceolate; plants mostly glabrous)..... 3. *A. longiflora*.

^a Sitzungsber. Akad. Wiss. Math. Naturw. (Wien) 93: 234.

Leaves not long-attenuate.

Stems hirtellous throughout, the leaf blades
puberulent on both surfaces, thick and
fleshy..... 3a. *A. longiflora hirtella*.

Stems glabrous; leaf blades glabrous and much
thinner..... 4. *A. greggii*.

1. *Acleisanthes acutifolia* Standley, Contr. Nat. Herb. 12: 370. 1909.

Type locality, "Maxon's Spring, Texas." Type collected by Dr. V. Havard.

Specimens examined:

CHIHUAHUA: Santa Eulalia Mountains, August 25, 1885, *Pringle* 671.

COAHUILA: Saltillo, June, 1898, *Palmer* 282.

2. *Acleisanthes anisophylla* A. Gray, Amer. Journ. Sci. II. 15: 261. 1853.

Type locality, "Prairies of Turkey Creek and Elm Creek, Western Texas." Type collected by Charles Wright (no. 598).

No Mexican specimens of this species have been examined by the writer, but Hemsley states that it was collected in northern Mexico along the Rio Grande by Schott.

3. *Acleisanthes longiflora* A. Gray, Amer. Journ. Sci. II. 15: 261. 1893.

Type locality, "Valley of the Limpio," Texas. The type is Charles Wright's no. 599.

Specimens examined:

CHIHUAHUA: Vicinity of Aldama, May, 1908, *Palmer* 243; near Chihuahua, 1885, *Pringle* 101.

COAHUILA: Vicinity of Saltillo, May, 1898, *Palmer* 181; Parras, 1905, *Purpus* 1056; Saltillo, 1848, *Gregg* 88; Buena Vista, 1847, *Gregg* 355.

COAHUILA or NUEVO LEÓN: 1880, *Palmer* 1116.

The root of this plant is reported to have useful medicinal properties. It is known under the names of *trompetilla* and *yerba de la rabia*.

3a. *Acleisanthes longiflora hirtella* Standley, Contr. Nat. Herb. 12: 371. 1909.

Type locality, "Near Saltillo, Coahuila." Type collected by Gregg, September 20, 1848 (no. 463).

Only the type specimen has been examined.

4. *Acleisanthes greggii* Standley, Contr. Nat. Herb. 12: 371. 1909.

Type locality, "Monterey, Mexico." Type collected by Gregg, June 22, 1848 (no. 157).

19. BOERHAAVIA L.

Boerhaavia L. Sp. Pl. 3. 1753.

Type species, *Boerhaavia erecta* L.

KEY TO THE SPECIES.

Perennials.

Flowers not in umbels or heads.

Leaves linear or linear-lanceolate..... 1. *B. linearifolia*.

Leaves ovate or obovate.

Flowers clustered, sessile or on very short pedicels;
fruit glabrous..... 2. *B. anisophylla*.

Flowers solitary on pedicels 10 mm. long or more;
fruit viscid..... 3. *B. gracillima*.

Flowers in umbels or heads.

Stems glandular throughout; clusters of flowers and
fruit 6 to 10 mm. in diameter..... 4. *B. viscosa*.

Stems glabrous above or at least not glandular upon the branches of the inflorescence; clusters of flowers and fruit only 2 to 6 mm. broad, often only 4 or 5 flowers in an umbel.

Stems neither hirsute nor villous below..... 5. *B. sonorae*.

Stems more or less hirsute or villous below.

Stems nowhere viscid, more or less hirsute, especially about the nodes, upon the petioles, and margins of the leaf blades..... 6. *B. hirsuta*.

Stems densely viscid-hirsute below..... 7. *B. ixodes*.

Annuals.

Inflorescence spicate.

Anthocarp about as broad as long.

Stems densely villous and viscid; leaves not black-dotted beneath; bracts persistent; anthocarp 4-angled..... 8. *B. wrightii*.

Stems viscid only in rings about the middle of the internodes; leaf blades black-dotted beneath; bracts deciduous; anthocarp 5-angled..... 9. *B. fallax*.

Anthocarp usually twice as long as broad.

Stems densely viscid throughout..... 10. *B. spicata*.

Stems not densely viscid, glabrous at least above.

Anthocarp truncate at the apex..... 11. *B. rosei*.

Anthocarp rounded at the apex.

Perianth 1 mm. long or less; stamens included. (Spikes very slender and few-flowered.)

Ribs of the fruit broad and smooth; stems glabrate; leaf blades thin. 12. *B. watsoni*.

Ribs of the fruit narrow and rugulose; stems viscid-puberulent; leaf blades thicker..... 13. *B. torreyana*.

Perianth 1.5 to 3 mm. long; stamens usually exerted.

Spikes densely flowered; ribs of the fruit thin (perianth 3 mm. long). 14. *B. xanti*.

Spikes with but few flowers, slender, the flowers remote; ribs of the fruit thick and smooth.

Perianth 3 mm. long; leaf blades black-dotted beneath..... 15. *B. alamosana*.

Perianth 1.5 mm. long; leaf blades not black-dotted beneath.. 16. *B. coulteri*.

Inflorescence not spicate.

Anthocarp rounded at the apex, subtended by large, reddish, persistent bracts..... 17. *B. purpurascens*.

Anthocarp truncate or retuse at the apex; bracts small, greenish or whitish, early deciduous.

Anthocarp with 5 conspicuous, thin wings, about as broad as long, retuse at the apex..... 18. *B. alata*.

Anthocarp not with thin wings, angled, the angles sometimes so broad as to be almost wing-like, truncate at the apex.

Anthocarp usually with 3 angles, sometimes with 4.

Inflorescence of axillary or terminal simple umbels..... 19. *B. pterocarpa*.

Inflorescence paniculate..... 20. *B. triquetra*.

Anthocarp 5-angled.

Perianth 2 to 3 mm. long.

Leaf blades linear to lanceolate; anthocarp with thin, wing-like angles..... 21. *B. maculata*.

Leaf blades lanceolate to ovate; angles of the anthocarp thick, narrow, not wing-like..... 22. *B. lateriflora*.

Perianth 1.5 mm. long or less.

Leaf blades ovate (usually black-dotted beneath); flowers in a compound corymb..... 23. *B. erecta*.

Leaf blades lanceolate or oblong; flowers in heads or simple umbels.

Leaf blades lanceolate, black-dotted beneath..... 24. *B. universitatis*.

Leaf blades oblong, not black-dotted beneath..... 25. *B. intermedia*.

1. *Boerhaavia linearifolia* A. Gray, Amer. Journ. Sci. II. 15: 322. 1853.

Type locality, "Western Texas."

Specimens examined:

COAHUILA: Saltillo, May, 1898, *Palmer* 155.

COAHUILA OR NUEVO LEÓN: 1880, *Palmer* 1121.

2. *Boerhaavia anisophylla* Torr. Bot. Mex. Bound. 171. 1859.

Boerhaavia palmeri S. Wats. Proc. Amer. Acad. 18: 142. 1883.

Type locality, "Entrance of the Great Cañon of the Rio Grande," Texas.

Specimens examined:

COAHUILA: Saltillo, 1880, *Palmer* 1120 (type of *B. palmeri*); vicinity of Saltillo, May, 1898, *Palmer* 156; Mesillas to Saltillo, 1848, *Gregg* 533; west of Cerralvo, 1847, *Gregg* 829.

NUEVO LEÓN: Monterey, 1846, *Edwards & Eaton* 61.

CHIHUAHUA: Santa Eulalia Mountains, August 12, 1885, *Pringle* 685.

It should be noticed that Doctor Watson described two distinct species under the name of *Boerhaavia palmeri* besides a *B. spicata palmeri*. The second species is noted upon page 424 under *Boerhaavia spicata*. The one which is a synonym of *B. anisophylla* was described first, and after it was found to be a synonym the second was described. In the original description of the first *B. palmeri* it is wrongly called an annual.

2a. *Boerhaavia anisophylla micrantha* Heimerl, Ann. Cons. Jard. Genève 5: 187. 1901.

Type locality, "In campis ad Tehuacán," Puebla. Type collected by Galeotti (no. 581).

No material of this form has been examined. It was described as having flowers much smaller than the species. From the locality in which it is found it should be specifically distinct.

3. *Boerhaavia gracillima* Heimerl, Bot. Jahrb. Engler 11: 86. pl. 2. f. 1a-1g. 1889.

Boerhaavia anisophylla paniculata Coulter, Contr. Nat. Herb. 2: 356. 1894, not *B. paniculata* Rich.

Type locality, "In territorio Mexicano." Type collected by Hartweg (no. 45).

Specimens examined:

CHIHUAHUA: Rocky hills near Chihuahua, August 15, 1885, *Pringle* 665; mountains of Cosihuiriachi, 1846, *Wislizenus* 174; vicinity of Chihuahua, alt. 1,300 meters, May, 1908, *Palmer* 199; southwestern Chihuahua, 1885, *Palmer* 663; in the Sierra Madre near Seven Star Mine, alt. 2,150 meters, August 28, 1899, *Townsend & Barber* 379.

BAJA CALIFORNIA: San José del Cabo, 1890, *Brandegge* 487.

SONORA: Guaymas, 1887, *Palmer* 663; Sierra de Alamos, March 15, 1910, *Rose, Standley & Russell* 12874.

AGUASCALIENTES: Near Aguascalientes, August 20, 1901, *Rose & Hay* 6199.

DURANGO: Ramos to Inde, August 11 to 14, 1898, *Nelson* 4688; Durango and vicinity, 1896, *Palmer* 629.

OAXACA: Vicinity of Cuicatlan, alt. 550 to 770 meters, October, 1894, *Nelson* 1604; Tomellín, August 14, 1910, *Hitchcock*.

PUEBLA: Near Tehuacán, September, 1905, *Rose, Painter & Rose* 10145; Tehuacán, August 9, 1910, *Hitchcock*.

HIDALGO: Ixmiquilpan, 1905, *Purpus* 1436.

QUERÉTARO: Querétaro, July 24, 25, 1910, *Hitchcock*.

WITHOUT DEFINITE LOCALITY: Type collection.

In March, 1910, the writer saw the dead plants in abundance in cultivated fields about Hermosillo, Sonora.

In the original description of the species two collections are mentioned, the first being Hartweg's and the other Pringle's 665 from Chihuahua. There is no indication of which was chiefly used in drawing up the description, hence the former should be taken as the type.

4. *Boerhaavia viscosa* Lag. & Rodr. Anal. Cienc. Nat. 4: 256. 1801.

Boerhaavia glandulosa Anderss. Enum. Pl. Galap. 64. 1861.

Boerhaavia diffusa viscosa Heimerl, Jahresb. Oberrealsch Fünfhaus 23: repr. 27. 1897.

Type locality, Peru.

Specimens examined:

CHIHUAHUA: Southwestern Chihuahua, 1885, *Palmer* 212; near Chuichupa, September 6, 1899, *Townsend & Barber* 408.

TAMAULIPAS: Vicinity of Victoria, alt. 320 meters, May 6, 1907, *Palmer* 200, 210, 426; Tampico, July 21, 1910, *Hitchcock*.

SINALOA: Mazatlan, June, 1897, *Rose*; near Mazatlan, March 31, 1910, *Rose, Standley & Russell* 13771; gravel beds along the Rio Fuerte, San Blas, March 24, 1910, *Rose, Standley & Russell* 13396; Ymala, September, October, 1891, *Palmer* 1697.

DURANGO: Durango, 1896, *Palmer* 300.

SAN LUIS POTOSÍ: Cárdenas, July 19 and 20, 1910, *Hitchcock*.

ZACATECAS: Near San Juan Capistrano, August 18, 1897, *Rose* 2417; near Concepción del Oro, August, 1904, *Palmer* 290.

TEPIC: Arroyo south of Acaponeta, April 9, 1910, *Rose, Standley & Russell* 14256; Tepic, January, February, 1892, *Palmer*; Acaponeta, February, 1895, *Lamb* 528; Acaponeta, June, 1897, *Rose* 1844.

OAXACA: Valley of Oaxaca, April 2, 1896, *Conzatti & Gonzales* 83; Oaxaca, June 28, 1900, *Deam*; Cuicatlan, September 24, 1894, *L. C. Smith* 197; vicinity of Yalalag, alt. 1,230 to 2,400 meters, July, 1894, *Nelson* 944; valley of Oaxaca, alt. 1,570 to 1,780 meters, September 8, 1894, *Nelson* 1240; Oaxaca Valley, alt. 1,530 meters; October 30, 1894, *C. L. Smith* 774.

COAHUILA: Torreon and vicinity, 1898, *Palmer* 487.

NUEVO LEON: Monterey, October, 1895, *Caec. & Ed. Seler* 1072.

MORELOS: Valley of Cuantla, alt. 1,230 meters, May 30, 1901, *Pringle* 9308; fields near Yautepec, alt. 1,230 meters, May 22, 1904, *Pringle* 13177.

PUEBLA: Tehuacán, 1888, *Caec. & Ed. Seler* 12.

MICHOACAN or GUERRERO: La Orilla, Rives de las Balsas, 1898, *Langlassé* 163.

MEXICO: Environs de Mexico, *Berlandier* 577; near City of Mexico, 1849, *Gregg* 615; Trapiche Concepción, June, *Galeotti* 588; Tizapan, Valley of Mexico, May 23, 1865-6, *Bourgeau* 180.

COLIMA: Acapulco and vicinity, 1895, *Palmer* 308.

YUCATAN: Campeche, *Perrine*.

VERA CRUZ: Vera Cruz, 1853, *Müller* 45.

CHIAPAS: Near Tuxtla, alt. 735 to 780 meters, September 1, 1895, *Nelson* 3103.

GUATEMALA: Jumaytepeque, Depart. Santa Rosa, alt. 1,840 meters, September, 1892, *Heyde & Lux* 4061; Laguna Amatitlán, Depart. Amatitlán, alt. 1,200 meters, February, 1890, *J. D. Smith* 1914; along southern shore of Lake Amatitlán, alt. 1,250 meters, April 10, 1905, *Pittier* 114; Amatitlán, alt. 1,200 meters, October, 1904, *Tuerckheim* 8740; Gualán, Depart. Zacapa, alt. 122 meters, January 1, 1906, *Kellerman* 5618.

The name of *coananepilli* is given to this species in some parts of central and southern Mexico. It is reputed to have medicinal properties.

4a. *Boerhaavia viscosa apiculata* Standley, Contr. Nat. Herb. 12: 383. 1909.

The type of this has not been reexamined and no additional material has been seen. Perhaps it must be considered a synonym of the species, although it seems different in having obtuse and mucronate leaf blades. The type was collected at Cofradia near Culiacan, Sinaloa, by Mr. T. S. Brandegee, October 20, 1904.

5. *Boerhaavia sonora* Rose, Contr. Nat. Herb. 1: 110. 1891.

Type locality, "Along watercourses near Alamos," Sonora. Type collected by Dr. Edward Palmer in 1890 (no. 715).

Specimens examined:

SONORA: Type; Hermosillo, June 10, 1897, *Maltby* 221, 259; vicinity of Navojoa, March 21, 1910, *Rose, Standley & Russell* 13137; rocky island in harbor, Guaymas, April 23, 1910, *Rose, Standley & Russell* 15018; Guaymas, June, 1897, *Rose* 1243.

BAJA CALIFORNIA: Los Angeles Bay, 1887, *Palmer* 172 and 172½; Todos Santos, January 2, 1890, *Brandegee* 486; San José del Cabo, March 6, 1897, *Anthony* 356.

SINALOA: Sandy soil along the river near Fuerte, March 25, 1910, *Rose, Standley & Russell* 13478; along the river near Rosario, April 15, 1910, *Rose, Standley & Russell* 14628; open field near Villa Union, April 2, 1910, *Rose, Standley & Russell* 13934.

TEPIC: Acaponeta, June 23, 1897, *Rose* 1432.

A specimen collected by Doctor Palmer at Torreon, Coahuila, in October, 1898, is very closely related to this species; it differs merely in having larger heads of flowers and fruit.

The species seems to be fairly common along the western coast of Mexico in Sonora and Sinaloa. It is frequent in open ground, especially in sandy soil, besides being abundant in waste places and in cultivated fields. The roots, at Fuerte, were said to be used medicinally. The common name was given here as *mochi*. It was stated that the town of Las Mochis farther down the river was given its name because of the abundance of the plant about its site. This statement was contradicted by others, however.

6. *Boerhaavia hirsuta* Willd. Phytog. 1: 1. 1794.*Boerhaavia polymorpha* L. C. Rich. Act. Soc. Hist. Nat. Paris 1: 185. 1792.*Boerhaavia caribaea* Jacq. Obs. Bot. 4: 5. pl. 84. 1771.*Boerhaavia diffusa hirsuta* Kuntze, Rev. Gen. Pl. 533. 1891.

Type locality not ascertained.

*Specimens examined:*OAXACA: Tehuantepec, 1910, *Orcutt* 3014.YUCATAN: 1895, *Gaumer* 309; Merida, November 30, 1864, *Schott* 3; Merida, February 12, 1865, *Schott* 21.TABASCO: San Juan Bautista, 1888, *Roviroso* 159.GUATEMALA: Atucatempa, Depart. Jatiapa, alt. 920 meters, April, 1894, *Heyde & Lux* 6371; Gualán, January 19, 1905, *Deam* 393.SALVADOR: *Renson* 319.PANAMA: Ahorca Lagarto to Culebra, March 9, 1905, *Cowell* 369.**7. *Boerhaavia ixodes* Standley, sp. nov.**

Perennial from a thick woody root; stems ascending, much branched, 40 cm. long or more, stout, densely glandular-hirsute below, glabrous above; leaf blades ovate or oblong, the lower obtuse, the upper acute, their margins somewhat undulate, thick, paler beneath, glandular-pubescent on both surfaces or almost glabrous, on petioles as long as the blades or shorter; flowers mostly sessile, few in each head, dark red; anthocarp ellipsoidal or clavate, strongly glandular.

Type in the U. S. National Herbarium, no. 573670, collected in the vicinity of Chihuahua, May 1 to 21, 1908, by Dr. Edward Palmer (no. 193).

In an earlier paper dealing with this family the writer confused this plant with *B. hirsuta*, and the specimens have usually been distributed under that name. Doctor Heimerl has designated it in the herbarium as a subspecies of *B. viscosa*, but it is amply distinct from both those species. Compared with the latter it has much more abundant and different pubescence on the lower part of the stem, and the branches of the inflorescence are glabrous rather than glandular. *Boerhaavia hirsuta* is altogether without glandular pubescence.

*Additional specimens examined:*BAJA CALIFORNIA: Palm Valley, May 30, 1888, *Orcutt*; Santa Agueda, 1890, *Palmer* 225; Valle de las Palomas, May, 1883, *Orcutt*; Socorro Island, 1903, *Barkley* 205.DURANGO: Vicinity of Durango, 1896, *Palmer*.SONORA: Sierra de Alamos, March 14, 1910, *Rose, Standley & Russell* 12819; about 5 miles below Minas Nuevas, March 12, 1910, *Rose, Standley & Russell* 12671; bed of the Rio de Sonora near Hermosillo, March 6, 1910, *Rose, Standley & Russell* 12454.STATE UNKNOWN: Near San Pablo, April 20, 1847, *Gregg*; Cartajena, October, 1857, *Schott*.

In addition to these Mexican specimens the following from the southwestern United States have been examined:

ARIZONA: Congress Junction, alt. 920 meters, May 4, 1903, *Jones*; fenced area, Santa Rita Forest Reserve, May, 1903, *Griffiths* 4369; same locality, June, 1903, *Griffiths* 4782; Tucson, April 8, 1892, *J. W. Toumey* 473a; mesas, May 7, 1881, *Pringle*.CALIFORNIA: San Jacinto Hot Springs, San Diego County, July 4, 1892, *Hasse* 5662; plains near the Middle Tule River, alt. 245 to 325 meters, 1897, *Purpus* 5009.**8. *Boerhaavia wrightii* A. Gray, Amer. Journ. Sci. II. 15: 322. 1853.***Boerhaavia bractcosa* S. Wats. Proc. Amer. Acad. 20: 370. 1885.

Type locality, "Pebbly hills near El Paso," Texas. Type collected by Charles Wright (no. 618).

*Specimens examined:*SONORA: Papago Tanks, Pinacate Mountains, November 16, 1907, *Mac Dougal* 43.

9. *Boerhaavia fallax* Standley, sp. nov.

A much branched annual with slender, erect or spreading branches; stems sparingly pilose below, glabrous above, but with glandular rings about the middle of the internodes; leaf blades lanceolate or linear-lanceolate, acute, glabrous, whitish beneath, and conspicuously brown-dotted, on petioles one-half or one-third as long; bracts small, linear-lanceolate, soon deciduous; flowers few, in slender, loose spikes, these in open panicles; perianth about 3 mm. long, with 1 exerted stamen; anthocarp about 2.5 mm. long and almost as thick, very obtuse above, constricted below, its 5 ribs acutish, smooth.

Type in the U. S. National Herbarium, no. 22930, collected at Los Angeles Bay, Baja California, in 1887, by Dr. Edward Palmer (no. 603).

The specimens were distributed as *Boerhaavia wrightii*, but they do not appear to be more closely related to that species than to some others. From that they differ in the smaller, less conspicuous, less brightly colored bracts, narrower leaves, much less pubescent stem, and the 5-ribbed fruit.

10. *Boerhaavia spicata* Choisy in DC. Prodr. 13²: 456. 1849.

Boerhaavia palmeri S. Wats. Proc. Amer. Acad. 24: 69. 1889.

Type locality, Mexico.

Specimens examined:

CHIHUAHUA: Hacienda de San Miguel near Batopilas, 1885, *Palmer* 209.

SONORA: Dry sandy soil near Guaymas, 1887, *Palmer* 683; arroyo near Alamos, March 15, 1910, *Rose, Standley & Russell* 12899.

SINALOA: Open field near Villa Union, April 2, 1910, *Rose, Standley & Russell* 13935; sandy soil along the Rio Fuerte near Fuerte, March 25, 1910, *Rose, Standley & Russell* 13455; Culiacan, August 20, 1904, *Brandege*; along the river near Rosario, in sandy soil, April 14, 1910, *Rose, Standley & Russell* 14587.

WITHOUT DEFINITE LOCALITY: Fragment of the type in the Gray Herbarium.

11. *Boerhaavia rosei* Standley, sp. nov.

A densely branched annual with spreading or ascending branches; stems slender, reddish, puberulent or covered in part with short gland-tipped hairs, above glabrous except for the glandular rings about the middle of the internodes; leaf blades ovate to lance-ovate, small, 10 to 20 mm. long, acute, thick, dull green above, paler beneath or glaucous, rounded or truncate at the base, glabrous; inflorescence much branched, the spikes slender with the flowers few and rather distant, never crowded; perianth less than 1 mm. long, pinkish, glabrous; stamens included; bractlets linear, attenuate, hyaline; anthocarp narrowly obpyramidal, 3 mm. long, truncate at the apex, brown at maturity, glabrous, with 5 narrow, straight, smooth ribs.

Type in the U. S. National Herbarium, no. 636279, collected in sandy soil along the Rio Fuerte near the town of Fuerte, Sinaloa, March 25, 1910, by *Rose, Standley & Russell* (no. 13156). The fruit of the plant strongly resembles that of *Boerhaavia erecta*. No other species of this group has truncate fruit, that of the others being rounded at the apex.

12. *Boerhaavia watsoni* Standley, Contr. Nat. Herb. 12: 384. 1909.

Boerhaavia spicata palmeri S. Wats. Proc. Amer. Acad. 24: 70. 1889.

Type locality, "Sandy mesas about Guaymas," Sonora. Type collected by Dr. Edward Palmer in 1887 (no. 141).

Specimens examined:

SONORA: Type; prairies, September, 1851, *Thurber* 792.

13. *Boerhaavia torreyana* (S. Wats.) Standley, Contr. Nat. Herb. 12: 385. 1909.

Boerhaavia spicata torreyana S. Wats. Proc. Amer. Acad. 24: 70. 1889.

Type locality, "Texas, New Mexico, and Arizona."

Specimens examined:

COAHUILA: Torreon, October, 1898, *Palmer* 488.

14. *Boerhaavia xanti* S. Wats. Proc. Amer. Acad. 24: 69. 1889.

Type locality, "Cape Saint Lucas," Baja California. Type collected by L. J. Xantus in 1859-60 (no. 93).

Specimens examined:

BAJA CALIFORNIA: Type; same locality, *Xantus* 92; San José del Cabo, September 1, 1890, *Brandegge* 484; Binorama, 1899, *Brandegge*.

SONORA: Guaymas, 1887, *Palmer* 681.

Mr. Brandegge's no. 484 matches the type almost exactly. The specimens from Guaymas differ somewhat in having the leaves not black-dotted beneath and larger, less acute, and thinner, while the stems are more villous; they are without fruit.

15. *Boerhaavia alamosana* Rose, Contr. Nat. Herb. 1: 110. 1891.

Type locality, "Hillsides about Alamos," Sonora. Type collected by Dr. Edward Palmer in September, 1890 (no. 714).

Only the type specimen has been examined.

The species is closely related to *B. coulteri* and more and better material is needed of both species to determine their exact status.

16. *Boerhaavia coulteri* (Hook.) S. Wats. Proc. Amer. Acad. 24: 70. 1889.

Senkenbergia coulteri Hook. f. in Benth. & Hook. Gen. Pl. 3: 6. 1880.

Type locality, Mexico.

Specimens examined:

SONORA: Rocky hillside near Hermosillo, March 7, 1910, *Rose, Standley & Russell* 12545; Mexican Boundary, *Schott*.

WITHOUT DEFINITE LOCALITY: *Doctor Coulter* 1425.

This last specimen probably is a duplicate type. The publication of the species is very unsatisfactory, the description being so short as to make the name almost a nomen nudum. Coulter's specimens probably came from northern Sonora and very possibly from the region about Hermosillo, as he is known to have collected there.

17. *Boerhaavia purpurascens* A. Gray, Amer. Journ. Sci. II. 15: 321. 1853.

Type locality, "Stony hills near the copper mines of Santa Rita, New Mexico." Type collected by Charles Wright (no. 1725).

Specimens examined:

CHIHUAHUA: Near Chihuahua, 1887, *Palmer* 1582.

SONORA: Guadalupe Canyon, August 27, 1893, *Merton* 2044.

18. *Boerhaavia alata* S. Wats. Proc. Amer. Acad. 24: 69. 1889.

Type locality, "On a small rocky island in Guaymas harbor," Sonora. Type collected by Dr. Edward Palmer in 1887 (no. 332, in part).

Specimens examined:

SONORA: Type; rocky island in the harbor, Guaymas, March 10, 1910, *Rose, Standley & Russell* 12616.

When the writer visited Guaymas in March and again in April none of the plants were seen growing, the season being still too dry. The dead plants of the previous season, however, were noticed everywhere. This species seemed to be the most abundant of all in this locality.

19. *Boerhaavia pterocarpa* S. Wats. Proc. Amer. Acad. 17: 376. 1882.

Type locality, "Apache Pass, Arizona." Apache Pass is in the Chiricahua Mountains. The type was collected by J. G. Lemmon in 1881.

Specimens examined:

SONORA: Near Altar, 1904, *Griffiths* 6887.

20. *Boerhaavia triquetra* S. Wats. Proc. Amer. Acad. 24: 69. 1889.

Type locality, "Sandy plains and stony ridges near Los Angeles Bay," Baja California. Type collected by Dr. Edward Palmer in 1887 (no. 521).

Specimens examined:

BAJA CALIFORNIA: Type; also Palmer's 603 collected in the same locality during the same season.

21. *Boerhaavia maculata* Standley, Contr. Nat. Herb. 12: 379. 1909.

Type locality, "Guaymas, Sonora." Type collected by Dr. Edward Palmer in 1887 (no. 332, in part).

Specimens examined:

SONORA: Type.

SINALOA: Topolobampo, September, 1897, *Palmer* 208; dry rocky cliffs along the sea near Topolobampo, March 23, 1910, *Rose, Standley & Russell* 13324.

One of the most noticeable peculiarities of this species is the very long pedicels of some of the flowers, the longest becoming 10 mm. long or even more; the uppermost flowers of the corymb have shorter pedicels. The flowers, too, are very large for the genus; in the specimens collected by the writer at Topolobampo they were 6 or 7 mm. in diameter, of a delicate pink color. They were open late in the forenoon and were rather conspicuous upon the cliffs where plant life was not abundant. Only a few plants were observed and they probably were brought into flower so early because of the water dashed up from the sea upon the cliffs.

22. *Boerhaavia lateriflora* Standley, sp. nov.

An erect or spreading annual, much branched; stems slender, finely puberulent; leaf blades broadly lanceolate to oblong, glabrous, thin, of about the same color on both surfaces, acute to obtuse at the apex, rounded at the base, all on slender petioles one-third to half as long as the blade; inflorescence loosely paniculate, the earlier inflorescence consisting of peduncled, axillary umbels; flowers in many-flowered umbels, equally pedicellate; perianth white, 2 mm. long or more; stamens barely exerted; anthocarp clavate, 5-angled, 3 mm. long or less.

Type in the U. S. National Herbarium, no. 22945, collected at Guaymas, Sonora, in 1887, by Dr. Edward Palmer (no. 680). The station which has added so many species of *Boerhaavia* to our flora yields yet another. This one is nearest *B. intermedia* but differs in its thinner, usually more acute leaf blades which are not strongly glaucous beneath, and in its large white perianth. One of the most noticeable characteristics of the plant is the large number of long-peduncled umbels borne in the axils of the lower leaves, whence the specific name.

Other specimens were collected at Guaymas in 1887 by Doctor Palmer under numbers 678, 682, 684, 685, 686, and 687.

23. *Boerhaavia erecta* L. Sp. Pl. 3. 1753.

Boerhaavia virgata H. B. K. Nov. Gen. & Sp. 2: 215. 1817.

Valeriana latifolia Mart. & Gal. Bull. Acad. Sci. Brux. 11¹: 124. 1844.

Boerhaavia paniculata subacuta Choisy in DC. Prodr. 13²: 451. 1849.

Type locality, "In Vera Cruce," Mexico.

Specimens examined:

SONORA: Guaymas, 1887, *Palmer* 182.

SINALOA: Culiacan, 1891, *Palmer* 1505; old field east of Mazatlan, April 7, 1910, *Rose, Standley & Russell* 14160; sandhills near Rosario, April 15, 1910, *Rose, Standley & Russell* 14630; Rosario, July 24, 1897, *Rose*; Culiacan, 1904, *Brandege*; Rosario, July, 1897, *Rose* 1827, 1844; between Rosario and Colomas, July 12, 1897, *Rose* 1605.

TEPIC: Arroyo south of Acaponeta, April 9, 1910, *Rose, Standley & Russell* 14251; Acaponeta, June 29, 1897, *Rose* 1498.

- JALISCO:** Barranca near Guadalajara, June, 1886, *Palmer* 121; Bolaños, September, 1897, *Rose* 3684.
- DURANGO:** Ramos to Inde, August, 1898, *Nelson* 4695; barren hills about Tlahualilo, alt. 1,000 meters, August 27, 1905, *Pittier* 487.
- NUEVO LEON:** Monterey, September 7, 1902, *Pringle* 11139.
- OAXACA:** Near San Gerónimo, alt. 65 meters, July, 1895, *Nelson* 2760; Cuicatlan, September 24, 1894, *L. C. Smith* 206.
- PUEBLA:** Santa Lucia, vicinity of San Luis Tultitlanapa, June, 1908, *Purpus* 3521.
- GUERRERO:** Balsas, September 9, 1910, *Hitchcock*.
- MORELOS:** Near Yautepec, July, 1905, *Rose, Painter & Rose* 8549.
- TAMAULIPAS:** Vicinity of Victoria, alt. 320 meters, 1907, *Palmer* 198; Tampico, July 21, 1910, *Hitchcock*.
- COLIMA:** Acapulco, 1894-5, *Palmer* 309; Colima, July, 1897, *Palmer* 28; Manzanillo, December, 1890, *Palmer* 907.
- VERA CRUZ:** Rio de Santa Maria, Zacuapan, August, 1906, *Purpus* 1929.
- YUCATAN:** Merida, June 12, 1865, *Schott* 478; 1896, *Valdez* 91; 1895, *Gaumer* 361.
- SALVADOR:** *Renson* 147; San Salvador, April, 1905, *Velasco* 8857.
- NICARAGUA:** 1853-6, *C. Wright*; Asseradores Island, Depart. Chinandega, January 19, 1903, *Baker* 2134.
- GUATEMALA:** Amatitlán, Depart. Amatitlán, alt. 1,200 meters, October, 1904, *Tuerckheim* 8741; waste places about Gualán, alt. 190 meters, June 20, 1909, *Deam* 6386; vicinity of Puerto Barrios, near sea level, June 2, 1903, *Pittier* 381; Moran, Depart. Amatitlán, February 8, 1905, *Kellerman* 4535; Cuajiniquilapa, Depart. Santa Rosa, alt. 800 meters, September, 1893, *Heyde & Lux* 6296; Chicacao, Depart. Sololá, alt. 460 meters, February, 1894, *Heyde & Lux* 6372; Escuintla, Depart. Escuintla, alt. 335 meters, March, 1890, *J. D. Smith* 2045.
- COSTA RICA:** In open field, Nicoya, alt. 200 meters, May 22, 1903, *Cook & Doyle* 650; plaines de Zent, finca Chirripó, dans les cultures, alt. 200 meters, February, 1900, *Pittier* 16044; Zent banana plantation, Port Limon, at sea level, May 2, 1903, *Cook & Doyle* 450; cultures á Nicoya, January, 1900, *Pittier* 13813.

HONDURAS: San Pedro Sula, 1887, *Thieme* 5425b.

The subspecies *thorneri* (M. E. Jones) Standley, is represented in Mexico by some of the specimens listed. From the typical form it differs merely in not having the leaves black-dotted beneath and in its somewhat stricter habit.

24. *Boerhaavia universitatis* Standley, Contr. Nat. Herb. 12: 380. 1909.

Type locality, "On the campus of the university, Tucson, Arizona." Type collected by Prof. J. J. Thornber, in 1903.

Specimens examined:

BAJA CALIFORNIA: Carmen Island, November, 1890, *Palmer* 845; San José del Cabo, October 24, 1902, *Brandeggee*; same locality, November, 1902, *Brandeggee*; same locality, September 3, 1890, *Brandeggee* 485.

COAHUILA: Monclova, 1880, *Palmer* 1123.

CHIHUAHUA: Southwestern Chihuahua, 1885, *Palmer* 225.

SONORA: Agiabampo, 1890, *Palmer* 758; Guaymas, 1887, *Palmer* 679.

25. *Boerhaavia intermedia* M. E. Jones, Contr. Western Bot. 10: 41. 1902.

Type locality: "El Paso, Texas."

Specimens examined:

CHIHUAHUA: *Thurber* 732; hills near Chihuahua, 1886, *Pringle*; between Casas Grandes and Sabinal, September, 1899, *Nelson* 6378.

SONORA: August, 1851, *Thurber* 1050.

COAHUILA: Torreon, October, 1898, *Palmer* 468.

20. **CYPHOMERIS** Standley, nom. nov.

Lindenia Mart. & Gal. Bull. Acad. Sci. Brux. 10¹: 357. 1843, not Benth. 1842.

Tinantia Mart. & Gal. op. cit. 11¹: 240. 1844, not Schiedw. 1839.

Senkenbergia Schauer, Linnaea 19: 711. 1847, not *Senkenbergia* Gaert. Mey. & Scherb. 1800.

Type species, *Lindenia gypsophiloides* Mart. & Gal.

KEY TO THE SPECIES.

- Stems and leaves glabrous; leaf blades ovate-lanceolate or linear-lanceolate, usually entire; inflorescence of usually simple racemes..... 1. *C. gypsophiloides*.
 Stems and leaves puberulent; leaf blades ovate, the margins undulate; inflorescence much branched..... 2. *C. crassifolia*.

1. **Cyphomeris gypsophiloides** (Mart. & Gal.) Standley.

Lindenia gypsophiloides Mart. & Gal. Bull. Acad. Sci. Brux. 10¹: 358. 1843.

Tinantia gypsophiloides Mart. & Gal. op. cit. 11¹: 240. 1844.

Senkenbergia annulata Schauer, Linnaea 19: 711. 1847.

Boerhaavia gibbosa Pavon; Choisy in DC. Prodr. 13²: 457. 1849.

Senkenbergia gypsophiloides Benth. & Hook. Gen. Pl. 3: 6. 1880.

Boerhaavia gypsophiloides Coulter, Contr. Nat. Herb. 2: 354. 1894.

Type locality, "Dans les plaines à mimosées et à cactées de Tehuacan de las Granadas, à environ 5,000 pieds."

Specimens examined:

CHIHUAHUA: Near Chihuahua, 1885, *Pringle* 693; Chihuahua, 1886, *Pringle* 937.

COAHUILA: Saltillo, 1898, *Palmer* 1714.

PUEBLA: Tehuacán, 1905, *Purpus* 1331.

HIDALGO: Ixmiquilpan, 1905, *Purpus* 1438; on Sierra de la Mesa, 1905, *Rose, Painter & Rose* 9133.

NUEVO LEÓN: Between Monterey and Cerralvo, 1847, *Wislizenus* 340.

WITHOUT DEFINITE LOCALITY: *Doctor Coulter* 1434; *Gregg* 513.

2. **Cyphomeris crassifolia** Standley.

Senkenbergia crassifolia Standley, Contr. Nat. Herb. 12: 373. 1909.

Type locality, "Saltillo, Coahuila." Type collected in 1898 by Dr. Edward Palmer (no. 172).

Specimens examined:

NUEVO LEÓN: Monterey, *Edwards*; Nuevo León, October 12, 1895, *Caec. & Ed. Seler* 1111.

COAHUILA: Azufrota, 1848-9, *Gregg* 513.

WITHOUT DEFINITE LOCALITY: Between San Luis Potosí and San Antonio, Texas, August, 1878, *Parry & Palmer* 771 (in part).

21. **COMMICARPUS** Standley.

Commicarpus Standley, Contr. Nat. Herb. 12: 373. 1909.

Type species, *Boerhaavia scandens* L.

KEY TO THE SPECIES.

- Pedicels glabrous; glands scattered irregularly over the fruit..... 1. *C. scandens*.
 Pedicels pubescent; glands arranged in more or less regular horizontal rows about the fruit..... 2. *C. brandegei*.

1. **Commicarpus scandens** (L.) Standley, Contr. Nat. Herb. 12: 373. 1909.

Boerhaavia scandens L. Sp. Pl. 3. 1753.

Boerhaavia sarmentosa P. Br. Nat. Hist. Jam. 123. 1756.

Boerhaavia grahami A. Gray, Amer. Journ. Sci. II. 15: 323. 1853.

Type locality, "In Jamaica ad urbem jago de la vega."

Specimens examined:

CHIHUAHUA: Vicinity of Aldama, May, 1908, *Palmer* 241.

SONORA: Santa Cruz Valley, 1852, *Thurber* 694; Guaymas, October, 1897, *Maltby* 192; Guaymas, 1887, *Palmer* 146; Hermosillo, 1892, *Brandege*; rocky hills of the Sonoita, 1851-52, *Wright* 1715; rocky hill near Hermosillo, March 4, 1910, *Rose, Standley & Russell* 12344; along an irrigating ditch, Hermosillo, March 8, 1910, *Rose, Standley & Russell* 12540; hedges, Alamos, March 14, 1910, *Rose, Standley & Russell* 12844; hedges, Navojoa, March 21, 1910, *Rose, Standley & Russell* 13146.

COAHUILA: Environs de Matamoros, 1839, *Berlandier* 3204.

SAN LUIS POTOSÍ: Region of San Luis Potosí, 1878, *Parry & Palmer* 772.

BAJA CALIFORNIA: Los Angeles Bay, 1887, *Palmer* 146; San José del Cabo, October 25, 1902, *Brandege*; Santa Agueda, March, 1890, *Palmer* 262; San Gregorio, 1890, *Brandege* 483.

SINALOA: Altata, 1904, *Brandege*; Culiacan, 1904, *Brandege*; Villa Union, 1895, *Lamb* 388; Mazatlan, March 30, 1910, *Rose, Standley & Russell* 13733; Fuerte, March 25, 1910, *Rose, Standley & Russell* 13491; thickets along the river, San Blas, March 24, 1910, *Rose, Standley & Russell* 13398; hedges, Villa Union, April 2, 1910, *Rose, Standley & Russell* 13912; along the river near Rosario, April 14, 1910, *Rose, Standley & Russell* 14602; Culiacan, April 21, 1910, *Rose, Standley & Russell* 14888.

TAMAULIPAS: Sierra de San Carlos de Tamaulipas, 1836, *Berlandier* 3205.

ZACATECAS: Near San Juan Capistrano, August 21, 1897, *Rose* 2456.

OAXACA: Oaxaca, April, 1901, *Conzatti & Gonzales* 1273; Cuicatlan, September 24, 1894, *L. C. Smith* 192; de Tlacolula á Santa Ana, June, 1906, *Conzatti* 1459; vicinity of Cuicatlan, October, 1894, *E. W. Nelson* 1609; Tequisistlan, January 8, 1896, *Caec. & Ed. Seler* 1685; Oaxaca Valley, 1894, *C. L. Smith* 859.

HIDALGO: Ixmiquilpan, 1905, *Purpus* 1437; near Ixmiquilpan, *Rose, Painter & Rose* 8939.

PUEBLA: Near Tehuacán, 1905, *Rose, Painter & Rose* 9963.

QUERÉTARO: Near Querétaro, August, 1906, *Rose, Painter & Rose* 11174; between Higuerillas and San Pablo, August 24, 1905, *Rose, Painter & Rose* 9815 and *Altamirano* 1701.

MICHOACAN OF GUERRERRO: Petatlan, alt. 50 meters, November 15, 1898, *E. Langlassé* 637.

YUCATAN: 1895, *Gaumer* 627.

COLIMA: Ymala, 1891, *Palmer* 1730.

It is possible that this may be an introduced plant on the west coast of Mexico as well as elsewhere. I have seen it only in the immediate vicinity of towns where it is almost invariably found in the hedges that line streets and roads. The fruit is exceedingly viscid, adhering to everything with which it comes in contact, so that it might easily be carried about by animals brushing against the plants or otherwise. The viscosity is retained by the fruits for a very long time in herbarium specimens.

2. *Commicarpus brandegei* Standley, Contr. Nat. Herb. 12: 374. 1909.

Boerhaavia elongata Brandege, Proc. Cal. Acad. II. 2: 199. 1889, not Salisb. Prodr. Stirp. 56. 1796.

Type locality, "San Pablo, Jesús María," Baja California.

Specimens examined:

BAJA CALIFORNIA: San Pablo, 1889, *Brandege*, type; Jesús María, 1889, *Brandege*; Arroyo Salado, 1901, *Purpus* 243.

2a. *Commicarpus brandegei glabrior* Standley, Contr. Nat. Herb. 12: 374. 1909.

Type locality, "San José del Cabo, Baja California." Type collected by T. S. Brandege, September 29, 1893.

Specimens examined:

BAJA CALIFORNIA: Cape San Lucas, 1911, *Rose* 346.

22. ANULOCAULIS Standley.

Anulocaulis Standley, Contr. Nat. Herb. 12: 374. 1909.

Type species, *Boerhaavia eriosolena* A. Gray.

1. *Anulocaulis eriosolenus* (A. Gray) Standley, Contr. Nat. Herb. 12: 375. 1909.

Boerhaavia eriosolena A. Gray, Amer. Journ. Sci. II. 15: 322. 1853.

Type locality, "Valley near Azufrota, in Coahuila or Durango, Northern Mexico."

Type collected by Doctor Gregg in 1848 (no. 512).

Specimens examined:

COAHUILA: Azufrota, type; Viesca, 1905, *Purpus* 1053; Torreon, 1903, *Purpus*;

San Lorenzo de Laguna, 70 miles southwest of Parrás, May, 1880, *Palmer* 1124.

Anulocaulis leiosolenus (Torr.) Standley should be found on the Mexican side of the Rio Grande, since it was first collected in the canyon of that stream 70 miles below El Paso.