

SCROPHULARIACEAE OF COLOMBIA—I.

BY FRANCIS W. PENNELL.

For a period of eight months, during 1917 and 1918, the writer was engaged in scientific work in Colombia. No attempt will now be made to tell the story of his adventures there, nor to give more than the briefest summary of his impressions of Tropical or Andine vegetation. A short narrative of my explorations and a comparative sketch of the plant-life seen has already been presented in the *Journal of The New York Botanical Garden* for June, 1918. I will simply say that my travels took me from the northern seacoast to the Andes east of Neiva in 3° north latitude, from the prairies and lowland forest of the Orinoco drainage, from the Magdalena and Sinu valleys, upward through every zone of vegetation to the summits of each of the three ranges of the Andes. The greatest diversity of life was seen, and the collections of plants, brought from nearly all points visited, include much that is new to science.

From July 6 to August 16, 1917, it was my privilege to work with Dr. Henry H. Rusby, of the College of Pharmacy, New York City—a companionship which to a botanical novice in a strange land was invaluable. All specimens made on and before August 16, while numbered consecutively with those made by myself alone later, are to be cited as Rusby & Pennell. . . .

Detailed maps of Colombia are difficult to obtain, and many of our collecting-stations were at small towns, or single houses. Consequently, although in the lists of specimens given I am stating the Department in which each point is located, it seems important to give a full list of the localities from which our plants have come. Arranging these in the order of our itinerary, and grouping them according to broad natural areas of topography, should enable anyone to place approximately any station. For each point the Department is stated. The names of houses are placed in quotation marks.

Northern Seacoast:

July 6, 1917. Cartagena, Bolívar.

Along Rio Magdalena:

- July 8, 1917. Barranquilla, Bolívar
 " 10, " Calamar, "
 " 11, " El Banco, Magdalena
 " 12, " Gamarra and Carpentiera, Magdalena
 " 14, " Puerto Berrio, Antioquia
 " 15, " Buenavista, Caldas.

Plain of Tolima:

- July 16, 1917. Mariquita and San Lorenzo, Tolima.

Plain of Upper Magdalena:

- July 19, 1917. Girardot, Cundinamarca
 " 21, " Espinal to Cuamo, Tolima
 " 22, " Cuamo to Rio Saldaña, Tolima
 " 22, " Rio Saldaña to Natagaima, Huila
 " 24, " Quebrada de Angeles, "
 " 25, " Quebrada de Angeles to Rio Cabrera, Huila
 " 26, " Rio Cabrera to Villavieja, "
 " 27, " Villavieja to Neiva, "
 " 30, " Neiva, Huila.

Cordillera Oriental:

- July 30 to August 8, 1917. Excursion from Neiva over the crest of the Cordillera to "Balsillas", and return.

Along Upper Magdalena:

- August 8-9, 1917. Neiva, Huila
 " 12, " Natagaima, Huila
 " 13, " Boca Saldaña, Huila.

Railroad from Girardot to Bogotá:

- August 14, 1917. Portillo, Anapoima, San Joaquin, Hospicio, La Esperanza, Cachipay, Zipacon and Anolaima, Cundinamarca.

Upper western slopes of Cordillera Oriental:

- August 16, 1917. Bogotá, Cundinamarca.

Eastern slopes of Cordillera Oriental:

- August 22, 1917. Chipaque, Cundinamarca
 " 23, " Caquezá, "
 " 24, " Caquezá to Rio Sananie, Cundinamarca
 " 24, " Quetame to "Susumuco," "
 " 25-26, 1917. "Susumuco," "

Plain of Meta:

- August 26 to September 2, 1917. Villavicencio, Meta.

Eastern slopes of Cordillera Oriental:

- September 4, 1917. Villavicencio to "Buenavista," Meta
 " 4, " "Buenavista" to "Pipirál," Cundinamarca
 " 5, " "Pipirál" to "Susumuco," "
 " 5, " "Guayabetál," "
 " 6, " "Guayabetál" to "Monte Redondo," Cundinamarca
 " 7, " "Monte Redondo" to Quetame, "
 " 7-8, " Caquezá, "
 " 8, " Ubagué, "

Summit of Cordillera Oriental:

- September 8, 1917. Paramo de Cruz Verde, Cundinamarca.

Upper western slopes of Cordillera Oriental:

- September 12, 1917. Bogotá and Mt. Guadalupe, Cundinamarca
 " 13, " Bogotá (Rio San Francisco), "
 " 15, " Tequendama, "
 " 17, " Bogotá (Monserrate), "
 " 18, 23, " Bogotá (Chapinero), "

Summit of Cordillera Oriental:

- September 20, 1917. Paramo de Cruz Verde, Cundinamarca.

Upper western slopes of Cordillera Oriental:

- September 20, 26, 1917. Bogotá (Rio San Cristobal), Cundinamarca
 " 22, 24, " " (Rio del Arzobispo), "
 " 24, 25, " " (Las Cruces), "
 " 26, " " (Cerro de Focha), "
- Summit of Cordillera Oriental:
 September 27, 1917. Paramo de Choachi, Cundinamarca.
- Upper western slopes of Cordillera Oriental:
 September 30, 1917. Bogotá (San Cristobal), Cundinamarca
 October 4-8, " " "
 " 6, " " (Chapinero), "
 " 6, " Rio Teusaca, "
 " 12, " Bogotá (Rio San Cristobal) "
 " 13-15, " Sibaté to El Peñon, "
 " 20-24, " Zipaquirá to Mt. Chuscal, "
 " 23, " Namacón, "
 " 28, " Tequendama, "
 " 29, " Sibaté to El Peñon, "
- Summit of Cordillera Oriental:
 November 14, 1917. Paramo de Cruz Verde, Cundinamarca.
- Lower western slopes of Cordillera Oriental:
 November 28-30, 1917. Fusagasugá, Cundinamarca
 December 1-4, " Pandi and Icononzo, Cundinamarca.
- Plain of Upper Magdalena:
 December 4-5, 1917. Melgar and Girardot, Cundinamarca.
- Eastern slopes of Cordillera Central:
 December 11, 1917. Libano, Tolima
 " 15-17, " "Rosalito," between Murillo and Paramo de Ruiz,
 Tolima
 " 16-17, " Paramo de Ruiz, Tolima
 " 17-18, " Murillo, "
 " 18-29, " Libano ("La Trinidad" and "La Virginia"),
 Tolima
 " 29-30, " "El Convenio," Tolima.
- Plain of Tolima:
 December 30, 1917. San Lorenzo, Tolima
 January 6, 1918. Guayabal and San Felipe, Tolima
 " 3, 7, " Honda and Mariquita, "
- Along Rio Magdalena:
 January 9-10, 1918. Brazuela de Perales, Antioquia
 " 11-13, " Puerto Berrio and Malena, Antioquia
 " 14, " Vuelta de Acuña, "
 " 14, " Opposite Boca Carare, "
 " 15, " Cañabetál, Bolívar.
 " 15, " Boca de Rosario, Puerto Nuevo and Boca Sogomosa,
 Santander
 " 16, " El Banco, Magdalena
 " 18-19, " Magangué, Bolívar.
- Plain of Bolivar:
 January 24, 1918. Buenavista, Bolívar
 " 25, " Sincé and Corozál, Bolívar
 " 26, " Sincelejo, "
 " 27, " Chinu and Sahagun, "
 " 28, " Ciénaga de Oro and Cereté, Bolívar
 " 30, " Monteria. "
- Along Rio Sinu:
 February 3, 1918. "Medellin," Bolívar
 " 4, " "Los Hurtados," Bolívar
 " 5, " Morales, "
 " 6, " Barro Blanco, "
 " 8, " Tierra Alta and Boca Tai, Bolívar

- " 10-11, " "Angostura" and Frasuquillo, "
 " 13-14, " Boca Verde, "
 Upper slopes of Cordillera Occidental:
 February 23, 1918. Paramo de Chaquiro, Bolívar
 " 25, " Cascada Chorrón. "
 Along Rio Antizales:
 February 25-26, 1918. Antizales, Bolívar.
 Along Rio Esmeralda:
 February 26, 1918. Boca Antizales, Bolívar
 " 27, " "Las Dantas" to "Puerto Canoa," Bolívar
 " 28, " "Puerto Canoa" to "Salvajin." "
 Along Rio Sinu:
 March 1, 1918. Boca Esmeralda, Bolívar
 " 4, " Boca Verde, "
 " 5-6, " Frasuquillo and "Angostura," Bolívar
 " 7-10, " Boca Tai and Tierra Alta, "
 " 11, " Morrocoquiel, "
 " 12, " "Los Hurtados," "
 " 21, " Montería, "
 " 23, " Vilches, "
 " 25, " "El Pueblo," below Lórica. "
 Northern Seacoast:
 March 26-27, 1918. Cartagena and Turbaco, Bolívar
 April 1, " Santa Marta, Magdalena.

Of chief interest has been the comparison of the vegetation of different altitudinal life-zones, and these upon the slopes of the three divergent Cordilleras of the Andes. The central axis of the Andes, entering Colombia from the South, soon divides into three ranges, all of which, rising from the midst of a broad low Tropical plain, reach high elevations. Also in the northeast is the wholly isolated Sierra Nevada de Santa Marta. Upon each mountain system, one ascends from Tropical lowland, forest or prairie ("Sabana"), through Subtropical forest, through Temperate forest or "Sabana," to the "Paramo," as the treeless chill slopes above timber-line are called. Temperature and moisture cause the floras of the different zones to differ, and similarly the isolation of the different mountain systems accounts for a divergence in the floras of the same zone on each chain.

Dr. Frank M. Chapman, in his "Distribution of Bird Life in Colombia," has given us a masterly presentation of this problem, and I adopt his system of life zones and his terminology of each. As stated in his summary on page 85 of volume 36 of the *Bulletin of The American Museum of Natural History*, these are:

- Tropical Zone—sea-level to 4,500-6,000 ft. (1350-1800 meters).
 Subtropical Zone—4,500-6,000 ft. to 9,000-9,500 ft. (2,700-2,850 meters).
 Temperate Zone—9,000-9,500 ft. to 11,000-13,000 ft. (3,300-3,900 meters).
 Paramo Zone—11,000-13,000 ft. to snow-line, 15,000 ft. (4,500 meters).

My observations have led me to occasional slight modifications of his limits, as in placing the lower limit of the Paramo above Bogotá at only 3100 meters. Here local conditions explain such a change. But in general outline, and in nearly all details, his scheme may be adopted for plants as for animals. Plants seem more subject to geographical differentiation than animals, so that in certain genera the same zone on different Cordilleras has related, but never the same, species. A fuller discussion of this subject will be given in the concluding paper of this series—now I wish but to make the summary of distribution accompanying each species of this study intelligible.

The vegetation of a land so diverse as Colombia is immensely rich; consequently upon a short expedition it has been impossible to follow out in comparative study any wide number of families. A few groups well selected, and so far as possible all their species considered, will give data for geographical botany nearly as precise as would the comparing of many families. I have studied the Scrophulariaceae, keeping a record of each species, and making a careful floral description of each. For the Temperate and Paramo zones, and for the Tropical prairies, this family furnishes an excellent index to floral areas. My collections were mainly in these regions, and of herbaceous plants, so that from a phytogeographical viewpoint, the selection of this family has been justified. It is my hope to follow this study with that of some allied group requiring forest environments, probably of the Gesneriaceae.

The present paper gives the results of a study of only about one-half the Scrophulariaceae of Colombia—those which we may call the Antirrhinoid genera. These fall into several tribes, each predominant or restricted to a special life-zone. The Gratioleae are mainly Tropical, while wholly so are the Russelieae and Angelonieae. The Mimuleae, Hemimerideae and Fagelieae, the last with many conspicuous species, predominate in the Temperate Zone of the mountain-slopes. The genus *Bartsia*, of the Rhinanthoid Scrophulariaceae and so yet to be studied, is best developed in the Paramo Zone.

Necessarily the chief basis of this study has been my own collections. I have however revised all the collections from Colombia which I know to be in the United States. These are surprisingly meagre, and from widely scattered localities. The chief are those made by H. H. Smith in the Sierra Nevada de Santa Marta in 1899-1901; by I. F. Holton near Bogotá and in Vallé in 1852-1856;

and—more imperfect—certain series of specimens made in southern Colombia by F. C. Lehmann and at widespread stations over the country by José Triana. To the custodians of the herbaria which have loaned me specimens, the United States National Museum, Gray Herbarium, and Field Museum of Natural History, as well as to my colleagues at The New York Botanical Garden, I am under obligation.

Also, I would mention my indebtedness to that group of Colombian workers whom I had the privilege of meeting in 1917, the growth of whose museum at Bogotá has been phenomenal. Especially would I thank Brothers Aristé-Joseph and Ydinael, Hermanos Cristianos of the Universidad de La Salle. A further word of appreciation must be given to Sr. Santiago Cortés of Bogotá, who, working long alone, has been able to give to the world only the first volume of his "Flora de Colombia."

The following study is primarily systematic, and keys are given throughout. New species and those seen by the writer are carefully described. Synonymy for Colombia is cited fully, otherwise only those names are included which are of first descriptions of Colombian species. The original statement of distribution, or of type-specimen is quoted, and the effort is made to firmly establish the nomenclature used. But it must be said that, as most of the types are in Europe and inaccessible to me, and as Colombia's flora is as yet very partially known, we cannot be certain of the identity of some of these. But I believe that, with very few exceptions, the names now used will be permanent.

For each species a statement of environment and distribution is given, the latter made as definite as our knowledge permits, and analysed accordingly to life-zone and Cordillera. Lastly is given a list of specimens seen, these grouped under the Departments which at present (1920) are in force. State-outlines in Colombia have been so shifting that these limits have not always been easily ascertainable. The herbaria in which specimens may be consulted are indicated by the symbols:

A—The Academy of Natural Sciences of Philadelphia.

C—Field Museum of Natural History, Chicago, Ill.

H—Gray Herbarium of Harvard University, Cambridge, Mass.

U—United States National Museum, Washington, D. C.

Y—New York Botanical Garden, Bronx Park, New York City.

My own collections may all be consulted at The New York Botanical Garden. Duplicates are being distributed to many herbaria.

At the conclusion of the systematic portion of this study there is planned a synopsis of the geographic distribution of the Scrophulariaceae of Colombia, and also a series of brief sketches of those collectors in Colombia to whom reference will have been made in the text.

KEY TO ANTIRRHINOID SCROPHULARIACEAE OF COLOMBIA.¹

Corolla with the posterior lobes external in the bud.

(ANTIRRHINOIDEAE.)

Capsule septicidal, or loculicidal by a simple median split, the septum breaking from the capsule-wall or rupturing. Corolla not spurred. Leaves opposite or whorled in threes (except in *Capraria*).

Corolla, even if saccate anteriorly, without a horn-like process at the base of the anterior lobes. Capsule septicidal, or loculicidal. Seeds, if reticulate, with lines not raised or wing-like.

Stigma two-lipped.

Capsule septicidal, or secondarily also somewhat loculicidal, splitting to base; placentae simple. Sepals distinct or nearly so (except in *Vandellia* and *Torenia*). Leaves, or rarely only the capsule, somewhat glandular-punctate. Inflorescence simply racemose (if several pedicels are in one axil, then no common peduncle is evident). Corolla yellow, blue or white.

I. GRATIOLEAE.

Capsule loculicidal (only tardily septicidal if at all), or indehiscent; placentae branched and widely spreading. Sepals united over one-half length. Leaves and capsule not glandular-punctate. Inflorescence racemose, or of axillary cymes a single one of which is terminal to the primary peduncle. Corolla yellow, two-ridged and pubescent within on the anterior side.

II. MIMULEAE.

Stigma capitate.

Corolla conspicuously zygomorphic, the tube scarcely developed and the anterior lobes much exceeding the posterior ones. Capsule without placental hairs, and dehiscing only distally. Seeds ridged, not reticulate. Leaves opposite, or the upper alternate.

Stamens four; anther-sacs with membranous walls. Corolla orange, flattened, its lobes all evident, the tube split to base between the posterior lobes. Sepals five, less than one-half the length of the capsule.

¹The warning must be given that the keys to tribes and genera are prepared for Colombian species, and contrasts may not hold for extra-limital genera and species.

Capsule scarcely dehiscing loculicidally. Seeds blackish. Inflorescence simply racemose. Stem quadrangular.

III. HEMIMERIDEAE.

Stamens two; anther-sacs with firm walls. Corolla yellow, its lips concave-saccate or the posterior much reduced, the individual lobes scarcely or not evident, the tube not split to base between the posterior lobes. Sepals four, at least one-half the length of the capsule. Capsule dehiscing loculicidally as well as septicidally. Seeds brown. Inflorescence cymose, two pedicels of each cyme being terminal to the primary peduncle. Stem terete or nearly so.

IV. FAGELIEAE.

Corolla red, nearly regular, tubular, the short lobes nearly equal. Capsule filled with slender hairs between which are the scattered seeds, dehiscing to base septicidally. Seeds reticulate, not ridged. Leaves whorled in threes, and the stem with six angles. Inflorescence of axillary cymes, two pedicels of each being terminal to the primary peduncle.

V. RUSSELIEAE.

Corolla violet-blue, saccate anteriorly and with a fine horn-like process at the base of the anterior lobes. Capsule loculicidal, the septum only tardily if at all splitting sagittally. Seeds reticulate, the reticular lines raised into wing-like processes. Inflorescence simply racemose.

VI. ANGELONIEAE.

Capsule loculicidal, the septum and adjacent capsule-wall persisting, the remaining wall splitting irregularly. Corolla blue, with a spur at the base of the anterior petal. Leaves alternate.

VII. ANTIRRHINEAE.

Corolla with the antero-lateral or anterior lobes external in the bud. (RHINANTHOIDEAE.²)

I. GRATIOLEAE.

Leaves alternate, serrate. Stamens five. Corolla essentially regular, the five lobes equally distinct. 1. *Capraia*.

Leaves opposite or whorled in threes. Stamens four, three or two (the posterior one lost). Corolla more or less zygomorphic, the two posterior lobes united over one-half their length.

Leaves entire to serrate-dentate. Capsule globose to lanceolate in outline. Seeds not regularly cylindrical nor spirally ridged, disposed in more than one row within each valve of the capsule.

Corolla with the ridges to the antero-lateral sinuses, if developed, low and not projecting beyond those points (so anterior filaments simple). Style not with a semi-persistent callose base. Septum rupturing, so that the

² To be considered in a second paper.

placental mass eventually stands free. Pedicels frequently bibracteolate. Stem, if quadrangular, with the angles not conspicuously ridged or winged.

Anther-sacs proximate, no connective arms developed.

Seeds reticulate. Leaves sessile or nearly so.

Pedicels bibracteolate. Sepals five.

Pedicels bibracteolate at base (remote from the calyx). Corolla yellow, pubescent within at base of posterior lobes. Sepals unequal, and leaves serrate. Plant repent-ascending.

2. *Mecardonia*.

Pedicels bibracteolate at apex (just beneath calyx).

Corolla violet-blue or white.

Filaments four, all with anthers. Bractlets 1 mm. or less long, much shorter than the sepals.

Sepals unequal, the outer much larger than the narrow innermost. Corolla pubescent within at base of posterior lobes, or glabrous, violet-blue or white. Capsule globose-ovoid to oblong. Leaves serrate to entire, and stems, erect or ascending.

3. *Caconapea*³

Sepals uniform. Corolla pubescent within at base of the anterior lobes. Capsule depressed-globose. Leaves serrate and stem repent-ascending.

4. *Conobea*.

Filaments two, the anterior rudimentary or wanting. Bractlets 5-10 mm. long, equaling or exceeding the nearly uniform sepals. Corolla pubescent at base of the posterior lobes, white or pinkish-tinged. Leaves serrate and stem ascending or erect.

5. *Gratiola*.

Pedicels not bracteolate. Sepals four or five. Corolla blue or white.

Corolla glabrous within. Sepals unequal, the innermost narrowest. Leaves palmately veined, entire or slightly undulate. Pedicels tending to deflex in fruit. Plants repent.

Outermost sepal cordate, much exceeding the linear-attenuate innermost ones; five sepals always present. Capsule oblong or ovoid-oblong, acute, brown, much shorter than the sepals. Styles united to apex. Corolla blue or white.

6. *Monocardia*.

³*Bramia monnieri* (L.) Pennell, a repent herb, with broadly rounded entire leaves, corolla with distinct posterior lobes, and outer sepal scarcely longer than the innermost, is widespread in Tropical America, and must surely occur on moist semi-brackish sands along the Colombian coast. See, Proc. Acad. Nat. Sci., Phila. 1919: 243, 1920.

Outermost sepal ovate-oblong, scarcely longer than the lanceolate innermost, one of which may be lost. Capsule nearly globose, obtuse, pale-brown, little shorter than the sepals. Styles distinct near apex. Corolla white.

Corolla 4 mm. long, appearing four-lobed because the three petals forming the anterior lip are all evident. Stamens four. Sepals five or four. 7. *Macwillamia*.

Corolla 2 mm. long, appearing three-lobed because the anterior petal is lost, leaving the anterior lip two-lobed. Stamens three (only one of the antero-lateral pair developed). Sepals four. 8. *Hydrantheium*.

Corolla white, densely hirsute within over bases of all lobes. Sepals four, uniform. Leaves pinnately veined, serrate-dentate. Pedicels permanently ascending-spreading. Plant erect.

9. *Scoparia*.

Anther-sacs separated on short arms of the connective.

Seeds longitudinally striate, the striae frequently tuberculate. Corolla blue or white. Plants erect.

Pedicels bibracteolate, 1 mm. long or less. Corolla blue, pubescent within on the anterior side. Capsule acuminate. Seeds tuberculate-striate. Leaves cordate-clasping at base. Tall herb.

10. *Stemodia*.

Pedicels not bracteolate. Corolla pubescent within on the posterior side, or glabrous. Seeds minutely roughened-tuberculate or smooth. Leaves narrowed at base.

Leaves sessile or nearly so, in whorls of three. Corolla 9-13 mm. long, glabrous within, blue. Capsule acuminate. Seeds minutely roughened-tuberculate. Style semi-persistent. Tall herb.

11. *Unanuea*.

Leaves evidently petioled, opposite. Corolla 4-8 mm. long, pubescent within on the posterior side, blue or white. Capsule acutish. Seeds smooth, with rounded ridges. Style soon deciduous. Low herbs.

12. *Lendneria*.

Corolla violet-blue or white, with two raised ridges (each formed by the adherence of a filament) to the antero-lateral sinuses, and which frequently project as knob-like processes beyond those points (the free portion of the filament appearing as a lateral outgrowth of the adherent portion). Style with a semi-persistent, frequently enlarged and callose base. Septum persistent, with the attached placentae. Pedicels never

bracteolate. Stem quadrangular, the angles ridged or slightly winged.

Sepals united over one-third length. Filaments all with anthers. Seeds not with transverse lines. Leaves petioled, serrate-dentate. Angles of stem slightly winged.

Pedicels 1-2 mm. long. Sepals united nearly one-half their length, much shorter than the capsule. Corolla straight, the tube strongly horizontally flattened, the posterior lip purple-brown, elsewhere corolla white throughout, pubescent within on ridges to antero-lateral sinuses; the free portions of the anterior filaments appearing as up-curved from the apices of these ridges. Capsule acuminate, finely pubescent to glabrous. Seeds tuberculate. Leaves oval, rounded, narrowed at base. Plant repent, pubescent.

13. *Vandellia*.

Pedicels 10-25 mm. long. Sepals united over three-fourths length, equaling or slightly longer than the capsule. Corolla decurved, the tube scarcely or not flattened horizontally, blue or white, glabrous within on the ridges to antero-lateral sinuses; the free portions of the anterior filaments appearing as outgrowths proximad to the apices of these ridges which therefore terminate as short knobs. Capsule mucronate or acute, glabrous. Seeds shallowly pitted. Leaves ovate or lanceolate-ovate, acute, truncate-cuneate at base. Plants repent to erect, glabrous.

14. *Torenia*.

Sepals distinct or nearly so. Antero-lateral filaments without anthers. Seeds with fine transverse lines. Leaves sessile, mostly clasping, slightly crenate or entire. Angles of stem ridged, not winged. Corolla blue. Plant diffused-ascending, glabrous.

15. *Ilysanthes*.

Leaves pinnatifid. Capsule linear-attenuate in outline. Seeds regularly cylindrical, spirally ridged, disposed in one row within each valve of the capsule. Corolla purple-blue. Plant low, branched, erect.

16. *Schistophragma*.

II. MIMULEAE.

Capsule oblong, dehiscing loculicidally, its walls dry, membranous, brownish. Calyx-tube longer than and enclosing the capsule, its ribs slightly winged, its lobes decidedly unequal, the posterior longest. Corolla 10-15 mm. long, yellow, with many red-brown spots within throat on the anterior side. Leaves broadly ovate, shortly petioled, 1-4 cm. long. Inflorescence of axillary simple pedicels. Stem obscurely angled, not winged. Plant low, repent-ascending.

17. *Mimulus*.

Capsule globose, indehiscent, its walls fleshy, white. Calyx-tube shorter than the capsule, its ribs not winged, its lobes slightly unequal, the posterior longest. Corolla 15–18 mm. long, yellow throughout. Leaves lanceolate, cordate-clasping at base, 15–20 cm. long. Inflorescence of axillary several-branched cymes, borne upon conspicuous peduncles. Stem with angles narrowly winged. Plant tall, erect, widely branched from base.

18. *Leucocarpus*.

III. HEMIMERIDEAE.

19. *Alonsoa*.

IV. FAGELIEAE.

20. *Fagelia*.

V. RUSSELIEAE.

21. *Russelia*.

VI. ANGELONIEAE.

22. *Angelonia*.

VII. ANTIRRHINEAE.

23. *Linaria*.1 **CAPRARIA** Linné.*Capraria* L., Sp. Pl. 628. 1753.Type species, *Capraria biflora* L.1. **Capraria biflora** L.*Capraria biflora* L., l. c. 628. 1753. "Habitat in Curassao." Specimens from Curaçao seen in herbarium New York Botanical Garden.*Capraria lanceolata* Vahl, Ecl. Am. 2: 47. 1798. "Habitat ad St. Martham. von Rohr." Not *C. lanceolata* L. f., Suppl. 284. 1781. Von Rohr's plant was the pubescent form prevalent in Colombia, but appears to have represented an abnormal state in which the pedicels are short and arise from an abbreviated branch.*Capraria semiserrata* Willd., Sp. Pl. 3: 324. 1800. New name for *C. lanceolata* Vahl.*Capraria semiserrata berterii* A. DC.; Benth. in DC. Prod. 10: 429. 1846. "Ad Stam. Martham (Bert. in h. DC.)." An entire-leaved state.

A widespread species of lowland Tropical America, growing mostly on and near the seashore, but extending inland on river-banks, plains and waste land. Very variable, but with most states found in the same region or even in the same colony. Varies in size of leaves, in form of leaves from linear-lanceolate to nearly ovate, and in serration from entire to sharply serrate-dentate; varies in the length of the pedicels; varies in length of and attenuation of the sepals, in size of corolla from 8 to 10 mm. long, and somewhat pubescent or glabrous within anteriorly, and in capsules from oblong to ovoid, and from round and emarginate to acutish. Most conspicuously does the plant vary in pubescence, from glabrous throughout, through states with the stem pubescent and the pedicels glabrous or the pedicels sparsely pubescent—pubescent either with short or long hairs—to forms densely hirsute on stems, pedicels, sepals and

the midribs and margins of the leaves. The last state (forma *hirta*⁴ Loes. in Bull. Herb. Boiss. ser. II, 3: 284. 1903. "Habitat in Guatemala, in dept. Chiquimula in ruderalibus ad S. Juan Ermita: Sel[er]n. 3314." Isotype seen in herbarium New York Botanical Garden) prevails in Colombia.

River-banks, flats and sandy waysides, at altitudes below 200 meters, Tropical zone; the typical form near the Caribbean shore (doubtless also along the Pacific shore), forma *hirta* Loes. (indicated in lists by asterisk) along the lower river-courses and across the Sabana of Bolívar.

Antioquia. *Brazuela de Perales, on Rio Magdalena (river-flat, alt. 150 m.), Pennell 3704; *Vuelta de Acuña, on Rio Magdalena (sandy loam, alt. 125–130 m.), Pennell 3789.

Bolívar. *Calamar (along Rio Magdalena, alt. 15–25 m.), Rusby & Pennell 20; Cartagena, I. F. Holton 582 (H, Y), (roadside, alt. 5–10 m.), Rusby & Pennell 3 (somewhat pubescent with short hairs). *Sincé (edge of thicket, alt. 120–170 m.), Pennell 4039; *Turbaco (thin loam over white rock, alt. 150–200 m.), Pennell 4761; *Vilches, on Rio Sinu (orchard, alt. 20–50 m.), Pennell 4711.

Magdalena. *Bonda (open damp place, alt. 45 m.), H. H. Smith 1331 (C, H, U, Y). Don Jaco (near the coast), H. H. Smith 551 (C, H, U, Y). Playa Brava (open plain near the coast), H. H. Smith 2823 (Y). Santa Marta (railroad bank, alt. 0–10 m.), Pennell 4771. Around Rio Frio (between the Ciénaga de Santa Marta and the foothills, alt. 0–100 m.), H. Pittier 1611 (U).

2 MECARDONIA Ruiz and Pavon.

Mecardonia R. & P. [Fl. Peruv. et Chil. Prod. 95. 1794, generic diagnosis]; Syst. Veg. Fl. Peruv. et Chil. 164. 1798.

Type species, *M. ovata* Ruiz & Pavon,⁵ of Peru.

⁴ This state has been described also as *Capraria lanceolata* Vahl, and *C. semi-serrata* Willd. (above), as *C. hirsuta* H. B. K., Nov. Gen. et Sp. 2: 355. 1818, from Mexico, and as *C. biflora* β *pilosa* Griseb., Fl. Brit. W. I., 427, 1861, from the Bahamas. The first name should be used if this be accounted a distinct species, the last if a variety, and *hirta* if a form.

⁵ *Mecardonia ovata* Ruiz & Pavon, Syst. Veg. Fl. Peruv. et Chil. 164. 1798. "Habitat in Peruviae plateis ad Chinchao et Cuchero vicos." Description appears to be certainly that of *M. procumbens* (Mill.) Small, a wide-spread plant to be expected in Peru. The only discrepancy is in describing the calyx as heptaphyllous, although it is stated that the two small outer leaves are deciduous. Possibly the bractlets at the base of the pedicel were noted approximating the flower in very young buds, or more probably an error of vision was made, and because later it could not be checked the imagined bractlets were considered to be deciduous.

1. **Mecardonia procumbens** (Mill.) Small.

Erinus procumbens Mill., Gard. Dict. ed. VIII. n. 6. 1768. "Houst. MSS."

Herpestis caprarioides H. B. K., Nov. Gen. et Sp. 2: 368. 1818. "Crescit locis arenosis, siccis Regni Novo-Granatensis in ripa fluminis Magdalenae juxta El Peñon [Humboldt & Bonpland]."

Monniera procumbens (Mill.) Kuntze, Rev. Gen. 463. 1891.

Mecardonia procumbens (Mill.) Small, Fl. S. E. Un. St. 1065. 1338. 1903.

Bacopa procumbens (Mill.) Greenm. in Field Col. Mus., Bot. Ser. 2: 261. 1907.

Herpestis procumbens (Mill.) Urb., Symb. Bot. 4: 558. 1911.

Moist open soil, along streams in loam or sand, at altitudes below 1200 meters. Tropical zone, doubtless throughout lowland Colombia, largely as a weed. Also in the Sabana of Bogotá, at an altitude of 2600 meters, probably introduced. Widespread throughout Tropical America.

Antioquia. Opposite Boca Carare (forest along R. Magdalena, alt. 125 m.), Pennell 3829.

Bolívar. Boca Verde on Rio Sinu (field along river, alt. 100-200 m.), Pennell 4568; Cañabetal (sand along river, alt. 90-100 m.), Pennell 3874; Sincelejo (thicket, alt. 150-200 m.), Pennell 4068.

Caldas. Buena Vista (moist open sand, alt. 170-180 m.), Rusby & Pennell 63.

Cundinamarca. Bogotá (desiccated soil in meadow, alt. 2600 m.), Pennell 1909 [small-leaved form which has been described as *Herpestis chamaedryoides* H. B. K.]; Icononzo (loam slope, alt. 900-1000 m.), Pennell 2777.

Huila. Natagaima (soil frequently overflowed by river, alt. 400-450 m.), Rusby & Pennell 1182; Quebrada de Angeles above Natagaima (gravel, alt. 450-600 m.), Rusby & Pennell 286.

Magdalena. Masinga (damp clearings, alt. 90-750 m.), H. H. Smith 1326 (Y), Agua Dulce, H. H. Smith 1326 (Y).

Meta. Villavicencio (moist meadow along Rio Guatiquia, (alt. 500 m.), Pennell 1556.

Tolima. Honda (moist sandy field, alt. 250-300 m.), Pennell 3620; Libano (field on "La Trinidad," alt. 900-1200 m.), Pennell 3368.

Valle. La Paila, I. F. Holton 579 (Y).

3. **CACONAPEA** Chamisso.

Caconapea Cham. in Linnaea 8: 28. 1833.

Type species *C. gratiolooides* Cham., of Brazil.

Pedicels 5-10 mm. long, one to an axil. Corolla 5-7 mm. long, pubescent or puberulent within over base of posterior lobes; lobes violet, throat yellow within, especially on the anterior

side and lined with violet, the posterior lobes united nearly to apex.

Corolla 7 mm. long, pubescent within. Anthers all uniform. Sepals strongly dissimilar, the outer ovate, all puberulent. Capsule septicidal, with thick protuberant placentae, in dehiscence portions of the septum remain adhering to the walls. Seeds conspicuously reticulate. Leaves lanceolate-elliptic, crenate-serrate. Stem sharply quadrangular, 1-3 dm. tall.

1. *C. auriculata*.

Corolla 5 mm. long, puberulent within. Anthers of posterior filaments larger. Sepals slightly dissimilar, the outer lanceolate, all somewhat pubescent. Capsule loculicidal, with thin placentae, placed along median line of the septum which ultimately breaks free from the lateral walls. Seeds finely reticulate. Leaves linear, entire. Stem obscurely quadrangular, .3-.5 dm. tall.

2. *C. debilis*.

Pedicels less than 2 mm. long, usually several to an axil. Corolla 2-3 mm. long, glabrous within; lobes white or violet, throat white and without lines. Placentae thin, attached to median line of septum. Seeds finely reticulate.

Leaves tapering to the narrow base. Stem pilose with spreading white hairs.

3. *C. axillaris*.

Leaves rounded-clasping at base. Stem appressed-pubescent or glandular-dotted.

Corolla deciduous, white throughout, its posterior lobes united nearly to apex. Exterior sepals rounded, all glabrous or obscurely puberulent. Stem whitish with appressed reflexed hairs.

4. *C. appressa*.

Corolla persistent, lobes violet-blue, its posterior lobes united only three-fifths length. All sepals acute, each with a tuft of white hairs at apex. Stem yellowish with sessile glands.

5. *C. conferta*.

1. ***Caconapea auriculata*** (Rob.) Pennell, comb. nov.

Herpestis auriculata Rob. in Proc. Am. Acad. 26: 172. 1891. "Wet places near Guadalajara [Mexico]; November, 1889 [C. G. Pringle] (n. 2937)."

Later collections of Pringle from near Guadalajara, 4623 and 6148, seen in herbarium of Columbia University at The New York Botanical Garden.

Bacopa auriculata (Rob.) Greenm. in Field Col. Mus., Bot. Ser. 2: 262. 1897.

Stem 1-3 dm. tall, sharply four-angled, glabrous to slightly puberulent above. Leaves 1-1.7 cm. long, .5-.8 cm. wide, oblong-lanceolate, crenate, often dentate at and near base, obtuse, rounded-clasping at base; glabrous or glabrate. Pedicels solitary, 5-10 mm. long, puberulent. Bractlets linear-subulate, less than 1 mm. long. Sepals obscurely puberulent: outermost 4 mm. long, ovate, obtuse to acute, obscurely veined; two median slightly shorter and more narrowly ovate; two innermost 3 mm. long, linear-attenuate,

somewhat hyaline. Corolla 7 mm. long; posterior lobes united nearly to apex; pubescent within tube, especially on anterior side, pubescent in horizontal line over bases of posterior lobes; within tube yellow, extending to base of anterior lobes, distally and over lobes violet-blue, with longitudinal fine deep-violet lines. Filaments glabrous, the postero-lateral pair slightly shorter, its anthers equalling those of the antero lateral pair; posterior filament represented by a tiny knob. Style glabrous, at apex bifid and bearing two plate like stigmas. Capsule 2.5–3 mm. long, globose-ovoid, glabrous, dehiscent septically, the lateral portions of the septum adhering to the capsule wall. Placentae protruding into the cells, not coalescent. Seeds .4 mm. long, crescentic-cylindric, truncate at the apex, brown, with evident longitudinal lines and cross-reticulations.

Wet open soil, sandy or loam, at altitudes of 500 to 800 meters, Tropical zone, llanos of upper Magdalena valley. Doubtless in the Sabana of Bolívar and elsewhere in northern Colombia. Ranges northward to Mexico.

Cundinamarca. Melgar (moist open clayey loam, alt. 500–600 m.), Pennell 2885.

Huila. Neiva (seepy place in plain, alt. 550–600 m.), Rusby & Pennell 1067.

Tolima. San Lorenzo (open springy loam, w. of, alt. 600–800 m.), Pennell 3531.

2. *Caconapea debilis* Pennell, sp. nov.

Stems ascending, repent and matted below, becoming erect and .3–.5 dm. tall, obscurely four-angled, finely pubescent with reflexed appressed white hairs. Leaves .4–.6 cm. long, .07–.1 cm. wide, linear, obtuse, clasping (but not dilated) at base, nerveless beneath; finely pubescent on the midrib beneath or glabrous throughout. Pedicels solitary, 5–7 mm. long, finely pubescent with reflexed hairs. Bractlets linear-subulate, less than .5 mm. long. Sepals: outermost 3.5 mm. long, linear-lanceolate obtuse; two median slightly shorter but nearly similar, these three green, glabrous or nearly so, except for a frequent terminal tuft of short hairs; the two innermost 3 mm. long, lanceolate-linear, acuminate, with broad scarious margins and ciliate with minute white hairs. Corolla 5 mm. long; posterior lobes united nearly to apex; externally minutely pubescent, within slightly pubescent over bases of the posterior lobes, elsewhere glabrous; within tube pale, yellowish on anterior side, lined with

violet, distally over lobes violet. Filaments glabrous, the postero-lateral pair shorter, its anthers more than twice larger than those of the antero-lateral pair. Style glabrous, with two plate-like stigmas. Capsule 2 mm. long, oblongpyriform, rounded and retuse at apex, glabrous, dehiscing loculicidally. Placentae thin, linear, flattened against the persistent septum. Seeds about .2 mm. long, oval, slightly crescentic, yellowish-brown, obscurely ridged to somewhat reticulate at maturity.

Type, shallow pool in llano, east of Villavicencio, Meta, altitude about 450 meters, collected in flower and fruit September 2, 1917, F. W. Pennell 1623 in herbarium New York Botanical Garden.

Nearest to *Herpestis reptans* Benth. of Brazil, which is described as having leaves .2-.3 cm. wide, linear-lanceolate, prominently nerved beneath, all sepals obtuse and seeds yellow.

Shallow pools in llano, at an altitude of 450 meters, Tropical zone in Meta.

3. **Caconapea axillaris** (Benth.) Pennell, comb. nov.

Herpestis axillaris Benth. in DC. Prod. 10: 396. 1846. "Ad aquas stagnantes in campis Deluvia Sanctae Marthae (Purdie!) . . . (v. in herb. Hook.)."

Monniera axillaris (Benth.) Kuntze, Rev. Gen. 463. 1891.

Tropical zone, in Magdalena. No specimens seen.

4. **Caconapea appressa** Pennell, sp. nov.

Stem .7-1.5 dm. tall, obscurely four-angled, below glabrous, above pubescent with reflexed white hairs. Leaves 1-2 cm. long, .3-.4 cm. wide, lanceolate-linear, entire, tapering from the rounded-clasping base, glabrous, glandular-dotted. Pedicels 1-5 in an axil, 1-2 mm. long, pubescent with reflexed hairs. Bractlets filiform-subulate, less than 1 mm. long. Sepals glabrous, densely glandular-punctate: outermost 3 mm. long, ovate; the next nearly as wide, the median one-sided, narrower, these three obtuse, somewhat reticulate, glabrous; the two innermost narrowly lanceolate, attenuate, costate, with the margins hyaline and ciliolate. Corolla 2-2.5 mm. long; posterior lobes united nearly to apex; glabrous throughout; white throughout. Filaments glabrous, the postero-lateral pair slightly shorter and its anthers slightly smaller. Style glabrous, bearing two approximate stigmas. Capsule 2 mm. long, narrowly cylindrical oblong, glabrous, dehiscing septicidally and loculicidally, none of the septum adhering to the capsule wall. Placentae narrow, thin, a little raised line median to the persistent broad septum. Seeds .5 mm. long, cylindrical, tapering to each end, brown, with longitudinal ridges and fine cross lines.

Type, moist depression in llano east of Villavicencio, Meta, altitude about 450 meters, collected in flower and fruit, August 28 and September 2, 1917, F. W. Pennell 1460, in herbarium New York Botanical Garden.

Moist soil, in llanos, at an altitude of 450 meters, Tropical zone, in Meta.

5. *Caconapea conferta* Pennell, sp. nov.

Stem .5–1.8 dm. tall, obscurely four-angled, below glabrous, above puberulent with sessile yellowish glands. Leaves 1–2 cm. long, .2–.4 cm. wide, narrowly lanceolate, tapering from the rounded-clasping base, entire, densely glandular-dotted. Pedicels 1–5 in an axil, less than 1 mm. long, puberulent with sessile glandular dots. Bractlets filiform-subulate, less than 1 mm. long. Sepals densely glandular-puberulent, each tipped with a tuft of white hairs: outermost 3 mm. long, narrowly ovate; two median narrower and one-sided, these three acuminate; two innermost 2.5 mm. long, lanceolate-attenuate, somewhat hyaline-margined and more ciliolate. Corolla 3 mm. long; posterior lobes united $\frac{3}{5}$ length; glabrous throughout; its tube white, lobes violet-blue, darker distally within. Filaments glabrous, bluish, the postero-lateral pair slightly shorter; anthers all of about the same size, light-yellow. Style glabrous bearing two stigmas. Capsule 2 mm. long, ellipsoid-oblong, glabrous, dehiscing septocidally and loculicidally, none of the septum adhering to the capsule-wall. Placentae narrow, thin, median to the persistent broad septum. Seeds .3 mm. long, cylindric, slightly irregularly curved, rounded, brown, with fine longitudinal ridges.

Type, moist depression, in llano east of Villavicencio, Meta, altitude about 450 meters, collected in flower and fruit August 28 and September 2, 1917, F. W. Pennell 1435; in herbarium New York Botanical Garden.

Moist soil in llanos, at an altitude of 450 meters, Tropical zone, in Meta.

4. *CONOBEA* Aublet.

Conobea Aubl., Hist. Pl. Guiane Fr. 2: 639. pl. 258. 1775.

Type species, *C. aquatica* Aubl., of Guiana.

1. *Conobea scoparioides* (C. & S.) Benth.

Sphaerothera scoparioides Cham. & Schlechtd. in Linnaea 2: 606. 1827.

“E Brasilia aequinoctiali misit Sellow.”

Conobea scoparioides (C. & S.) Benth. in DC. Prod. 10: 391. 1846.

Tropical zone, collected only in Choco, but doubtless widespread in northern and eastern Colombia. Widespread through eastern lowland South America.

Choco. Novisa, J. Triana (H, Y).

5. **GRATIOLA** Linné.

Gratiola L., Sp. Pl. 17. 1753.

Type species, *G. officinalis* L., of Europe.

1. **Gratiola bogotensis** Cortés, sp. nov.

Spreading extensively by rootstocks. Aerial stems erect or decumbent at base, succulent, slightly puberulent, 1–4 dm. tall. Leaves oblong-lanceolate, 1.5–2.5 cm. long, .3–.8 cm. wide, clasping by a rounded base, distally dentate and glandular-punctate, finely puberulent to glabrate. Pedicels 1–2 mm. long. Bractlets similar to and equaling or slightly exceeding the lanceolate calyx-lobes, 5–10 mm. long. Corolla 12–14 mm. long, its tube four-angled, yellowish, with fine brown lines, its lobes spreading, white, somewhat pinkish-tinged or at times the corolla strongly pink. Antero-lateral filaments evident, each capped by two small rudimentary anthers. Capsule ovoid, 5 mm. long. Seeds .5 mm. long, obovoid, conspicuously alveolate-reticulate.

Type, wet grassy place, base of mountain above Chapinero, near Bogotá, Cundinamarca, altitude 2700–2800 meters, collected in flower and fruit September 23, 1917, Pennell 2108 in Herb. New York Botanical Garden. This was collected in company with Sr. Santiago Cortés, who designated it by the name here given.

A near ally or possibly geographical variety, of *Gratiola peruviana* L., Sp. Pl. 17. 1753, based upon Feuillée's description and drawing of a plant found in the mountains of Chile, at 26° S. L. Feuillée's plant is well-matched by a specimen collected by Otto Kuntze in February, 1892, at Ervilla, Chile, and which has the stem less fleshy, the leaves broader and the pedicels slightly longer than does our plant.

Wet grassy places, springheads and ditches, at altitudes of 2600 to 3200 meters, Temperate zone, ascending, in dwarf form, to Paramo, Cordillera Oriental, and Cordillera Central, southward at least into Ecuador.

Cundinamarca. Bogotá (ditch in meadow, alt. 2600 m.), Pennell 1908, (wet grassy place near Chapinero, alt. 2700–2800 m.) Pennell 2108, (southwest of Las Cruces, open spring-head, alt.

2600–2700 m.) Pennell 2158; Sibaté (wet loam, alt. 2700–2800 m.), Pennell 2451; Ubaqué (wet ditch, edge of paramo, alt. 3000–3200 m.), Pennell 1902; Zipaquirá (Mt. Aquila, edge of pool, just below paramo, alt. 3100 m.), Pennell 2532.

Nariño. Tuquerres (alt. 3000 m.), Triana (H, Y).

Tolima. Murillo (pool, alt. 2600–2800 m.), Pennell 3155.

6. **MONOCARDIA**⁶ Pennell, gen. nov.

Stems much branched, terete, repent, the apices ascending. Leaves sessile, slightly clasping, oblong to orbicular, entire, palmately-veined from base, obscurely glandular-dotted and not odorous. Pedicels axillary, 6–20 mm. long, pubescent, not bracteolate. Calyx of 5 very dissimilar sepals; outermost (posterior) heart-shaped; two antero-laterals smaller, obliquely, or but one-half cordate- or truncate-ovate, three outer prominently reticulate; two postero-laterals (innermost) linear-attenuate, only $\frac{2}{3}$ length of outermost and usually slightly longer than the capsule. Corolla 3–7 mm. long, the widely-spreading lobes longer than the tube, the two posterior lobes united nearly throughout; glabrous throughout, blue or white. Stamens four, glabrous, didynamous (the posterior filaments shorter and usually anthers smaller); anthers uniform, the narrow sacs closely connivent, each opening its entire length. Style glabrous, little exceeding the sepals. Stigmas distinct, flat. Capsule 2–4 mm. long, much shorter than calyx, oblong or ovoid-oblong, acute, brown, septicidal and loculicidal; the septum with adherent thin placentae, persisting plate-like. Seeds .2–.3 mm. long, oblong, blackish-brown, ridged and with cross-reticulations.

Type species, *M. violacea* Pennell.

Hydrotrida Small, in general aspect like this genus, differs in possessing a circle of bristles surrounding the ovary, pubescence within over the bases of the corolla-lobes, two bracteoles below the calyx, and more conspicuous glands which exhale a strong aromatic odor. Pedicels and sepals with spreading hairs. Stems and leaves beneath pubescent. Corolla blue.

Corolla 6–7 mm. long. Calyx 5–7 mm. long. Leaves 1.2–1.8 cm. long, and nearly as wide. Stems densely hirsute, 2–3 dm. long.

1. *M. violacea*.

Corolla 4–5 mm. long. Calyx 4–6 mm. long. Leaves .7–1.8 cm. long, ovate-oblong. Stems pubescent, less than 1.5 dm. long.

⁶Name from *μόνος*, one, and *καρδία*, heart, in allusion to the single large cordate sepal.

Leaves 1.2–1.8 cm. long, the younger pubescent along midrib beneath. Sepals 5–6 mm. long. 2. *M. lilacina*.

Leaves .7–.9 cm. long, the younger pubescent over the entire surface beneath. Sepals 4–5 mm. long. 3. *M. humilis*.

Plant glabrous throughout. Corolla white, 3–3.5 mm. long.

4. *M. albida*.

1. ***Monocardia violacea*** Pennell, sp. nov.

Stems fleshy, 2–3 dm. long or longer, densely hirsute with yellowish hairs. Leaves ovate- or oval-orbicular, 1.2–1.8 cm. long, 1–1.4 cm. wide, obtuse, pubescent beneath along midrib proximally, distally glabrous and obscurely reticulate. Pedicels 10–20 mm. long, hirsute with spreading hairs. Sepals all ciliate: the three outer 5–7 mm. long, the innermost pubescent on the midrib. Corolla 6–7 mm. long; tube yellow, distally purplish, the lobes violet. Filaments violet-bluish; anthers white. Capsule 3–4 mm. long, narrowly oblong. Seeds .3 mm. long, brown.

Type, wet loam, along trail in forest, near Villavicencio, Meta, altitude 450 meters, collected in flower and fruit August 28, 1917, F. W. Pennell 1480; in Herb. New York Botanical Garden. Only specimen seen.

Wet loam in forest at an altitude of 450 meters. Tropical zone, in Meta, and in Panama. Doubtless wide-spread in northern South America.

2. ***Monocardia lilacina*** Pennell, sp. nov.

Stems slightly fleshy, .5–1.5 dm. long, pubescent with spreading hairs. Leaves ovate-oblong, 1.2–1.8 cm. long, .8–1.1 cm. wide; obtuse, pubescent beneath along midrib proximally. Pedicels 8–12 mm. long, pubescent with spreading hairs. Sepals all ciliate: the three outer 5–6 mm. long, two innermost pubescent on the midrib, shorter. Corolla 4–5 mm. long, violet within throat, the lobes pale-blue. Filaments of anterior stamens pale-blue, of posterior violet; anthers pale-blue. Capsule 2.5–3 mm. long, ovoid-oblong. Seeds .2–.25 mm. long, blackish.

Type, wet loam, along trail in forest, near Villavicencio, Meta, alt. 450 meters, collected in flower and fruit August 28, 1917. F. W. Pennell 1476; in Herb. New York Botanical Garden.

Wet loam in forest, at altitudes of 450 to 500 meters, Tropical zone, in Meta.

Meta. Villavicencio (wet trail in forest, alt. 500 m.), Pennell 1378, (alt. 450 m.), Pennell 1476, (wet place near Rio Guatiquia, alt. 500 m.), Pennell 1547.

3. *Monocardia humilis* Pennell, sp. nov.

Stems not fleshy, .2–1 dm. long, pubescent with spreading hairs. Leaves ovate-oblong, .7–.9 cm. long, .3–.8 cm. wide, obtuse, at least when young hirsute over entire under surface, not evidently reticulate. Pedicels 6–9 mm. long, pubescent with spreading hairs. Sepals all ciliate: the three outer 4–5 mm. long, pubescent over entire outer surface. Corolla 4–5 mm. long, violet within throat, the lobes pale-blue. Filaments of anterior stamens pale-blue, of posterior violet; anthers pale-blue. Capsule 2–3 mm. long, ovoid-oblong. Seeds .2–.25 mm. long, blackish.

Type, sandy soil, seepy place in plain east of Neiva, Huila, alt. 550–600 meters, collected in flower and fruit August 8, 1917, Rusby & Pennell 1065; in Herb. New York Botanical Garden.

Wet open soil, sandy or loam, at altitudes below 800 meters, Tropical zone, llanos of upper Magdalena valley, and in Panama. Doubtless in the Sabana of Bolívar.

Huila. Neiva (sandy seepy place in plain east of N., alt. 550–600 m.), Rusby & Pennell 1065.

Tolima. San Lorenzo (swale west of S. L., alt. 600–800 m.), Pennell 3544.

4. *Monocardia albida* Pennell, sp. nov.

Stems not fleshy, .3–1.5 dm. long, glabrous. Leaves ovate-oblong, .7–1.5 cm. long, .3–1 cm. wide, obtuse, glabrous. Pedicels 7–14 mm. long, glabrous. Sepals glabrous: the three outer 4–5 mm. long. Corolla 3–3.5 mm. long, dull white throughout. Filaments and anthers white. Capsule 2–3 mm. long, narrowly elliptic-oblong. Seeds .2–.3 mm. long, blackish.

Type, wet loam, trail in forest, Villavicencio, Meta, alt. 450 meters, collected in flower and fruit August 28, 1919, F. W. Pennell 1477; in Herb. New York Botanical Garden.

Wet loam in forest at altitudes of 450 to 500 meters, Tropical zone, in Meta.

Meta. Villavicencio (wet trail in forest, alt. 450 m.), Pennell 1477, (moist meadow near Rio Guatiquia, alt. 500 m.), Pennell 1555 (plant much smaller than 1477).

7. *MACUILLAMIA* Rafinesque.

Macuillamia Raf. [Neogenyton 2.1825, generic description only.] Autik. Bot. 44, 1840.

Type species, *Monniera rotundifolia* Mich., of Illinois.

1. *Macuillamia limosa* Pennell, sp. nov.

Extensively repent. Stem slightly succulent, finely pubescent rather densely so distally. Leaves 1.2–1.7 cm. long, 8–10 mm. wide obovate-elliptic, entire, narrowed at base, rounded at apex, with 7 or 9 longitudinal veins. Pedicels slender, 10–15 mm. long, finely pubescent, in flower ascending, soon reflexing below the leaf-like bracts. Sepals 2.5–3 mm. long, obtuse, somewhat pubescent; two outer ovate-oblong; two median lanceolate-oblong; the innermost one narrower or wanting. Corolla 4 mm. long, the lobes spreading, slightly longer than the tube, the two posterior united to apex; glabrous throughout, white. Filaments white. Anthers purplish. Styles distinct near apex; stigmas semi-capitate. Capsule 2–2.5 mm. long, nearly globose, obtuse. Seeds .6 mm. long, cylindrical-oblong, reticulate, brown.

Type, open pool in clayey loam, Melgar, Cundinamarca, altitude 400–500 meters, collected in flower and fruit December 4–5, 1917, F. W. Pennell 2927; in Herb. New York Botanical Garden.

Open pools and ditches, in shallow still water, at altitudes below 500 meters, Tropical zone, in the Magdalena and Cauca valleys, and doubtless through northern Colombia. Ranges northward to Mexico.

Antioquia. Puerto Berrio (shallow water, alt. 125–135 m.), Rusby & Pennell 32.

Cundinamarca. Melgar (pool in clayey loam, alt. 400–500 m.), Pennell 2927.

Tolima. Espinal to Cuamo (ditch, loam, alt. 350–400 m.), Rusby & Pennell 179.

Valle. La Paila, I. F. Holton 581 (H, Y).

8. **HYDRANTHELIUM** Humboldt, Bonpland and Kunth.

Hydrantheium H. B. K., Nov. Gen. et Sp. 7: 202. pl. 646. 1825.

Type species, *H. callitrichoides* H. B. K., of Venezuela.

1. *Hydrantheium braunii* Ernst.

Hydrantheium braunii Ernst, in Vargasia 1: 189. 1870.

“Hallé el 19 de Setiembre de 1869 en uno de los pozos de la sabana delante el camposanto de la Merced [Caracas],” Venezuela.

Open wet soil, at an altitude of 30 meters, Tropical zone, in Magdalena; doubtless eastward near the Caribbean coast through Venezuela.

Magdalena. El Libano plantation, (Santa Marta region, open land on border of swamp and flooded during heavy rains, alt. 30 m.),

H. H. Smith 2544 (C, H, U, Y). (Plants small, largest .8 dm. long, and in flower only, youngest leaves slightly undulate-lobed.)

9. SCOPARIA Linné.

Scoparia L., Sp. Pl. 116. 1753.

Type species, *S. dulcis* L.

1. Scoparia dulcis L.

Scoparia dulcis L., l. c. 116. 1753. "Habitat in Jamaica, Curassao"; ex L., Hort. Cliff. 320. 1737. "Crescit in Curassao & Jamaica." No specimens from Curaçao seen but the plant here considered unquestionably occurs there.

Capraria dulcis (L.) Kuntze, Rev. Gen. 459. 1891.

Open soil, loam or sand, river-banks, fields, along trails and in towns, at altitudes below 1500 meters, Tropical zone, doubtless throughout lowland Colombia. Ranges throughout Tropical America, a weed of South American origin.

Antioquia. Vuelta de Acuña on Rio Magdalena (sandy loam shore, alt. 125–130 m.), Pennell 3790.

Bolívar. Boca Verde on Rio Sinu (cacaotale; alt. 90–120 m.), Pennell 4233; Buenavista, east of Sincé (open grassy place), Pennell 3991; Calamar (along Rio Magdalena, alt. 15–25 m.), Rusby & Pennell 17; Vilches on Rio Sinu (loam, alt. 20–50 m.), Pennell 4713.

Cundinamarca. Girardot (field, alt. 350–400 m.), Rusby & Pennell 113; Pandi (open slope, alt. 900–1100 m.), Pennell 2816.

Huila. Cordillera Oriental, east of Neiva (open foot-hill, alt. 700–1500 m.), Rusby & Pennell 460.

Magdalena. Bonda (alt. 45 m., common weed in open places below 900 m.), H. H. Smith 1330 (C, H, U, Y).

Meta. Villavicencio (streets, alt. 525 m.), Pennell 1372, (roadside, alt. 500 m.), Pennell 1572.

Tolima. Libano (field, alt. 700–900 m.), Pennell 3426.

Valle. La Paila, I. F. Holton 587 (Y).

10. STEMODIA Linné.

Type species, *S. maritima* L., of Jamaica.

Stemodia L., Syst. Nat. ed. X, 1118. 1759.

1. Stemodia durantifolia (L.) Sw.

Capraria durantifolia L., Syst. Nat. ed. X. 1116. 1759. ". . . Sloan. Jam. t. 174." Ex Sloane, Jam. 196. pl. 124. f. 2: "Grows in the sandy savannas [of Jamaica]."

Stemodia durantifolia (L.) Sw., Obs. Bot. 240. 1791.

Stemodacra durantifolia (L.) Kuntze, Rev. Gen. 466. 1891.

Occurs in two color-forms, blue, and lavender or "pale-pink."

River-flats and moist, or frequently desiccated, ditches, in open land, at altitudes below 500 meters, Tropical zone, near the Caribbean Coast, along the Rio Magdalena, and on the Sabana of Bolívar. Ranges from Mexico to Brazil and in the West Indies.

Antioquia. Brazuela de Perales (river flat along Rio Magdalena, alt. 150 m.), Pennell 3698 [corolla blue].

Bolívar. Cartagena (moist arroyo, 12 km. s. e. of C., alt. 50–100 m.), Pennell 4729 [corolla blue], (open ditch, 14 km. s. e. of C., alt. 50–100 m.), Pennell 4730 [corolla lavender]; Sincé (desiccated pool in prairie, alt. 120–170 m.), Pennell 4047 [corolla lavender].

Huila. Quebrada de Angeles, above Natagaima (alt. 450–500 m.), Rusby & Pennell 263 [corolla blue].

Magdalena. Carpentiera (along Rio Magdalena, alt. 50–60 m.), Rusby & Pennell 28; Mamatoca (open boggy ground, 5 m. s. of M., alt. 30 m.), H. H. Smith 1360 (C, H, U, Y) [corolla pale pink].

11. **UNANUEA** (Ruiz and Pavon.) gen. nov.

Unanuea R. & P., (Ic. Fl. Per. Ined.),

Erect, much-branched shrubby herbs or low shrubs, at least 8–10 dm. tall. Stems 4-angled. Leaves mostly whorled in threes, lanceolate to ovate, acute to acuminate, serrate to dentate, shortly petioled. Pedicels axillary, slender, as long as or longer than the calyces, not bracteolate. Sepals five, uniform, linear to lanceolate, entire. Corolla 9–13 mm. long, tubular-campanulate with spreading lobes, the posterior united three-fourths length; externally puberulent, within glabrous, purple-blue. Stamens four, didynamous (the posterior filaments shorter), glabrous, anthers-sacs elliptic, each stalked on a short arm of the connective. Style glabrous. Stigmas distinct, flattened. Capsule brown, ovate in outline, acuminate, dehiscent septically (even through septum) and slightly also loculicidally; placentae adherent to septum, roughened by funicles. Seeds oblong, minutely roughened-tubercular.

Differs from *Stemodia* L., which has corolla-lobes not widely spreading, pubescent or glabrous within on the anterior side, two bracteoles on the pedicel beneath the calyx, and the leaves sessile and clasping; from *Lendneria* Minod, which are herbs low and spreading, with smaller corollas densely pubescent within over the bases of the posterior lobes and with evidently petioled leaves. Both *Stemodia* and *Lendneria* are genera of the Tropical life-zone, while *Unanuea* is of the Subtropical and Temperate zones.

Type species, *Stemodia suffruticosa* H. B. K., of Ecuador.

1. Unanuea dentata (Minod) Pennell, comb. nov.

Stemodia suffruticosa H. B. K., f. *dentata* Minod in Bull. Soc. Bot. Genève ser. II. 10: 201. 1918. "In Andibus Ecuadorensibus (R. Spruce, n. 5066!)." Isotype seen in Gray Herbarium of Harvard University.

At an attitude of 2600 meters, Temperate zone, southern Cordillera Central southward into Ecuador.

Cauca. Mozoco, Moras Valley, Tierra Adentro (alt. 2600 m.), H. Pittier 1326 (U). ["A shrub, 1 m. high; fl. deep purple."]

12. LENDNERIA Minod.

Lendneria Minod, in Bull. Soc. Bot. Genève, ser. II. 10: 240. 1918.

Type species, *Capraria humilis* Soland.

Pedicels 1-2 mm. long. Corolla 4 mm. long, its lobes blue, the posterior united two-thirds length. Hairs within corolla over base of posterior lobes not knobbed. Anther-sacs circular, slightly separated on very short connective-arms. Capsule globose, 2 mm. long, much shorter than the sepals. Seeds pale yellowish, nearly cylindric. 1. *L. humilis*.

Pedicels longer, mostly 7-20 mm. long. Corolla 8 mm. long, its lobes white, the posterior united nearly to apex. Hairs within corolla over base of posterior lobes knobbed. Anther-sacs oblong, distinctly separated on stout connective-arms. Capsule in outline oblong-ovate, 4-5 mm. long, about equaling the sepals. Seeds brown-black, nearly oblong. 2. *L. angulata*.

1. Lendneria humilis (Solander) Minod.

Capraria humilis [Soland. in] Ait., Hort. Kew. 2: 354. 1789. "Nat. of the East Indies. John Gerard Koenig, M.D. Introd. 1781, by Sir Joseph Banks, Bart." Identified by Bentham in DC. Prod. 10: 383. 1846, as species here considered, his determination with an "!" Our plant has been occasionally reported as an introduction into the Old World Tropics.

Stemodia parviflora Ait., Hort. Kew., ed. II. 4: 52. 1812. "Nat. of South America. Cult. 1759 by Mr. Ph. Miller." Miller's plant was derived from Houston who collected at Cartagena in Colombia as well as in Mexico and the West Indies. The original introduction of Houston, published as *Erinus verticillatus* Mill., Gard. Dict. n. 5. 1768, differs so essentially from the account of Aiton's plant, especially in denoting a plant with glabrous stems and leaves, as to lead to the supposition that the latter was described from specimens of a different origin.

Stemodia arenaria H. B. K., Nov. Gen. et Sp. 2: 357. pl. 175. 1818. "Crescit in ripa inundata fluminis Magdalenae prope Banco et El Peñon inter Mompox et Morales."

Lendneria humilis (Solander) Minod in Bull. Soc. Bot. Genève, ser. II. 10: 240. 1918.

Corolla-tube yellowish, lobes blue-violet, tube and lobes, especially on the posterior side, with deep violet lines. Seen also (Pennell 4709) with corolla very pale, a distinct color-form.

Moist soil, river-banks and waste-land, frequently a weed near habitations, at altitudes below 200 meters, Tropical zone, along the

Rio Sinu in Bolívar, the Rio Cauca in Valle, and the Rio Don Diego in Magdalena; doubtless wide-spread elsewhere. Ranges from Mexico to Argentina and in the West Indies.

Bolívar. Boca Verde, on Rio Sinu (gravelly river-bank, alt. 90–120 m.), Pennell 4197, (field along river, alt. 100–200 m.), Pennell 4567; Frasuquillo, on Rio Sinu (grove along river in village, alt. 90–120 m.), Pennell 4610; Vilches, on Rio Sinu (shaded yard, alt. 20–50 m.), Pennell 4708 [corolla blue], 4709 [corolla pale-blue], 4710 [corolla intermediate in color between 4708 and 4709].

Magdalena. Open sandy ground by the Rio Don Diego, near the sea, H. H. Smith 2730 (Y).

Valle. La Paila, I. F. Holton 580 (H, Y).

2. *Lendneria angulata* (Oersted) Pennell, comb. nov.

Stemodia angulata Oersted in Kjoeb. Vidensk. Meddel. 1853: 22. 1853.
"I Naerheden af Cartago i Costa-Rica."

Certainly distinct from *Stemodia jorullensis* H. B. K., Nov. Gen. et Sp. 2: 358. 1818, which is described as 1–1½ feet tall and with leaves in threes, incised or doubly serrate.

Moist soil in shade, river-banks and waste land, at altitudes below 600 meters, Tropical zone, along the Rio Sinu in Bolívar, and in Magdalena; doubtless wide-spread in northern Colombia. Ranges northward to Guatemala.

Bolívar. Frasuquillo, on Rio Sinu (shady soil along river, alt. 70–100 m.), Pennell 4192.

Magdalena. Minca (damp door-yard, in crevices of bricks, alt. 600 m.), H. H. Smith 1328 (C, H, U, Y).

13. *VANDELLIA* Browne.

Vandellia Browne; L., Mant. Pl. 1: 12, 89. 1767.

Type species, *V. diffusa* L.

1. *Vandellia diffusa* L.

Vandellia diffusa L., Mant. Pl. 1: 89. 1767. "Habitat in Insula S. Thomae. D. D. Browne." Description inaccurate in describing the calyx as quadripartite (but with upper lobe subbifid), its lobes equal, the lower lip of corolla as bilobed, and the capsules as one-celled, but is nevertheless certified by Bentham, DC. Prod. 10: 416. 1846 as being the plant here considered.

Lindernia diffusa (L.) Wettst. in Nat. Pflanzenfam. 43b: 79. 1891.

Pyxidaria diffusa (L.) Kuntze, Rev. Gen.: 464. 1891.

Moist open soil, along trails and in towns, at altitudes below 1500 meters, Tropical zone; widely distributed through tropical America, in situations to suggest its having been naturalized. Ap-

parently introduced from the Ethiopian Region of the Old World Tropics.

Cundinamarca. Icononzo (along trail in forest, alt. 1400–1800 m.), Pennell 2871.

Magdalena. River Don Diego (open sandy wet ground near sea, alt. 0–10 m.), H. H. Smith 2729 (H, Y).

Meta. Villavicencio (moist depression in llano, e. of, alt. 450 m.), Pennell 1466; (streets of town, alt. 525 m.), Pennell 1575, (gravel along Rio Guatiquia, alt. 500 m.), Pennell 1590.

Tolima. Mariquita (prairie, depression, alt. 250–300 m.), Pennell 3639.

14. TORENIA Linné.

Torenia L., Sp. Pl. 619. 1753.

Type species, *T. asiatica* L., of India.

Bracts leaf-like, the upper smaller; inflorescence an elongate raceme.

Pedicels 20–25 mm. long. Sepals 4–5 mm. long. Corolla 5–7 mm. long, its posterior lobes united $\frac{2}{3}$ – $\frac{4}{5}$ length and equaling the anterior; anterior lobes widely horizontally spreading; within glabrous, blue on posterior lobes and distally on anterior lobes, these yellowish-white proximally with an arch of deep-violet at the base of the anterior lobes. Capsule 3–4 mm. long, obtuse and mucronate. Leaves ovate, 1–1.5 cm. long. Plant repent-ascending.

1. *T. crustacea*.

Bracts minute, subulate; inflorescence congested at the nodes.

Pedicels 10–15 mm. long. Sepals 9–11 mm. long. Corolla 8–9 mm. long, its posterior lobes united nearly to apex and shorter than the anterior lobes; antero-lateral lobes placed sagittally, the anterior lobe horizontal and longest; within pubescent over bases of anterior lobes, white or on anterior side somewhat blue-violet. Capsule 8–10 mm. long, acute. Leaves lanceolate-ovate, 1.2–2.5 cm. long. Plant ascending-erect.

Corolla on anterior lobe blue-violet, and on antero-laterals with blue-violet streaks. Leaves dentate. 2. *T. thouarsii*.

• Corolla white throughout. Leaves crenate-serrate.

2a. *T. thouarsii nivea*.

1. *Torenia crustacea* (L.) Cham. & Schlecht.

Capraria crustacea L., Mant. 87. 1767. "Habitat in Amboina; China."

Amboina plant, described by Rumphius, Herb. Amb. 5: 461. pl. 170 f. 3, verified by Dr. E. D. Merrill, Interp. Rumph. Herb. Amb. 468, as the plant here considered.

Torenia crustacea (L.) C. & S. in Linnaea 2: 570. 1827.

Vandellia crustacea (L.) Benth., Scroph. Ind. 35. 1835.

Lindernia crustacea (L.) F. Muell., Census 97. 1882.

Pyxidaria crustacea (L.) Kuntze, Rev. Gen. 2: 464. 1891.

Moist open soil, along trails and in towns, at altitudes of 500 to 600 meters, Tropical zone; introduced from Oriental Region of Old World Tropics.

Cundinamarca. Melgar (moist loam, open slope, along trail, alt. 500–600 m.), Pennell 2878, 2879 [form smaller throughout].

Meta. Villavicencio (streets and yards, alt. 525 m.), Pennell 1527.

2. *Torenia thouarsii* (Cham. & Schlecht.) Kuntze.

Nortenia thouarsii Cham. & Schlecht. in *Linnaea* 3: 18. 1828. "In Brasiliae provincia Rio Janeiro in uliginosis post Botafoginam . . . legit Beyrich, in insulis Madagascaria et Mauritii Depetit Thouars. . . . Willd. Hb. n. 11,547 (planta madagascariensis a Thouarsii comm.)."

Torenia nortenia Steud., *Nom.*, ed. II. 2: 692. 1841.

Torenia thouarsii (Cham. & Schlecht.) Kuntze, *Rev. Gen.* 468. 1891.

This has usually been known as *Torenia parviflora* Ham.

Moist banks, in edge of forest, at an altitude of 500 meters, Tropical zone; wide-spread through lowland tropical South America, growing as if a native plant. However, as this American plant appears to be indistinguishable from the plant of the Old World, and the remaining species of the genus are all Palaetropic it appears nearly certain that our plant is an introduction. From the Ethiopian and Oriental regions of the Old World Tropics.

Meta. Villavicencio (moist shaded bank near Rio Guatiquia, alt. 500 m.), Pennell 1528, (moist meadow and swamp in forest, near Rio Guatiquia, alt. 500 m.), Pennell 1560.

2a. *Torenia thouarsii nivea* Pennell, var. nov.

Leaves smaller, 1.2–1.5 cm. long, crenate-serrate, rather than dentate. Corolla white throughout. Probably a color-form identical with plants of the Old World Tropics and introduced therefrom.

Type, wet sand along Rio Guatiquia, altitude 500 meters, collected in flower and fruit August 30, 1917, F. W. Pennell 1531; in herbarium New York Botanical Garden.

15. ILYSANTHES Rafinesque.

Ilysanthes Raf., *Ann. Nat.* 13. 1820.

Type species, *I. riparia* Raf., of the Ohio.

1. *Ilysanthes inaequalis* (Walt.) Pennell.

Gratiola inaequalis Walt., *Fl. Carol.* 61. 1788. [South Carolina.]

Ilysanthes inaequalis (Walt.) Pennell in *Torrey* 19: 149. 1919.

Wet soil near streams, at an altitude little above sea-level, Tropical zone, in Magdalena. Probably wide-spread, and also in the

Subtropical and Temperate zones. Through lowland South America south to Paraguay; ranges northward into Temperate North America.

Magdalena. Rio Buritaca (observed only in a swampy place, bank of R. B., close to the sea—50 m. e. of Santa Marta), H. H. Smith 1329 (C, H, U, Y).

16. SCHISTOPHRAGMA Benth.

Schistophragma Benth. in DC. Prod. 10: 392. 1846

Type species, *S. pusilla* Benth.

1. Schistophragma pusilla Benth.

Schistophragma pusilla Benth. in DC. Prod. 10: 392. 1846. "In Mexico pr. Tehuantepec (Alaman!) . . . (v. s. comm. a. cl. DC.)." Description from a dwarf plant, which explains the variety following.

Schistophragma pusilla major Benth., l. c. 392. 1846. "In campis aridis pr. Sta Martha (Purdie!) . . . (v. in herb. Hook.)."

Conobea pusilla (Benth.) B. & H., Gen. 2: 951. 1876.

Open dry, stony soil, at altitudes below 300 meters, Tropical zone, in Magdalena, and doubtless spread across northern Colombia. Ranges northward to Mexico.

Magdalena. Bonda (alt. 60 m.), H. H. Smith 1970 (C, H, U, Y).

["Rare on open, stony and dry ground, hillsides or banks below 1000 f."]

17. MIMULUS Linné.

Mimulus L., Sp. Pl. 634. 1753.

Type species, *M. ringens* L., of Virginia.

1. Mimulus glabratus H. B. K.

Mimulus glabratus H. B. K., Nov. Gen. et Sp. 2: 370. 1818. "Crescit prope Moran Mexicanorum, alt. 1330 hex. [= 2527 m.]. Varies, even in same colony, with leaves obviously petioled or nearly sessile, and with all parts of the plant, including the flower, relatively large or relatively small. The latter state is doubtless the basis of *M. andicola* H. B. K. from Ecuador.

Corolla lemon-yellow, within throat on anterior side golden and spotted with many red-brown spots.

Along streams, springheads, swales and brooks, at altitudes of 2300 to 3200 meters, Temperate zone, ascending as a dwarfed plant to Paramo, and descending rarely into the Subtropical zone, both slopes of Cordillera Oriental, in Cundinamarca. Doubtless throughout this and the other Cordilleras. Ranges through the Andes southward to Bolivia and with many breaks, through the mountains of Central America and Mexico, northward to Colorado and the plains of North Dakota.

Cundinamarca. Bogotá (ditch in field near Rio San Cristobal, alt. 2800 m.), Pennell 2194, 2279, (wet open spring-head, alt. 2700–2800 m.), Pennell 2296; Chipaque (wet roadside, alt. 2300–2400 m.), Pennell 1326; Sibaté (wet roadside, alt. 2620 m.), Pennell 2387; Zipaquirá (springhead in meadow, alt. 2650 m.), Pennell 2533; Mt. Chuscal, west of Zipaquirá (swale on paramo, alt. 3100–3200 m.), Pennell 2600; Guasca (alt. 2700 m.), Triana.

18. LEUCOCARPUS D. Don.

Leucocarpus D. Don in Sweet, Brit. Flow. Gard. II. pl. 124. 1831.

Type species, *Conobea alata* Graham, of Mexico.

1. *Leucocarpus perfoliatus* (H. B. K.) Benth.

Mimulus perfoliatus H. B. K., Nov. Gen. et Sp. 2: 371. 1818. "Crescit in Regno Novo-Granatensi. . . . A Mutisio cum Bonplandio communicatus." Described as with leaves connate, but this appearance has misled subsequent workers, including Bentham in his characterization of *Leucocarpus*. The plant actually has opposite cordate-clasping leaves.

Leucocarpus perfoliatus (H. B. K.) Benth. in DC. Prod. 10: 335. 1846.

This species has usually been called *L. alatus* (Graham) D. Don, based upon *Conobea alata* Graham (1830) of Mexico, a plant more carefully described and under an appropriate name. The character of length of calyx-lobes, used by Bentham, is of no significance, the lobes varying in the same specimens and usually seeming relatively longer when in the bud.

Corolla yellow throughout, with two pubescent ridges within throat anteriorly. Plant shrubby below, from a perennial root sending up a clump of many long densely floriferous stems. Fruit fleshy, chalky-white.

Along stream banks in forest, at altitudes of 1350 to 2000 meters, probably from all slopes of the Cordilleras, and also on the Sierra Nevada de Santa Marta. Subtropical zone. Ranges from Mexico to Bolivia. The seeds are doubtless carried by birds.

Huila. Cordillera Oriental, east of Neiva (along rocky stream in forest, alt. 1500–2000 m.), Rusby & Pennell 600.

Magdalena. Las Nubes (damp clearing near stream, alt. 1350 m.), H. H. Smith 1405 (C, H, U, Y).

Tolima (?). "Forets de Quindio" (2200 m.), J. Triana (U).

Valle. Jicaramata, "circum flumen Toluam", I. F. Holton 578.

19. ALONSOA Ruiz and Pavon.

Alonsoa R. & P., Syst. Veg. Fl. Peruv. et Chil. 150. 1798.

Type species, *A. caulialata* R. & P., of Peru.

Leaves coarsely serrate or dentate, the largest 5–6 cm. long. Corolla 10 mm. long. Filaments thick. Anthers infundibuliform-

explanate. Capsule 9–10 mm. long, narrowly ovoid, conspicuously attenuate. Seeds black, the furrows nearly as wide as the intervening ridges. Stem above, pedicels and calyces usually glabrous, rarely somewhat glandular-pubescent.

1. *A. meridionalis*.

Leaves uniformly serrate, the largest 8–9 cm. long. Corolla 5–6 mm. long. Filaments thin. Anthers widely and flatly explanate. Capsule 6 mm. long, pyramidal, shortly attenuate. Seeds dark-brown, the furrows much narrower than the intervening ridges. Stem above, pedicels and calyces glandular-pubescent, densely pubescent at the bases of the petioles.

2. *A. serrata*.

1. *Alonsoa meridionalis* (L. f.) Kuntze.

Scrophularia meridionalis L. f., Suppl. 280. 1781. "Habitat in Nova Granada. D. Mutis." Type probably from Bogotá.

Hemimeris mutisii H. B. K., Nov. Gen. et Sp. 2: 376. 1817. "Crescit prope Santa Fe de Bogota [Humboldt & Bonpland]."

Alonsoa mutisii (H. B. K.) G. Don, Gen. Syst. 4: 513. 1838.

Alonsoa meridionalis (L. f.) Kuntze, Rev. Gen. 2: 457. 1891. The plant of Venezuela noted by Kuntze, and described as so variable in color, is *A. parviflora* (H. B. K.) G. Don.

Corolla uniformly dull-orange. Filaments dull-yellow. Anthers yellow.

Waysides and grassy slopes, around the margins of the Sabana of Bogotá, on the western slope of the Cordillera Oriental; at altitudes of 2600 to 2900 meters. Temperate zone.

Cundinamarca. Zipaquirá, Pennell 2564 (Y); Bogotá, Holton (Y), Pennell 1309 (Y), Pennell 2099 (Y), Pennell 2332 (Y); (Plateau de Bogotá), J. Triana (Y); El Peñon, s. w. of Sibaté, Pennell 2410 (Y), [pedicels unusually glandular-pubescent].

2. *Alonsoa serrata* Pennell, sp. nov.

Stem 6 dm. tall, four-angled, angles slightly winged, stem glabrous below, glandular-pubescent above. Leaves opposite, 8–9 cm. long, the blades ovate, uniformly serrate, slightly paler beneath, glabrous, on petioles less than one-half length of blade. Racemes indefinite, terminal on the stem and branches; bracts sessile, the lowermost ovate and somewhat serrate, nearly 2 cm. long, the upper lanceolate, smaller. Pedicels spreading, 10–11 mm. long, glandular-pubescent. Sepals oblong-lanceolate, acute, glandular-pubescent, 3–4 mm. long. Corolla 5–6 mm. long. Filaments slender. Anthers widely explanate. Style 2–2.5 mm. long. Stigma capitate. Capsule 6 mm. long, pyramidal, slightly attenuate to an obtuse apex, glabrous. Seeds .8–.9 mm. long, cylindrical, dark-brown, with about 8 rounded longitudinal ridges separated by deep narrow furrows; the whole surface finely alveolate-reticulate.

Type, Santa Marta Mountains, collected in flower and fruit about April, 1899, H. H. Smith 1497; in Herb. New York Botanical Garden. The note for 1497 is stated by Smith to have been lost, but he tells us that the plant is “probably from Valparaiso, 4500 ft. [= 1350 m.]” altitude. I suspect that this plant came from much higher than this.

Rusby has compared this with Purdie’s plant from Santa Marta and has written on our sheet “Purdie’s plants are more hairy than this,” an excellent confirmation of Purdie’s specimens cited in DC. Prod. 10. 250: being this same species.

Magdalena. Valparaiso, Santa Marta Mts., H. H. Smith 1497 (C, H, U, Y).

20. *FAGELIA* Schwencke.

Fagelia Schwencke, [in Verh. Bataafsh. Genootsch. Rotterdam 1: 474. pl. 13. 1774, generic diagnosis only]; J. F. Gmel., Syst. Nat. 40. 1791.
Calceolaria L., in Kongl. Vetensk. Acad. Handl. 31: 288, 1770, not *Calceolaria* Fabr., Enum. Meth. Pl. Host. Med. Helmstad. ed. II. 37. 1763.

Type species, *F. flavicans* J. F. Gmel., probably from Ecuador.

Anther-sacs proximate on the simple filament, both alike and fertile.

Anterior lip of corolla (= sac) not over twice width of posterior lip (= hood). Leaves entire to coarsely serrate-dentate, the blades at times triangular. [CHEILONCOS Kranzl.]

Capsule ovate or broader, no longer than broad, thick-walled, shorter than or but slightly exceeding the sepals. Corolla 8–25 mm. long, with the posterior lip broadly truncate to notched. Filaments stout, not or but little longer than the oblong anthers. Inflorescence corymb-like, both secondary branches developed, and at least some of the lateral flowers without bracts.

Shrubs. Glutinous above, on stems, pedicels, sepals and leaves.

Leaf-blades lanceolate, entire to slightly serrate, shortly petiolate. Corolla appearing broader than long because the sac is pressed tightly against hood; orifices to lips broad and rounded, so sac is shallow.

Calyx 4–6 mm. long. Leaves glaucous beneath. Plant less glutinous. Branches of the inflorescence once branched, so that flowers occur in fours. 1. *F. microbefaria*.

Calyx 2–3 mm. long. Leaves slightly paler beneath. Plants very glutinous. Branches of the inflorescence irregularly twice branched, so that flowers occur usually in clusters of more than four. 2. *F. fruticosa*.

Herbaceous throughout. Not glutinous, but often with stalked glands. Leaf-blades lanceolate to broadly triangular, serrate to doubly dentate. Corolla evidently elongated sagittally, with sac usually not pressed against hood and so

with its orifice evident; orifice to hood narrow, or truncate; to sac truncate, with sac deep.

Calyx 4–5 mm. long, shorter than or about equaling the capsule. Leaves sessile. Stem densely glandular-pubescent.

Leaves narrowed at base, elliptic-lanceolate, dentate, on both surfaces densely ferruginous-pubescent with dark-jointed hairs. Stem below densely, above sparsely pubescent. Inflorescence of a few wide-spreading branches. Corolla 8–10 mm. long. Anthers about 1.5 mm. long.

3. *F. lehmanniana*.

Leaves rounded-clasping at base, lanceolate, crenate-serrate (with spinulose serrations), above glabrate, beneath paler and finely pubescent. Stem below apparently glabrate, above pubescent with short gland-tipped hairs. Corolla about 12–15 mm. long. Anthers about 2.5 mm. long.

4. *F. crenata*.

Calyx 7–12 mm. long, longer than the capsule. Leaves petioled, petiole at times broadly winged.

Anther-sacs stiffly divaricate (so anthers straight), opening throughout or from distal apices. Capsule with gland-tipped hairs. Corolla slightly pubescent within at base. Style 1.5–4 mm. long. Wing of petiole less than one-third width of blade or wanting.

Leaves 3–5 mm. long, the petioles wingless.

Stem pubescent throughout with glandless hairs. Calyx-lobes obtuse to acute. Corolla 15–20 mm. long. Style 1.5 mm. long. Leaves 3–4 cm. long, obtuse to acutish, simply or somewhat doubly crenate-serrate, beneath pale and densely pubescent. Secondary branches of the inflorescence not or scarcely branched.

5. *F. saxatilis*.

Stem pubescent distally with gland-tipped hairs. Calyx-lobes acuminate. Corolla about 10 mm. long. Style 3 mm. long. Leaves 4–5 cm. long, acuminate, irregularly somewhat doubly serrate with acute teeth, beneath lighter green and somewhat pubescent. Secondary branches of the inflorescence repeatedly branched.

6. *F. bogotensis*.

Leaves 11–17 cm. long, the petioles winged proximally or throughout, the wing connate with that of opposite leaf.

Petioles broadly winged proximally, distally very narrowly margined; leaf-blades broader than long, irregularly shallowly crenate-dentate. Corolla with posterior lobes not united to apex, so leaving a deep narrow orifice into hood. Anther-sacs broadly contiguous.

7. *F. trilobata*.

Petioles nearly uniformly winged throughout; leaf-blades longer than broad, sharply doubly serrate-dentate. Corolla with posterior lobes united nearly or quite to apex, so leaving slight if any median orifice into hood. Anther-sacs narrowly contiguous.

Corolla 8–10 mm. long; hood with slight median orifice. Anthers 2 mm. long, the sacs opening throughout. Style 1.5–1.8 mm. long. Capsule 3–4 mm. long. Winged petiole usually 12–18 mm. wide, and somewhat dentate. Plant pubescent above with some gland-tipped hairs.

8. *F. alata*.

Corolla 13–15 mm. long; hood truncate, without apical median orifice. Anthers 3.5 mm. long, the sacs opening from distal apex but not throughout. Style 4 mm. long. Capsule 5–6 mm. long. Winged petiole 8–13 mm. wide, entire. Plant pubescent throughout with glandless hairs.

9. *F. nevadensis*.

Anther-sacs curved (so anther horseshoe-shaped), opening from proximal apices partially or throughout. Capsule pubescent with glandless hairs. Corolla glabrous within at base. Style 5 mm. long. Wing of petiole more than one-third width of blade.

Leaves sharply dentate, above glabrate, beneath paler and finely pubescent. Stem glabrate below, somewhat hirsute above. Calyx 8–10 mm. long.

10. *F. tolimensis*.

Leaves obtusely dentate, above pubescent, beneath softly pubescent to tomentose. Stem hispid below, hirsute-pubescent above. Calyx 9–11 mm. long.

11. *F. perfoliata*.

Capsule narrowly pyramidal, longer than broad, thin-walled, nearly twice as long as the sepals. Corolla 5–6 mm. long, nearly globose, with posterior lip attenuate to a shallowly notched apex. Filaments slender, several times longer than the hemispheric anthers. Inflorescence appearing as if with flowers axillary, normally one secondary branch developing repeatedly through an indefinite number of nodes.

12. *F. ovata*.

Anther-sacs separated on two arms of the connective (filament wanting or very short), dissimilar, the anterior tending to become sterile. Anterior lip two to four times the width of the posterior. Leaves pinnately lobed. [APOSECOS Benth.]

Anterior anther-sac fertile, brown or yellowish. Style .6–.8 mm. long. Calyx 3–5 mm. long. Pedicels and stems above pubescent with gland-tipped hairs.

Leaves 2–4 cm. long, the blades with one or two partial pairs of segments, the sinuses of which are narrow and reach only one-half to two-thirds the distance to the midrib. Calyx 3–4 mm. long. 13. *F. micrantha*.

Leaves 2–10 cm. long, the blades with usually three pairs of segments, the proximal sinuses of which are usually broad and reach nearly to the midrib. Calyx 4–5 mm. long. 14. *F. radiculoides*.

Anterior anther-sac sterile, yellow or orange-yellow. Style 1–2 mm. long. Calyx 5–9 mm. long.

Anterior anther-sac light-yellow. Corolla 5–7 mm. long. Leaf-blades with shallow crenately-toothed lobes. Distally finely pubescent with glandless hairs. 15. *F. crenatiloba*.

Anterior anther-sac orange-yellow. Corolla 7–21 mm. long. Leaf-blades with deep sharply serrate lobes.

Stems above and pedicels pubescent with few-celled gland-tipped hairs. Blades of lowermost leaves with shallow lobes. Base of petioles very narrowly connate. Calyx-lobes slightly serrate, obviously ciliate with gland-tipped hairs. Style 1–1.3 mm. long. Capsule pubescent with short gland-tipped hairs. 16. *F. chelidonioides*.

Stems above and pedicels hirsute with many-celled dark-jointed hairs. Blades of all leaves pinnatisect nearly to the midrib. Base of petioles obviously connate. Calyx-lobes decidedly serrate, hirsute on the back and margin. Style 1.8–2 mm. long. Capsule pubescent with glandless (or in *pinnatisecta* with interspersed gland-tipped) hairs.

Corolla 15–21 mm. long. Calyx-lobes ovate, acute. Capsule 6 mm. long. Leaves 5–8 cm. long, 3–5 cm. wide. 17. *F. scalaris*.

Corolla 8–10 mm. long. Calyx-lobes lanceolate or narrowly ovate, acuminate. Capsule 4 mm. long. Leaves 3–5.5 cm. long, 2–3 cm. wide. 18. *F. pinnatisecta*.

1. ***Fagelia microbefaria*** (Kränzl.) Pennell, comb. nov.

Calceolaria microbefaria Kränzl, in Ann. k. k. Naturh. Hofm. Wien 22: 193. 1907. "Kolumbien, Ostkordilleren, Provinz Pamplona, zwischen Urban und Las Vetas in 3300 m ü. d. M. (Linden Nr. 730!)."

Stem 1–2 meters tall, much branched, woody, with grayish-brown bark, the twigs reddish- or yellowish-brown, glutinous and finely pubescent. Leaves 6–8 cm. long, the blades lanceolate, acuminate, serrate to entire, at times slightly revolute, 12–17 mm. wide; each narrowed to a petiole 5–10 mm. long; blades above green, pubescent on the midrib or pulverulent or quite glabrous, beneath glaucous, sparsely puberulent to glabrous, reticulate; somewhat glutinous on upper surface. Corymb bractless, the secondary branches slightly

if at all branched, so that the inflorescence simulates a stalked four-flowered umbel. Peduncle and pedicels somewhat glutinous and pubescent with brown hairs. Calyx 4–6 mm. long, the lobes triangular-ovate, obtusish to acute, entire, puberulent, glutinous. Corolla: posterior lip 6–7 mm. long, 7–9 mm. wide, with broad rounded orifice; anterior lip 12–13 mm. long, 8–10 mm. wide, with rounded orifice opening into two-thirds or more of its length; sac pressed against hood so that corolla appears broader than long; externally finely puberulent, within glandular-pubescent proximally, especially about bases of filaments. Filaments stout, less than 1 mm. long. Anther 2.5 mm. long, brown, the walls thin, the sacs contiguous, opening throughout and eventually through the thin connective. Style 3 mm. long. Capsule 5 mm. long, broadly ovate, acute, puberulent. Seeds .4–.5 mm. long, oblong, obtuse, ridged, red-brown.

Thickets, along streams and at edge of forest, also in thicket-islands in Paramo, at altitudes of 2800 to 3300 meters; Temperate zone of western slope of Cordillera Oriental, from Santander to Cundinamarca.

Cundinamarca. Rio Frio, west of Zipaquirá (along stream-banks), Pennell 2570, 2605; Mt. Chuscal, west of Zipaquirá (thicket-island in paramo), Pennell 2584; Sibaté (bushy hillsides southwest of), Pennell 2389.

2. *Fagelia fruticosa* Pennell, sp. nov.

Stem 1–2 meters tall, much branched, woody, with grayish bark, the twigs reddish and glutinous-puberulent or slightly pubescent. Leaves 5–6 cm. long, the blades lanceolate, acuminate, slightly serrulate to entire, at times slightly revolute, 12–13 mm. wide; each narrowed to a petiole 4–7 mm. long; blades above dark-green and puberulent, beneath paler and reticulate, on both surfaces strongly glutinous. Corymb bractless, the secondary branches soon branching so as to simulate an umbel. Peduncle and pedicels glutinous and somewhat pubescent with brown hairs. Calyx 2–3 mm. long, the lobes broadly ovate, acute, entire, puberulent, glutinous. Corolla: posterior lip 6–7 mm. long, 7–8 mm. wide, with broad rounded orifice; the anterior lip 12–13 mm. long, 8–9 mm. wide, with rounded orifice opening into two-thirds or more of its length; sac pressed against hood so that corolla appears broader than long; externally finely puberulent, within pubescent proximally, especially near the filaments. Filaments stout, less than 1 mm. long. An-

thers nearly 2 mm. long, brown, the walls thin, the sacs contiguous, opening throughout and through connective. Style 3 mm. long. Capsule 5 mm. long, broadly pyramidal, acute, glandular-puberulent. Seeds.

Plant more glutinous and drying blacker than *Fagelia microbefaria*.

Type, forest at margin of Paramo de Ruiz, Tolima, altitude 3200–3500 meters, collected in flower December 16, 1917, F. W. Pennell 2998; in Herb. New York Botanical Garden.

Shrub belt about and below paramo, Temperate zone, eastern slope of the Cordillera Central, in Tolima.

3. *Fagelia lehmanniana* (Kränzl.) Pennell, comb. nov.

Calceolaria lehmanniana Kränzl. in Fedde, Rep. Nov. Spec. 1: 100. 1905. "Columbien: Dpto. Cauca; an feuchten Orten an den oberen Gehängen des Vulkan de Sotará und auf dem Paramo de Barbillas in 3000 bis 3300 m ü. d. M. (F. C. Lehmann, no. 6134!)" ; not *C. lehmannii* (Hieron) Hieron. in Engl. Bot. Jahrb. 20. Beibl. 49: 57. 1894.

At altitudes of 2800 to 3300 meters, Temperate Zone, southern Cordillera Central, from Cauca to Pasto.

Pasto. Puruquai, J. Triana in 1851–7 (Y).

4. *Fagelia crenata* (Lam.) Kuntze.

Calceolaria crenata Lam., Encyc. Meth., Bot. 1: 556. 1785. "Trouvée au Pérou par M. Joseph de Jussieu (v. s. in herb. Juss.)." Jussieu collected mainly in Ecuador.

Fagelia crenata (Lam.) Kuntze, Rev. Gen. 495. 1891.

At an altitude of 3000 meters, Temperate Zone, southern Cordillera Central, from Pasto to Ecuador.

Cauca. Valle de Quintero above Pitaio, R. Palo basin, Central Cordillera, H. Pittier 1425 (U).

Pasto. "Tuquerres et Puruquai," J. Triana in 1851–7. "Judabolsa."

5. *Fagelia saxatilis* (H. B. K.) Kuntze.

Calceolaria saxatilis H. B. K., Nov. Gen. et Sp. 2: 382. 1817. "Crescit locis saxosis montis Chimborazo in summa planitie Sisgun, alt. 1750 hex. [= 3325 meters] . . . [Humboldt & Bonpland]."

Fagelia saxatilis (H. B. K.) Kuntze, Rev. Gen. 460. 1891.

Stem about 1 meter tall, much branched, herbaceous, green or reddish, pubescent with white hairs, densely so above. Leaves 3–4 cm. long, the blades ovate, cordate or truncate at base, obtuse, each narrowed to a petiole 5–10 mm. long; blades above green, finely pubescent, beneath pale and densely pubescent, with some sessile glands; petiole white-lanate. Corymb bracted at base, its secondary branches usually quite simple. Pedicels lanose with glandless white

hairs. Calyx 8–14 mm. long, the lobes ovate, obtuse to acute, obscurely lobed, lanose-pubescent. Corolla: the posterior lip 3–4 mm. long the two lobes united nearly to apex (so strongly hooded with shallow median orifice); anterior lip 20–25 mm. long, 10–12 mm. wide, with orifice opening about one-third of its length; sac upcurving toward hood, the orifice opening externally; externally glandular-pruinose, within slightly pubescent at base on anterior side. Filaments 2 mm. long. Anthers 2 mm. long, brown, the walls thick, the sacs broadly contiguous, opening throughout and through the thin connective. Style 1.5 mm. long. Capsule 5–6 mm. long, broadly globose-pyramidal, obtuse, thick-walled, puberulent with gland-tipped hairs. Seeds .5 mm. long, oblong, distally acute, finely ridged, brown.

Thickets, along streams and at edge of forest, at altitudes of 2700 to 3300 meters; Temperate zone of eastern slope of Cordillera Central, from Tolima to Ecuador. Collected also above Bogotá, where probably an escape.

Tolima. "Rosalito," near Paramo de Ruiz (along stream in meadow), Pennell 2990. Also recorded by Kränzlin from Paramo de Ruiz, Purdie.

Cundinamarca. Guadalupe, above Bogotá, Bro. Ariste-Joseph A230 (U).

6. *Fagelia bogotensis* Pennell, sp. nov.

Stem probably about 1 meter tall, branched, herbaceous, pubescent with white hairs, distally these gland-tipped. Leaves 4–5 cm. long, the blades triangular ovate, cordate, acuminate, irregularly dentate with acute lobes 3–4 cm. long, 2.5–3 cm. wide; each on a wingless petiole 10–20 mm. long; blades above green, pubescent, beneath lighter green and moderately pubescent, without sessile glands; petiole pubescent, some hairs gland-tipped. Corymb leafy-bracted at base, its secondary branches becoming much branched. Peduncles and pedicels hirsute with gland-tipped hairs. Calyx 10–12 mm. long, the lobes ovate, acuminate, entire, hirsute-pubescent. Corolla: the posterior lip 4 mm. long, the two lobes united nearly to apex (so strongly hooded, with shallow median orifice); anterior lip about 10 mm. long, with orifice opening less than $\frac{1}{2}$ of length; sac upcurving toward hood, the orifice opening externally; externally glandular-pruinose, within somewhat pubescent at base. Filaments 1.5 mm. long. Anthers 2.5 mm. long, brown, the walls thick, the sacs broadly contiguous, opening from proximal end,

eventually to the distal apex. Style 3 mm. long. Capsule 6–8 mm. long, urceolate-pyramidal, acute, thick walled, pubescent with short gland-tipped hairs. Seeds .3 mm. long, oblong, mucronately acute at each end, ridged, brown

Type, Bogotá, Cundinamarca, alt. 2600 meters, collected in 1851–1857 by J. Triana; in Herb. Columbia University at The New York Botanical Garden.

At an altitude of slightly over 2600 meters, Temperate zone of western slope of Cordillera Oriental, in Cundinamarca.

7, *Fagelia trilobata* (Hemsl.) Rusby.

Calceolaria trilobata Hemsl., Biol. Centr. Am., Bot. 2: 439. 1881–2. "Guatemala, Volcan de Fuego, 7000 to 10,000 feet (Godman & Salvin, 239). Colombia. Hb. Kew. The description was mainly drawn up from Hotton's [= Holton's] Colombian specimen, n. 575." Species an aggregate, and to be typified by I. F. Holton 575. An isotype of this, in Herb. Columbia University at The New York Botanical Garden is labeled "Rio Arzobispo, in montibus juxta Bogotam, legit . . . 23 Oct. 1852." A redescription, from this specimen, is given below.

Fagelia trilobata (Hemsl.) Rusby in Mem. Torr. Bot. Club 6: 93. 1896. As to synonymy only.

Stem probably about 1 meter tall, branched, herbaceous, pubescent with white hairs, distally these gland-tipped. Leaves 15–17 cm. long, the blades triangular, slightly three-lobed, cordate, tapering to an acute tip, irregularly crenate-dentate, with callous-tipped lobules, 9–10 cm. long, 11–12 cm. wide, each on a petiole 6–7 cm. long its wing distally very narrow, proximally expanding to 3–4 cm. wide and connate with that of opposing leaf; above green, pubescent, beneath pale-green and slightly pubescent, more so on the veins, narrow-winged portion of petiole pubescent, some hairs with glandular tips. Corymb leafy-bracted at base, its secondary branches much branched. Peduncles and pedicels hirsute with gland-tipped hairs. Calyx 12 mm. long, the lobes ovate, acuminate, obscurely lobate, hirsute-pubescent. Corolla: the posterior lip 5–6 mm. long, the two lobes not united to apex, so not hooded, with deep, narrow median orifice; anterior lip 10–12 mm. long, with orifice opening much less than one-half of length; sac upcurving toward hood; externally glandular-pruinose, within somewhat pubescent at base. Filaments 2 mm. long, widening distally. Anthers 3.5 mm. long, brown or yellowish, the walls thick; the sacs broadly contiguous, opening throughout, the septum between very thin, and ultimately (?) breaking. Style 4 mm. long. Capsule glandular-puberulent, not seen mature.

Thickets along stream, at an altitude between 2600 and 3000 meters, Temperate zone of western slope of Cordillera Oriental, in Cundinamarca.

8. *Fagelia alata* Pennell, sp. nov.

Stem about 1 meter tall, little branched herbaceous, pubescent with white hairs, distally lanose and with short-stalked glands. Leaves 11–17 cm. long, the blades triangular-ovate, cordate, acuminate, coarsely doubly dentate (dentate with the lobules triangular and dentate), 7–10 cm. long, 6–8 cm. wide; each on a petiole 4–7 cm. long, this broadly winged throughout (in middle 10–18 mm. wide), entire to crenate-dentate, proximally slightly expanding and connate with that of opposing leaf; above green, beneath pale green, on both surfaces slightly pubescent, more so on younger growth. Corymb bractless, its secondary branches repeatedly branched. Peduncles and pedicels pubescent with longer white glandless, and with shorter gland-tipped hairs. Calyx 8–9 mm. long, the lobes lanceolate, acuminate, slightly serrate-dentate or some entire, glandular-puberulent. Corolla: the posterior lip 2–3 mm. long, 5 mm. wide, arched, the two lobes united very nearly to apex (so hooded with slight median aperture); anterior lip 8–9 mm. long, 7 mm. wide, with orifice opening much less than $\frac{1}{2}$ length (not strongly upcurving toward hood); externally minutely glandular-puberulent, within minutely pubescent at base on anterior side, lemon-yellow margin of sac very finely purple-spotted. Filaments .5–.7 mm. long, narrowing distally. Anthers 2 mm. long, yellowish, the walls thick; the sacs narrowly contiguous, opening throughout, the septum between thin and ultimately breaking. Style 1.5–1.8 mm. long. Capsule 3–4 mm. long, urceolate-pyramidal, emarginate, pubescent with short gland-tipped hairs. Seeds .2–.3 mm. long, oblong, distally obtuse, ridged, black-brown.

Type, moist bank in forest, loam soil, western slope of Cordillera Oriental, east of Neiva, Huila, altitude 1800–2300 meters, collected in flower and fruit August 1–8, 1917, Rusby & Pennell 579, in Herb. New York Botanical Garden.

Moist banks in forest at an altitude between 1800 and 2300 meters, Subtropical zone of the western slope of Cordillera Oriental, in Huila.

9. *Fagelia nevadensis* Pennell, sp. nov.

Stem erect, nearly 1 meter tall, branched, pubescent, lanose distally, with long glandless white dark-jointed hairs. Leaves 16 cm. long, the blades ovate, cordate, acuminate, doubly and sharply

dentate, (dentate with lobules irregularly and sharply dentate), 10 cm. long, 8–9 cm. wide; each on a petiole 6 cm. long, uniformly winged throughout (in middle 8–13 mm. wide), entire, proximally slightly expanding and connate with that of opposing leaf; above green, beneath slightly paler, slightly pubescent on both surfaces. Corymb leafy-bracted at base, its secondary branches long, each dividing above a long peduncular portion into six to eight pedicels. Peduncles and pedicels hirsute with glandless white hairs and with short-stalked glands. Calyx 11–12 mm. long, the lobes ovate, acuminate, entire, pubescent. Corolla: the posterior lip about 5 mm. long, 6 mm. wide, arched, the two lobes united to apex (so hooded, truncate without apical aperture); anterior lip 13–14 mm. long, 12–14 mm. wide, with orifice opening much less than one-half length of sac (sac strongly upcurving toward hood); externally glabrous, within pubescent at base on anterior side. Filaments .8 mm. long. Anther straight, 3.5 mm. long, grayish, its walls firm; sacs contiguous, permanently separated by a firm septum, each opening by a slit from the distal apex which does not reach the proximal end. Style 4 mm. long. Capsule 5–7 mm. long, pyramidal, somewhat obtuse, puberulent, with short-stalked glands. Seeds .2–.3 mm. long, irregularly oblong, ridged and transverse-lined, dark-brown.

Type, damp hillside, clearing at Las Nubes, slopes of Sierra Nevada de Santa Marta, Magdalena, collected in flower and fruit December 15, 1898–1901, Herbert H. Smith 1404, in herbarium New York Botanical Garden; isotypes in Gray Herbarium, United States National Museum, and Field Museum of Natural History. Said to be from "4500 feet" [= 1350 meters], such a low elevation for a plant of this genus as to force the suspicion that datum is erroneous. The specimen is more probably from some slope much higher, surely over 2000 meters altitude.

10. *Fagelia tolimensis* Pennell, sp. nov.

Stem lax, ascending, 1 to 2 meters long, branched, reddish, herbaceous, glabrate below, above slightly hirsute with dark-jointed hairs. Leaves 8–10 cm. long; the blades triangular-lanceolate, cordate or truncate, acuminate, irregularly and somewhat doubly dentate (dentate with lobules shallowly triangular and irregularly acutely toothed), 6–7 cm. long, 2.5–3.5 cm. wide; each on a petiole 2–3 cm. long, broadly winged throughout (in middle 12–15 mm. wide), irregularly shallowly crenately dentate, proximally expanding and connate with that of opposing leaf; above dark-green, minutely

pubescent, becoming glabrate, beneath pale-green, permanently pubescent, especially on the veins. Corymb leafy-bracted at base, its secondary branches soon much branched (pedicels long and slender). Peduncles and pedicels hirsute with dark-jointed hairs, these of various lengths. Calyx 8–10 mm. long, the lobes ovate, acuminate, entire, pubescent. Corolla: the posterior lip 3–4 mm. long, 5 mm. wide, arched, the two lobes united to apex (so hooded, without median aperture); anterior lip 12–14 mm. long, 10 mm. wide, with orifice opening about one-half length (sac strongly up-curving toward hood); externally slightly pubescent to glabrate, within glabrous throughout. Filaments 1.2 mm. long. Anthers horseshoe-shaped, brown; each sac 2 mm. long, contiguous, splitting its entire length, septum between sacs thin, but apparently not rupturing. Style 5 mm. long, proximally pubescent. Capsule pubescent with white glandless hairs; not seen mature.

Type, moist mossy loam, margin of forest, "Rosalito" (east of Paramo de Ruiz), Tolima, altitude 2800–3100 meters, collected in flower December 15–17, 1917, F. W. Pennell 2979; in Herb. New York Botanical Garden.

Nearest to *Fagelia purpurascens* (Sodirol) Pennell, comb. nov., of Ecuador, but appears distinct in having leaves more sharply cut, stem less pubescent, pedicels more slender and sepals shorter.

Moist soil, edge of forest, at an altitude between 2800 and 3100 meters, Temperate zone of eastern slope of Cordillera Central, in Tolima.

11. *Fagelia perfoliata* (L. f.) Kuntze.

Calceolaria perfoliata L. f., Suppl. 86. 1781. "Habitat in Nova Granada. Mutis." Type probably from Bogotá.

Fagelia perfoliata (L. f.) Kuntze, Rev. Gen. 460. 1891.

Stems lax, ascending, 1–2 meters long, somewhat branched, reddish-brown, pubescent throughout, above densely so, with hairs not or slightly dark-jointed. Leaves 8–13 cm. long, the blades triangular-lanceolate to ovate, cordate to truncate, acuminate, irregularly and somewhat doubly dentate (dentate with lobules shallowly triangular and shallowly dentate), 5–8 cm. long, 3.5–5.5 cm. wide; each on a petiole 3–5 cm. long, broadly winged throughout (in middle 15–20 mm. wide), slightly crenate-dentate to entire, proximally expanding and connate with that of opposing leaf; above green, beneath whitish-green, pubescent on both surfaces, densely canescent beneath. Corymb leafy-bracted at base, its secondary branches soon much branched (pedicels long and slender). Pe-

duncles and pedicels villous, with spreading dark-jointed hairs, these mostly long. Calyx 9–11 mm. long, the lobes ovate, acuminate, entire, pubescent. Corolla: the posterior lip 4–5 mm. long, 5–6 mm. wide, arched, the two lobes united to apex (so hooded without median aperture); anterior lip 13–14 mm. long, 7–8 mm. wide, with orifice opening about one-half length (sac strongly upcurving toward hood), externally slightly pubescent to glabrate, within glabrous throughout. Filaments about 1 mm. long. Anthers horse-shoe shaped, brown, each sac 1.8 mm. long, contiguous, splitting from proximal end its entire length, septum between sacs thin and rupturing. Style 5 mm. long, proximally pubescent. Capsule 5 mm. long, urceolate-pyramidal, acutish, pubescent with white glandless hairs. Seeds .5 mm. long, lanceolate, distally acuminate, ridged, and transverse-lined, brown.

Moist bushy slopes, along streams in shrub-zone, at altitudes of 2700 to 3000 meters, Temperate zone of western slope of Cordillera Oriental, in Cundinamarca.

Cundinamarca. Rio San Cristobal, near Bogotá (bushy mountain-slope, alt. 2800–3000 m.), Pennell 2380; Chipaque (moist road-bank above, alt. 2800–2900 m.), Pennell 1317; Sibaté (bushy slopes near, alt. 2700–3000 m.), Pennell 2485; Bogotá (alt. 2700 m.), J. Triana (U, Y).

12. *Fagelia ovata* (Smith) Kuntz.

Calceolaria ovata Smith, Ic. Ined. 1:3 pl. 3. 1789. "Ex Peru semina setulit Dombey."

Fagelia ovata (Smith) Kuntz, Rev. Gen. 460. 1891.

Stem erect or ascending, 1–4 dm. tall, branched, pubescent with white gland-tipped hairs. Leaves 2.5–3.5 cm. long, the blades ovate, narrowed to nearly truncate at base, acute, obscurely simply serrate with shallow teeth, 2.3–3 cm. long, 1–1.5 cm. wide, each on a petiole .2–.5 cm. long, not winged, lanose with gland-tipped hairs; green, beneath slightly paler, pubescent on both surfaces. Inflorescence apparently axillary, actually at each node two pedicels occur, at right angles to which are two leaves from the axil of one of which usually develops the branch which indefinitely repeats this manner of branching. Pedicels pubescent with gland-tipped hairs. Calyx 3 mm. long, the lobes ovate, acutish, entire, pubescent. Corolla: the posterior lip 3–4 mm. long, 4–5 mm. wide, arched, the two lobes united throughout, distally attenuate to a slightly notched apex (so hooded); anterior lip 5 mm. long, 5 mm. wide, widest at base, with orifice opening much less than one-half length of sac

(sac, upcurved toward hood, its anterior surface incurved forming a broad pouch into which anthers shed pollen and into which the stigma grows, apparently ensuring self-pollination); externally glabrous, within with a few hairs about base. Filaments 1.5 mm. long. Anthers .6 mm. long, elliptic or hemispheric, yellow, the walls thin; sacs contiguous by a broad contact, opening throughout. Style 1.2 mm. long. Capsule 5-6 mm. long, narrowly pyramidal, obtusish, thin-walled, sparsely puberulent with short-stalked glands. Seeds .1-.2 mm. long, oval, obtuse, ridged and transverse-lined, brown.

Type, moist roadside below Chipaque, Cundinamarca, altitude 1800-2200 m., collected in flower August 23, 1917, F. W. Pennell 1327; in Herb. New York Botanical Garden.

Moist shaded banks, at altitudes of 1300 to 2200 meters, Subtropical zone of eastern slope of Cordillera Oriental, in Cundinamarca.

Cundinamarca. Chipaque (moist roadside below, alt. 1800-2200 m.), Pennell 1327; Quetame to Monte Redondo (moist cliff, along stream in woodland, alt. 1300 m.), Pennell 1352, (moist bank, alt. 1400-1500 m.), Pennell 1854.

13. *Fagelia micrantha* Pennell, sp. nov.

Stem spreading and laxly ascending, 2-3 dm. long branched, sparsely pubescent below with short few-celled gland-tipped hairs. Leaves 2-4 cm. long, the blades acute or obtusish at apex, irregularly pinnately lobed with 1-2 pairs of segments, the incisions usually reaching $\frac{1}{2}$ to $\frac{2}{3}$ the distance to the midrib, the lobules and main portion of the blade irregularly dentate, 1.5-3 cm. long, 1.5-2.5 cm. wide; each on a petiole .5-1 cm. long, slightly winged, proximally clasping stem and slightly connate with that of opposing leaf; above deep-green, with sparse scattered pubescence soon becoming glabrous, beneath pale-green and nearly glabrous. Corymb leafy-bracted at base (the two primary flowers developed), the secondary branches scarcely or not longer than the primary pedicels, usually once dividing, and bracted with reduced leaves. Peduncles and pedicels pubescent with short gland-tipped hairs. Calyx 3-4 mm. long, the lobes oblong-ovate, obtuse, slightly serrate, pubescent proximally. Corolla: the posterior lip about 2 mm. long and 2 mm. wide, arched, the two lobes united and slightly hooded, free toward apex (leaving a narrow arched aperture into hood); anterior lip 5-6 mm. long, 4-5 mm. wide, with narrow base, hooded almost

entire length (sac strongly upcurving against hood): externally glabrous or minutely puberulent at base, within glabrous. Filaments none. Anther with two sacs separated on two arms of the connective, both sacs fertile; opening throughout, the anterior projecting into orifice, smaller; posterior arm (with sac) 1.5 mm. long, anterior arm (with sac) 1 mm. long. Style 6–8 mm. long. Capsule glabrous, not seen mature.

Type, along streamlet, edge of forest, "Rosalito" (between Murillo and Paramo de Ruiz), Tolima, altitude 2800–3100 meters, collected in flower December 17, 1917, F. W. Pennell 3145; in Herb. New York Botanical Garden. Growing with 3119, *F. crenatioba*.

Along streamlets, edge of forest, at an altitude between 2800 and 3100 meters, Temperate zone of eastern slope of Cordillera Central, in Tolima.

14. *Fagelia radiculoides* Pennell, sp. nov.

Stem spreading and laxly ascending, 1–15 dm. long, branched, glabrate, above pubescent with spreading gland-tipped hairs. Leaves 2–10 cm. long, the blades acute to acuminate at apex, pinnately lobed with usually three pairs of lanceolate segments, the incisions extending nearly to the midrib, the lobules and terminal segment irregularly serrate-dentate, 1.5–6 cm. long, 1.5–6.5 cm. wide; each on a petiole .5–4 cm. long, narrowly winged, proximally slightly expanding and connate with that of opposing leaf; above deep-green, with scattered hairs or glabrous, beneath glaucous, glabrous or pubescent on the midrib. Corymb leafy-bracted at base (the two primary flowers developed), the secondary branches long and repeatedly dividing, bracted throughout. Peduncles and pedicels pubescent with gland-tipped hairs. Calyx 4–5 mm. long, the lobes ovate, acute to obtusish, obscurely slightly serrate, pubescent proximally and on margin with gland-tipped hairs. Corolla: the posterior lip 1.5–2 mm. long, 2 mm. wide, arched, the two lobes united and slightly hooded, free toward apex (leaving a narrow arched aperture into hood); anterior lip 6–7 mm. long, 4–5 mm. wide, narrowed at base, hooded almost entire length (sac strongly upcurving against hood); externally and internally glabrous. Filaments none. Anther with two sacs separated on two arms of the connective, both sacs fertile, opening throughout, of about equal size, each arm (with sac) about 1 mm. long. Style .7–.8 mm. long. Capsule 3–4 mm. long, broadly globose-pyramidal, rounded and slightly notched, somewhat pubescent with gland-tipped hairs.

Seeds .5-.6 mm. long, oblong, obtuse, ridged (with rounded ridges) dark-brown.

Type, moist rocky cañon, Rio San Francisco, above Bogotá, Cundinamarca, altitude 2700-2800 meters, collected in flower and fruit September 13, 1917, F. W. Pennell 1942; in Herb. New York Botanical Garden.

Moist or wet soil, springheads, swales and cliffs, partially shaded or open, at altitudes of 2600 to 3200 meters, occasionally descending to 1500 meters, Temperate zone, ascending to Paramo, where dwarfed, and to Subtropical zone, where more rank; on both slopes of the Cordillera Oriental, in Cundinamarca.

Cundinamarca. Zipaquirá (springhead in meadow, alt. 2650 m.), Pennell 2534; Mt. Chuscal, west of Zipaquirá, (swale on paramo, alt. 3100-3200 m.), [only 1-2 dm. tall; leaves in some plants more pubescent], Pennell 2602; Bogotá (moist rocky cañon on Rio San Francisco above, alt. 2700-2800 m.), Pennell 1942, (moist bank, base of mount, alt. 2700-2800 m.), Pennell 2293; Sibaté (wet road-bank, alt. 2600-2800 m.), Pennell 2386; Ubagué (moist loam in shrub-zone above, alt. 2700-3000 m.), Pennell 1898; Monte Redondo to Quetame (wet bank, alt. 1400-1500 m.) [plant especially rank], Pennell 1855.

15. *Fagelia crenatiloba* Pennell, sp. nov.

Stem ascending, 3-6 dm. long, little branched, glabrous or nearly so, above pubescent with white several-celled glandless hairs. Leaves 5-7 cm. long, the blades obtuse or acutish at apex, pinnately lobed with 2-3 pairs of segments, the incisions rarely extending over $\frac{1}{2}$ - $\frac{2}{3}$ the distance to the midrib, the lobules and main portion of blade crenately dentate, 3.5-5 cm. long, 3-4 cm. wide; each on a petiole 1.5-2 cm. long, slightly margined, glabrous or nearly so, proximally somewhat expanding and connate with that of opposing leaf; above green and with scattered pubescence, beneath pale-green and the midrib and principal veins pubescent. Corymb leafy-bracted at base (the two primary flowers developed), its secondary branches longer, once or twice dividing and bracted throughout with reduced leaves. Peduncles and pedicels finely pubescent with several-celled glandless hairs. Calyx 5-6 mm. long, the lobes ovate, obtuse or acutish, slightly serrate, slightly pubescent, especially proximally. Corolla: the posterior lip 1-2 mm. long, 2-2.5 mm. wide, arched, the two lobes united and slightly hooded, free toward apex (leaving a narrow or triangular slit-like aperture into hood);

anterior lip 5–7 mm. long, 4–5 mm. wide, narrowed at base, hooded almost entire length (sac strongly upcurving against hood); externally glabrous or finely puberulent proximally, within glabrous. Filament none or very short. Anther with the two sacs separated on two arms of the connective, each (including sac) about 1.5 mm. long; posterior sac .6–.7 mm. long, whitish, opening throughout, fertile, concealed within hood; anterior sac shorter, projecting into orifice, partially or wholly sterile. Style 1 mm. long. Capsule nearly globose, finely pubescent with glandless hairs; not seen mature.

Type, along streamlet, edge of forest, "Rosalito," (between Murillo and Paramo de Ruiz), Tolima, altitude 2800–3100 meters, collected in flower December 17, 1917, F. W. Pennell 3119; in Herb. New York Botanical Garden.

Along streamlets, edge of forest, at an altitude between 2800 and 3100 meters, Temperate zone of eastern slope of Cordillera Central, in Tolima.

16. *Fagelia chelidonioides* (H. B. K.) Kuntze.

Calceolaria chelidonioides H. B. K., Nov. Gen. et Sp., 2: 378. 1818. "Crescit in radicibus montis Javirac prope Quito, alt. 1500 hex. [= ca. 2850 m.] [Humboldt & Bonpland]."

Fagelia chelidonioides (H. B. K.) Kuntze, Rev. Gen. 2: 459. 1891.

Fagelia diversifolia Pennell, in Addisonia 4: 73, pl. 153. "Type . . . collected on a moist bank at Chipaque, Department of Cundinamarca, Colombia, at an altitude of about 8700 feet, August 23, 1917, my number 1320, and is preserved in the herbarium of the New York Botanical Garden." Specimens seen later appear to unite this with the plant from Ecuador.

Stem erect or ascending, 3–9 dm. tall, little branched, sparsely pubescent, more so about nodes, with few-celled gland-tipped hairs. Leaves 4–15 cm. long, the blades acute to acuminate at apex, the lower ovate and shallowly pinnately lobed, irregularly serrate-dentate, the upper pinnately lobed nearly to the midrib with two or three pairs of oval or ovate, irregularly doubly serrate-dentate segments, (the odd terminal segment largest), 3–10 cm. long, 2.5–7.5 cm. wide, each on a petiole 1–5 cm. long, slightly margined, glandular pubescent, proximally slightly expanding and clasping the stem, usually slightly connate with that of opposing leaf; green above, pale green beneath, with scattered pubescence on both surfaces. Corymb leafy-bracted at base (the two primary flowers developed), its secondary branches elongated, several times dividing and bracted throughout with reduced leaves. Peduncles and pedicels finely pubescent with few-celled gland-tipped hairs. Calyx 7–8 mm. long, the lobes ovate, acuminate, slightly serrate (the

few serratures not callous-tipped), slightly pubescent on the back, and conspicuously ciliate with gland tipped hairs. Corolla: the posterior lip about 3 mm. long, 3-4 mm. wide, arched, the two lobes united and hooded, but not to apex (leaving a narrow slit like aperture into hood), anterior lip 10-15 mm. long, 11-13 mm. wide, narrowed at base, hooded almost entire length (sac strongly up-curving against hood); externally glabrous or puberulent on posterior lip, within pubescent about base and within posterior lip. Filament none. Anther with the two sacs separated on two arms of the connective, each about 1.5-1.8 mm. long; posterior sac 1.2 mm. long, yellowish, opening throughout, fertile, concealed within hood; anterior sac short, orange-yellow, sterile, projecting into the orifice, the club-like dark connective arm serving as a lever against which entering insect pushes, thus forcing the fertile sac out through the slit-like aperture of the hood and against back of insect. Style 1.1-1.3 mm. long. Capsule 8 mm. long, globose-pyramidal, obtuse, pubescent with short gland-tipped hairs. Seeds .6-.7 mm. long, oblong, obtuse, ridged (with high rounded ridges), brown.

Moist soil, roadside ditches and banks, frequently cultivated and possibly introduced from Ecuador, at altitudes of 2000 to 2700 meters, Subtropical zone of eastern slope of Cordillera Oriental, in Cundinamarca; also obviously from cultivation at Bogotá and at "Balsillas", east of Neiva in Huila; also from the Subtropical zone of the Cordillera Occidental, in Valle. In Ecuador.

Cundinamarca. Chipaque (moist bank, alt. 2600-2700 m.), Pennell 1320; Ubagué (moist soil, alt. 2000-2500 m.), Pennell 1877; [Zipaquirá (moist ditch on hill—alt. 2900 m.), evidently escaped from garden, Pennell 2567].

[Huila. "Balsillas," on Rio Balsillas (cult. in garden, alt. 2000-2100 m.), Rusby & Pennell 692.]

Cauca. Cuestá de Tocotá, road from Buenaventura to Cali, western Cordillera; alt. 1500-1900 m., H. Pittier 698 (U).

17. *Fagelia scalaris* Pennell, sp. nov.

Stem erect or ascending, about 1 meter tall, little branched, pubescent to hirsute above with many-celled dark-jointed not or scarcely gland-tipped hairs. Leaves 5-8 cm. long; the blades acuminate at apex, pinnatisect (cut nearly to midrib) with 2 or 3 pairs of lanceolate-ovate, irregularly serrate-dentate segments (the odd terminal segment largest), 4-6 cm. long, 3-5 cm. wide; each on a petiole 1-2 cm. long, very narrowly winged, hirsute, proximally

slightly expanding and connate with that of opposing leaf; green, beneath paler, with scattered pubescence on both surfaces. Corymb leafy-bracted at base (the primary flowers sometimes not developed), its secondary branches (one or both developed) long, once or twice dividing and bracted throughout with reduced leaves. Peduncles and pedicels hirsute with yellowish-white dark-jointed hairs. Calyx 6 mm. long, the lobes ovate, acute, serrate (with shallow callous-tipped serratures), densely hirsute. Corolla: the posterior lip 2-3 mm. long, 4 mm. wide, arched, the two lobes united and hooded, but not to apex (leaving a slit-like aperture into hood); anterior lip 15-21 mm. long, 14-18 mm. wide, narrowed at base, with narrow orifice, hooded almost entire length (sac strongly upcurving against hood); externally pubescent with short hairs on posterior lip, with longer hairs on base of anterior lip, within pubescent at base. Filaments very short or not developed. Anthers straight, 4 mm. long, the two sacs separated on two arms of the connective; posterior sac 1.5 mm. long, yellowish, opening throughout, fertile, concealed within hood; anterior sac short, orange-yellow, sterile, projecting into the orifice, the club-like dark connective-arm serving as a lever against which entering insect pushes, thus forcing the fertile sac out through the slit-like aperture of the hood and against back of insect. Style 2 mm. long. Capsule 6 mm. long, globose pyramidal, obtuse, pubescent with glandless hairs. Seeds .6-.7 mm. long, oblong, obtuse, ridge-angled, brown.

Type, swale, "Balsillas," on Rio Balsillas, altitude 2000-2100 meters, collected in flower and fruit August 3, 1917, Rusby & Pennell 710; in Herb. New York Botanical Garden.

Swales, at an altitude of 2000 to 2100 meters, Subtropical zone of eastern slope of Cordillera Oriental, in Huila.

18. *Fagelia pinnatisecta* Pennell, sp. nov.

Stem ascending, 2-6 dm. tall, little branched, pubescent above with many-celled dark-jointed not or scarcely gland-tipped hairs. Leaves 3-5.5 cm. long; the blades acuminate at apex, pinnatisect (cut nearly to midrib) with three pairs of lanceolate, irregularly serrate-dentate segments, (the odd terminal segment largest) 2-3.5 cm. long, 2-3 cm. wide; each on a petiole 1-2 cm. long, narrowly winged, somewhat hirsute, proximally slightly expanding and connate with that of opposing leaf; green and pubescent above, beneath pale, and hirsute pubescent on the main veins, sparsely so over surface. Corymb leafy-bracted at base (the primary flowers not

developed), its secondary branches long, once or twice dividing and leafy-bracted throughout with reduced leaves. Peduncles and pedicels hirsute with yellowish-white dark-jointed hairs. Calyx 7–9 mm. long, the lobes lanceolate or narrowly ovate, acuminate, serrate (with not or scarcely callous-tipped serratures), hirsute, especially proximally. Corolla: the posterior lip 2–3 mm. long, 2–3 mm. wide, arched, the two lobes united and hooded, but not to apex (leaving a narrow aperture into hood); anterior lip 8–10 mm. long, 6–7 mm. wide, narrowed at base, hooded over $\frac{2}{3}$ length (sac strongly upcurving against hood); externally and within slightly pubescent about base. Filaments very short or none. Anther with the two sacs separated on two arms of the connective, each about 1.6–1.8 mm. long; posterior sac 1.2 mm. long, yellowish, opening throughout, fertile, concealed within hood; anterior sac short, orange-yellow, sterile, projecting into the orifice, the club-like dark connective-arm serving as a lever as in *F. scalaris*. Style nearly 2 mm. long. Capsule 4 mm. long, broad-globose, rounded, pubescent with glandless and some gland-tipped hairs. Seeds .6–.7 mm. long, oblong, obtusish, ridge-angled, brown.

Type, swale, "Balsillas," on Rio Balsillas, altitude 2000–2100 meters, collected in flower and fruit August 3, 1917, Rusby & Pennell 721, in Herb. New York Botanical Garden. From the same swale as 710, *F. scalaris*.

Swales, at an altitude of 2000 to 2100 meters, Subtropical zone of eastern slope of Cordillera Oriental, in Huila.

21. *RUSSELIA* Jacquin.

Russelia Jacq., Enum. Pl. Carib. 25. 1760.

Type species, *R. sarmentosa* Jacq., of Cuba.

1. *Russelia colombiana* Pennell, sp. nov.

Herb, or shrubby below, diffuse, reaching 5 feet long. Stem 6-angled below, sharply 4-angled above, glabrous or with sparse pubescence. Leaves in threes, the upper opposite, ovate, 5 cm. long, 3 cm. wide, truncate at base, strongly acuminate, sharply serrate-dentate with ascending teeth (bracts lance-ovate, coarsely toothed), glabrous nearly from the first, green, with brown wax dots on upper surface. Inflorescence much elongated, of axillary cymes. Cymes hirtellous, 5–15-flowered. Calyx 4 mm. long, with brown wax dots, its lobes narrowly ovate with caudate pubescent tips nearly equaling the length of the body, slightly pubescent. Corolla red, 10–11 mm. long, its lobes 1.5 mm. long, the posterior united $\frac{1}{2}$ – $\frac{2}{3}$ their length; externally glabrous, within on anterior side pubes-

cent with yellow hairs. Stamens and pistil glabrous throughout. Capsule brown, globose-ovoid, 4.5–5 mm. long, with a slender beak 1–1.5 mm. long.

Related to *R. sarmentosa* Jacq. of Cuba, which differs in the stem being 4-angled, its leaves smaller, with rounded teeth and obtuse at apex, its sepals with shorter caudate tips, its corollas slightly larger, 12–14 mm. long, and its capsules smaller, excluding the beak, only 4 mm. long.

Type, in mountain forest, on the Agua Dulce road, between Santa Marta and the Sierra Nevada, altitude 450 meters [= 1500 feet], collected in flower and fruit November 22, 1898, Herbert H. Smith 1361; in Herb. New York Botanical Garden; isotypes in United States National Herbarium, Gray Herbarium and Field Museum of Natural History.

Forest, at an altitude of 450 meters, Tropical zone on lower slopes of Sierra Nevada de Santa Marta in Magdalena.

22. ANGELONIA Humboldt and Bonpland.

Angelonia Humb. & Bonpl., Pl. Aequin 2: 92. 1809.

Type species, *A. salicariaefolia* H. & B.

1. *Angelonia salicariaefolia* Humb. & Bonpl.

A. salicariaefolia Humb. & Bonpl., Pl. Aequin. 2: 92. pl. 108. 1809. "Habitat in America meridionali ad Caracas." . . . "Croît sur les collines arides de gneiss, qui avoisinent la ville de Caracas, a une hauteur de cinq ou six cents toises [ca. 1000–1200 m.] ou-dessus du niveau de l'océan." Specimen from Caracas, Otto Kuntze 1407, seen in Herb. New York Botanical Garden.

Gravelly slopes, rather moist, along the lower western slopes of the Cordillera Oriental, and the similar eastern slopes of the Cordillera Central, doubtless continuously encircling the upper Magdalena Valley; in the Cauca valley; extending eastward along the northern lower slopes of the Venezuelan Andes; at altitudes of 450–1400 meters. Tropical zone.⁴

Cundinamarca. Anapoima, J. Triana (Y); Fusagasugá, I. F. Holton 577 (Y); Fusagasugá to Pandi, Pennell 2714 (Y); Icononzo, Pennell 2761 (Y).

Tolima. San Lorenzo, (first foothill of Cordillera Central, west of), Pennell 3517 (Y).

⁴ *Angelonia angustifolia* Benth.

Specimens collected from plants cultivated at "Medellin," on the bank of the Rio Sinu, Bolívar, Pennell 4141 (Y) appear to be this commonly cultivated species of Mexico. The two plants are readily distinguished:

Herbage densely glandular-pubescent. Leaves lanceolate., clasping at base.

1. *A. salicariaefolia*.

Herbage glabrous or sparsely glandular-pubescent. Leaves linear-lanceolate, narrowed at base.

2. *A. angustifolia*.

Huila. Neiva (open slope of first foothill of Cordillera Oriental, east of), Rusby & Pennell 1082 (Y); Quebrada de Angeles, above Natagaima, Rusby & Pennell 284 (Y).

Valle. Cali, H. Pittier 632 (V).

23. LINARIA Miller.

Linaria Mill., Gard. Diet. ed. IV. 1754.

Type species, *Antirrhinum linaria* L., Sp. Pl. 616. 1753, of Europe.

1. *Linaria texana* Scheele.

Linaria texana Scheele in Linnaea 21: 761. 1848. "Zwischen Houston und Austin [Texas] haufig: Römer." Type not seen nor verified, but description evidently of plant here characterized.

Meadow-land, on the Sabana of Bogotá, at an altitude of 2600 to 2650 meters, certainly introduced. Widespread through western temperate North America, and collected extensively in Andine and Temperate South America, probably always as a weed.

Cundinamarca. Sibaté (meadow on sabana, alt.), Pennell 2469; Hacienda de Tequendama, I. F. Holton (Y).

Corrections to "Scrophulariaceae of the Southeastern United States" in Proceedings of the Academy of Natural Sciences of Philadelphia 1919: 224-291. 1920.

p. 228, last line. For "*Ranapalus*" read "*Macuillamia*."

p. 231, l. 19. Delete "lanate."

p. 238, l. 31. Delete "stoloniferous." The plants have slender rootstocks, not stolons.

p. 242. For entry under genus "8. *Ranapalus* Kellogg," substitute:

"8. *Macuillamia* Rafinesque.

Macuillamia Raf. [Neogenyton 2. 1825, generic description only] Autik. Bot. 44. 1840.

Type species, *Monniera rotundifolia* Michx., of Illinois.

1. *Macuillamia rotundifolia* (Michx.) Raf.

Monniera rotundifolia Michx.,"

p. 248, l. 8. Before the word "type" read:

Micranthemum orbiculatum Michx., Fl. Bor. Amer. 1: 10. pl. 2. 1803. "Hab. in udis opacisque sylvarum Carolinae et Georgiae."

p. 250, l. 9. Under "1. *Verbascum blattaria* L.," insert:

"*Verbascum claytoni* Michx., Fl. Bor. Amer. 1: 148. 1803.

'Hab. in Carolina [A. Michaux].' Evidently a form of the introduced species, *V. blattaria*."

p. 254, l. 29. For "Texas" read "Louisiana." *Penstemon australis* is replaced west of the Mississippi River by *P. pauciflorus* Buckl.

p. 255, l. 18. Delete "and west to Oklahoma." Specimens from west of the Mississippi River belong to another species.

p. 288, l. 1. Delete "Seeds."

p. 290, l. 29. For "straw-colored" read "brown to straw-colored," as the supposed contrast in color of capsule cannot be maintained.

TWO NEW CYPRINOID FISHES FROM FORMOSA.

BY MASAMITSU OSHIMA.

By courtesy of Mr. Moichiro Maki, of Taihoku Normal School, the author was able to examine the collections of Formosan fresh-water fishes made by his students during the summer of the year 1919. Among them two species of *Leuciscus* were found which are apparently new to science. Unfortunately, there are no records with regard to their type localities. It is certain, however, that they were obtained in the mountain streams of central Formosa, because other species preserved in the same bottle, that is, *Salmo formosanus* and *Liobagrus formosanus*, are not found from in other places than the tributaries of the Taiko and Taito Rivers.

Leuciscus schisturus new species. Fig. 1.

Head 4.20 in length; depth 4.65; D. III,7; A. III,8; P. 17; V. 9; scales 74 in lateral line; 14 scales between origin of dorsal and lateral line, 16 between the latter and middle of belly; 9 scales between

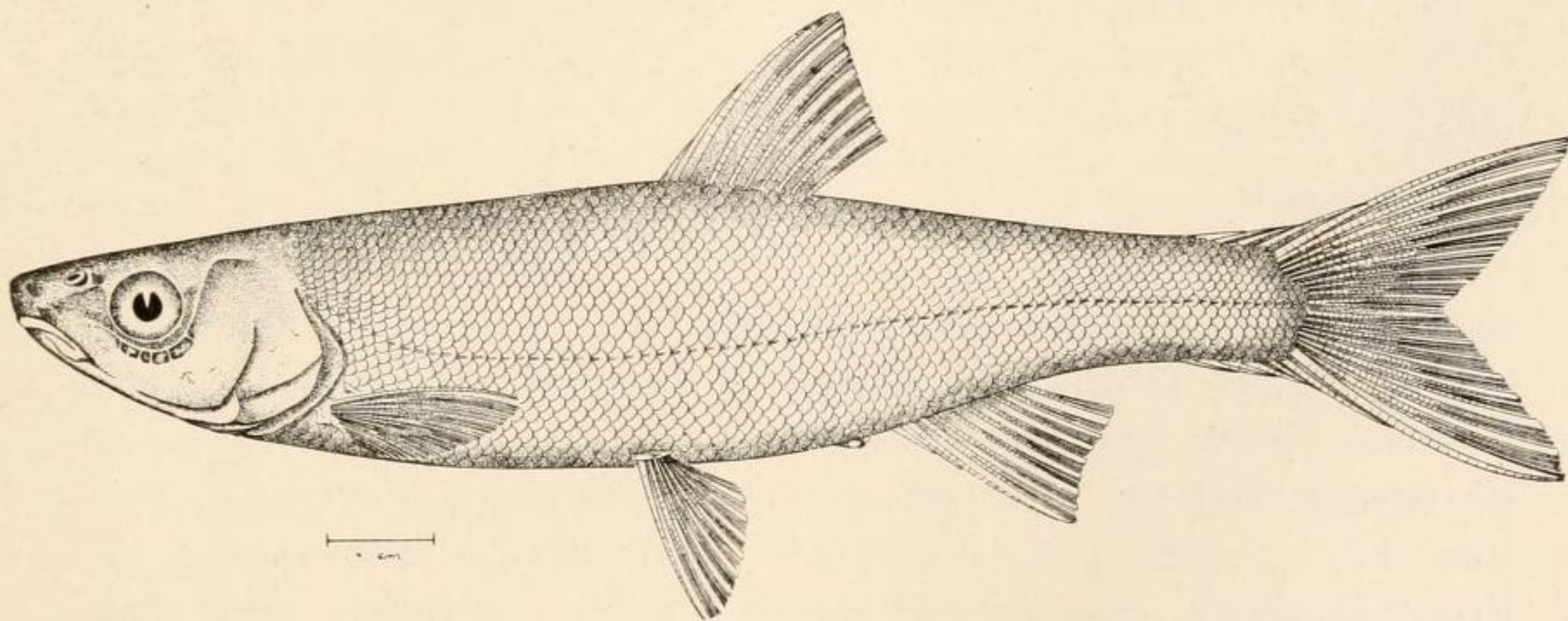


Fig. 1.—*Leuciscus schisturus* new species.

lateral line and the root of ventral; width of head 2 in its length; snout 3 in head; eye 5; interorbital space 3; pectoral 1.50; ventral 1.81; pharyngeal teeth 4, 2-2, 5; gill-rakers 4+8. Body elongate, compressed posteriorly; head elongate, triangular, upper profile nearly straight; snout rather long, pointed, edge of its skin slightly

covering the upper lip; interorbital space and top of head more or less convex; eye small, anterior and superior, 1.46 in snout; mouth subinferior, not very oblique, maxillary reaching posterior border of nostril; lips thin, the lower discontinuous, distinct at the angle of mouth only; anterior margin of lower jaw trenchant; pharyngeal teeth hooked, with no grinding surface; nostrils close together, on the supra-lateral part of snout; gill-openings rather large; gill-rakers rather short and pointed. Origin of dorsal midway between tip of snout and base of caudal, the first branched ray the longest, reaching beyond the others to origin of anal when depressed, its outer margin nearly straight; pectoral five-eighths the distance to ventrals; origin of ventral in advance of that of dorsal, inserted nearer origin of anal than that of pectoral; anal inserted a little nearer to tip of pectoral than base of caudal, the first branched ray the highest, scarcely reaching beyond the others when depressed, the base of the fin 1.50 in its height, outer border slightly concave; caudal peduncle long, its depth 2.50 in head; caudal fin deeply emarginate, lobes sharply pointed. Scales cycloid, imbricated, of rather even size; no pectoral flap; ventral with a slender scaly flap; lateral line continuous, more or less decurved anteriorly, running along the middle of tail. Color in alcohol uniformly grayish brown above, paler below; all the fins whitish. Total length 145 mm.

Habitat: Central Formosa (type-locality unknown).

(*Schisturus*, split-tail; with reference to the well-developed rudimentary caudal rays.)

Leuciscus medius new species,

Head 3.83 in length; depth 4.55; D. III,7; A. III,7; P. 15; V. 8; scales 76 in lateral line; 19 scales between the origin of dorsal and lateral line, 17 between the latter and middle of belly; 11 scales between lateral line and the root of ventral; width of head 2 in its length; snout 3 in head; eye 4.33; interorbital space 3; pectoral 1.71; ventral 1.81; pharyngeal teeth 4,2-2,5; gill-rakers 2+7. Body elongate, compressed; head elongate, pointed, sides flattened, upper profile nearly straight; snout rather pointed, slightly produced; eye moderate, anterior 1.50 in snout; mouth terminal, slightly oblique, maxillary reaching posterior border of nostril; lips thin, not dilated; lower lips discontinuous; anterior margin of lower jaw trenchant; pharyngeal teeth hooked, with no grinding surfaces, nostrils close together, in front of eye above; inter-

orbital space and top of head very slightly convex; gill-openings moderate; gill-rakers rather short and pointed. Origin of dorsal nearer base of caudal than tip of snout, rather high, the first branched ray the longest, reaching far beyond the origin of anal when depressed, its outer margin nearly straight; anal inserted nearer tip of pectoral than base of caudal, the first branched ray the highest, not reaching beyond the others when depressed, the base of the fin 1.42 in its height, its outer margin straight; pectoral two-thirds the distance to ventrals; ventrals inserted nearer origin of anal than that of pectoral, in advance of origin of dorsal; caudal peduncle

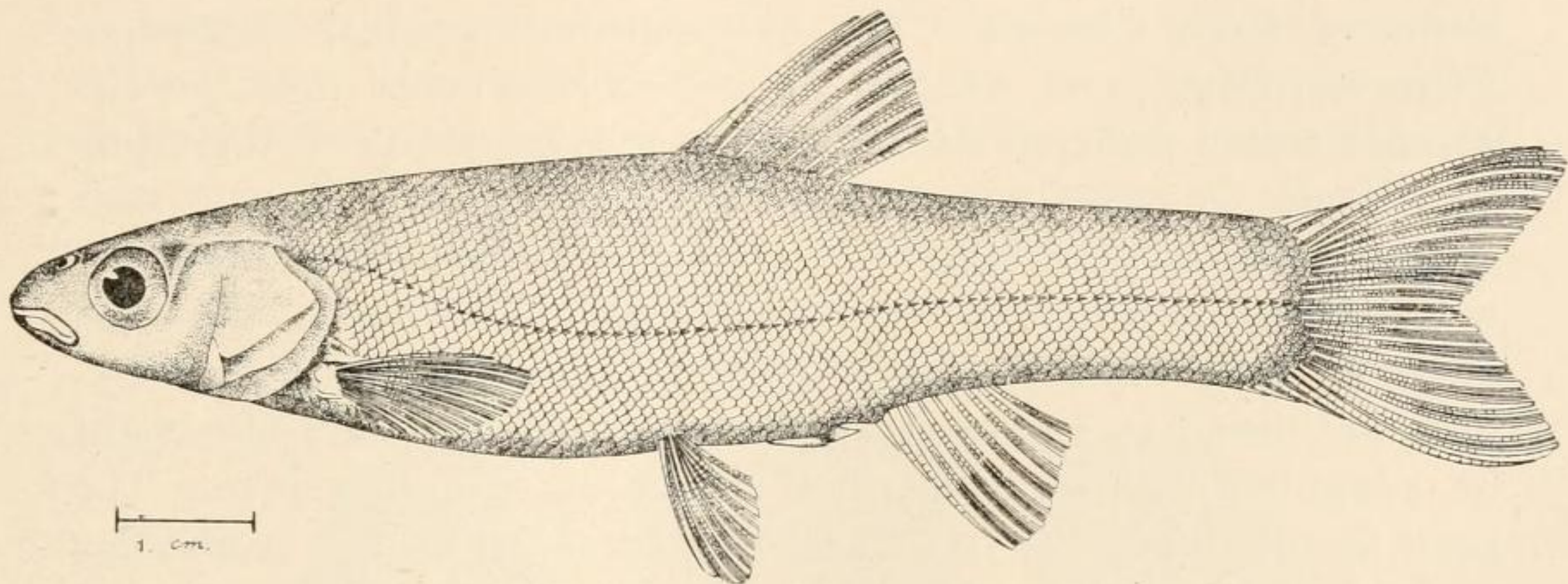


Fig. 2.—*Leuciscus medius* new species.

compressed, its depth 2 in head; caudal fin deeply forked, the lobes obtusely pointed. Scales cycloid, moderately small, of rather even size; no pectoral flap; ventral with a small fleshy flap; lateral line continuous, slightly decurved, running along the middle of the tail. Color in alcohol grayish brown above, paler below; all the fins whitish. Total length, 110 mm.

Habitat: Central Formosa (type-locality unknown).

The present species distinctly differs from the former in having 19 scales between origin of dorsal and lateral line.

(*Medius*, central, the species having been obtained in central Formosa.)

MOLLUSKS FROM LAKE CHAPALA, STATE OF JALISCO AND VICINITY.

BY HENRY A. PILSBRY.

Professor Francisco Contreras, in the course of his studies of the natural resources of Mexico, has made a small collection of the shells of Lake Chapala. The occurrence of peculiar species of *Planorbis*, *Physa*, and *Anodontites* probably indicates that there is a considerable endemic element in the mollusk fauna of this Mexican lake.

In treating of the *Planorbis* and *Physas* of Lake Patzcuaro¹, the writer called attention to the more enlarged last whorl of the shell, compared with the most closely related species found in other Mexican localities. It was conjectured that larger lung capacity might be advantageous to air-breathing snails of this deep lake. The same peculiarity is seen in *Planorbis contrerasi* and *Physa solidissima* of Lake Chapala; but while the shells of Lake Patzcuaro are thin and light, those of Chapala are remarkably solid, perhaps an adaptation to wave-beaten shores.

***Polygyra ventrosula* (Pfr.).**

Chapala. Diameter about 10 mm. Also similar smaller shells, diam. 7.3 mm., which are referable to the variety *hindsii* (Pfr.). Whether these sizes occur in the same colony, or are connected by intermediate sizes, should be noted.

***Polygyra matermontana jaliscoensis* Pils.**

Chapala. This form was described from Guadalajara.

***Drymaeus hegewischi* (Pfr.).**

Chapala.

***Planorbis tenuis chapalensis* new subspecies. Fig. 1.**

The shell is very strong and solid with narrow, deeply sunken spire on the left side. The aperture is piriform, the penult whorl intruding but little.

Greatest diam. 16, alt. at aperture 9.3 mm.

¹ These PROCEEDINGS for 1891, p. 324.

Laguna de Chapala, State of Jalisco, collected by Prof. Francisco Contreras, March 1, 1920. Type No. 46,194.

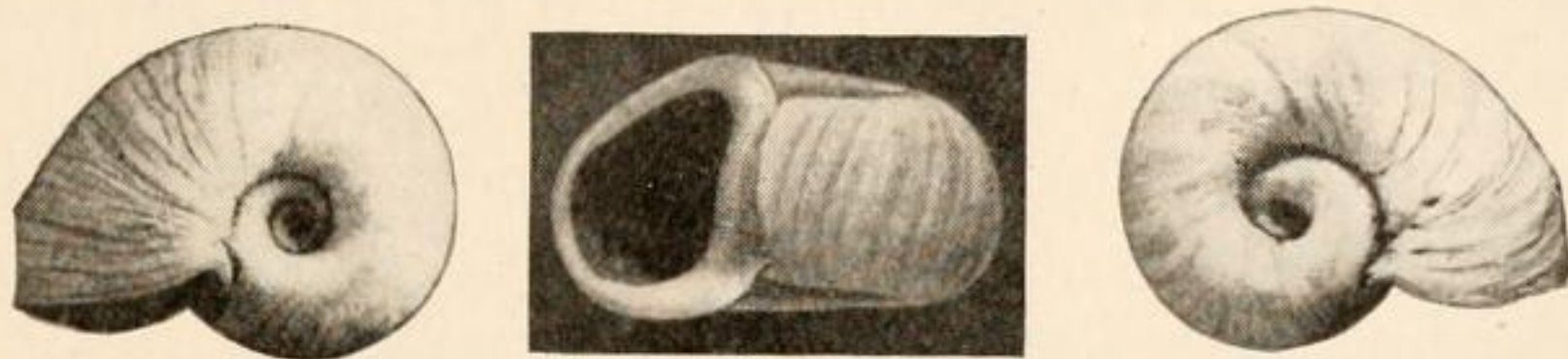


Fig. 1.—*Planorbis tenuis chapalensis*. Enlarged.

Planorbis contrerasi new species, Fig. 2,

The shell is solid; last whorl compressed on the right side, bluntly angular, with funnel- or vortex-shaped umbilicus; left side angular, with rather wide bowl-shaped concavity. *Surface closely striate spirally within both concavities*, seemingly with weak traces of spiral lines over the peripheral part, though the specimens are all so wave-worn that the external sculpture cannot be seen except within the aperture. The aperture is narrow, angular at the ends.

Greatest diameter 14.3, alt. at aperture 10.2 mm.; fully 4 whorls.

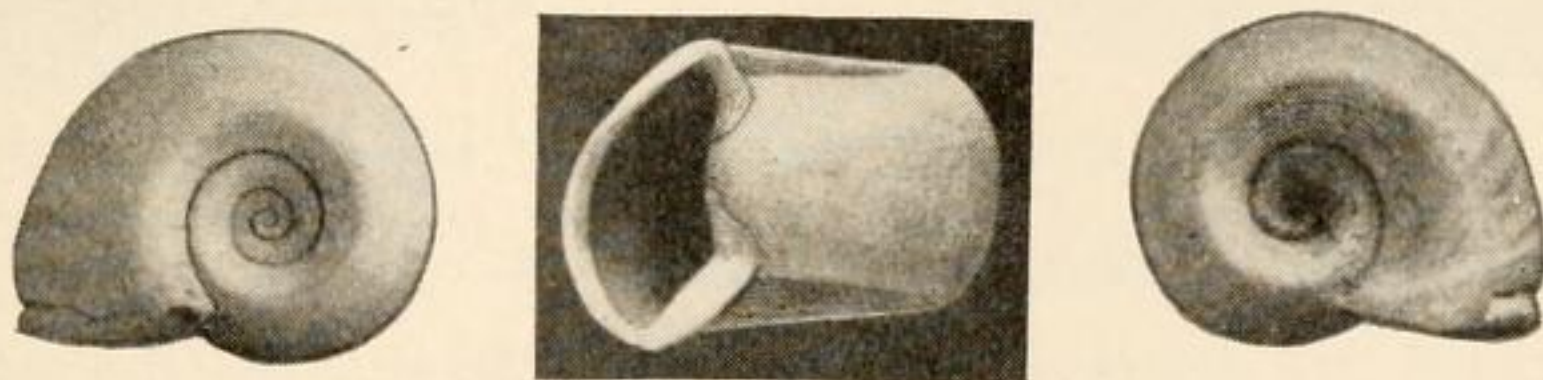


Fig. 2.—*Planorbis contrerasi*. Enlarged.

Laguna de Chapala, State of Jalisco, collected by Prof. Francisco Contreras, March 1, 1920. Type No. 46,193.

While the shape is somewhat like that of *Planorbis tenuis exaggeratus*, of Lake Patzcuaro, this species differs by its solidity and especially by the strongly developed spiral sculpture. It is a very distinct species.

Physa solidissima Pils.

Laguna de Chapala. Dead specimens of this remarkably globose, heavy species are somewhat larger than the type, the largest measuring: length 11.3, diam. 9.5, length of aperture 9.9 mm. The rounded fold of the massive columella is prominent, as in the type.

It is hoped that living individuals can be secured. They may show differences from the ordinary *Physas*.

Anodontites jaliscoensis n. sp. Fig. 3.

The shell is oblong, the alt. 55 per cent. of the length, the diameter slightly less than one-third the length, moderately solid; isabella

color, paler buff toward the beaks, a little browner toward the lower margin, the epidermis thin with weak growth lines; under the lens showing radial bands of festooned striae in the middle part. Beaks small, somewhat worn, showing no sculpture. The interior is pale Payne's gray with a rather wide matt border; stained with olive-buff in the cavity toward the beaks. There is a dark, iridescent triangle at the posterior end of the hinge.

Length 46, alt. 25.5, diam. 14 mm.

Tolimán, State of Jalisco. Prof. F. Contreras. Type No. 46,197.

This is a longer shell than *Anodonta coarctata* Anton, differing also in external texture, the wide dull border inside, and the deep, triangular "sinulus" at the end of the hinge.

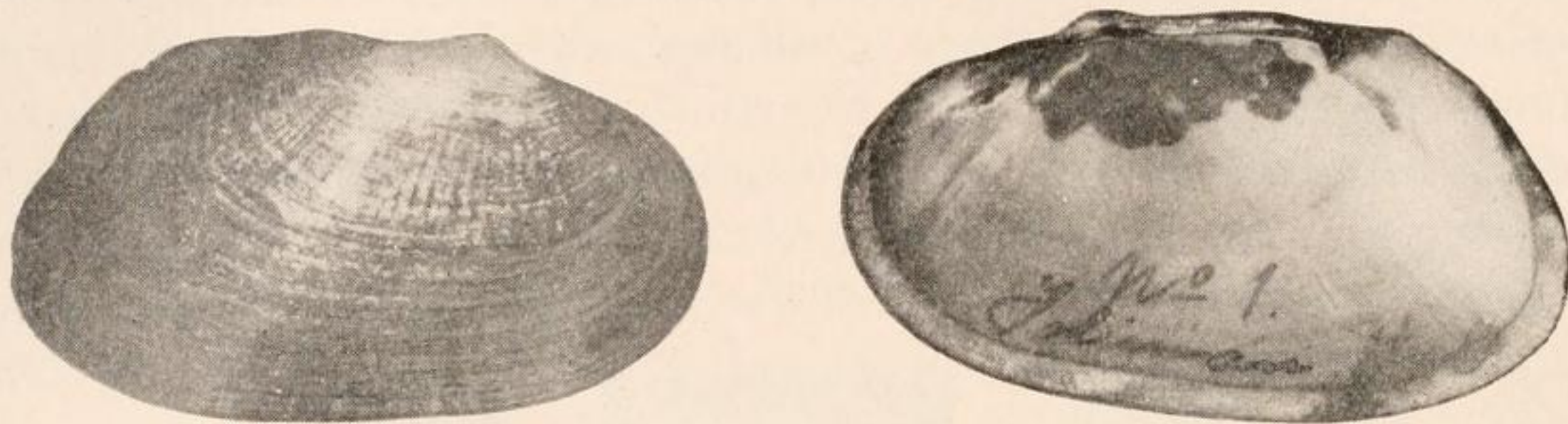


Fig. 3.—*Anodontites jaliscoensis*. Natural size.

Nephronaias aztecorum tolimanensis new subspecies. Fig. 4.

Differs from *N. aztecorum* and *N. a. chapalensis* by the smaller size and lower form, the shell not so wide posteriorly.

Length 43, alt. 24.3 mm.

Length 35, alt. 19.3, diam. 11.4 mm.

Tolimán, State of Jalisco. Type No. 46,195.

A specimen from Rio Grande, Zapotitlan, Jalisco, measures: length 54, alt. 28 mm.

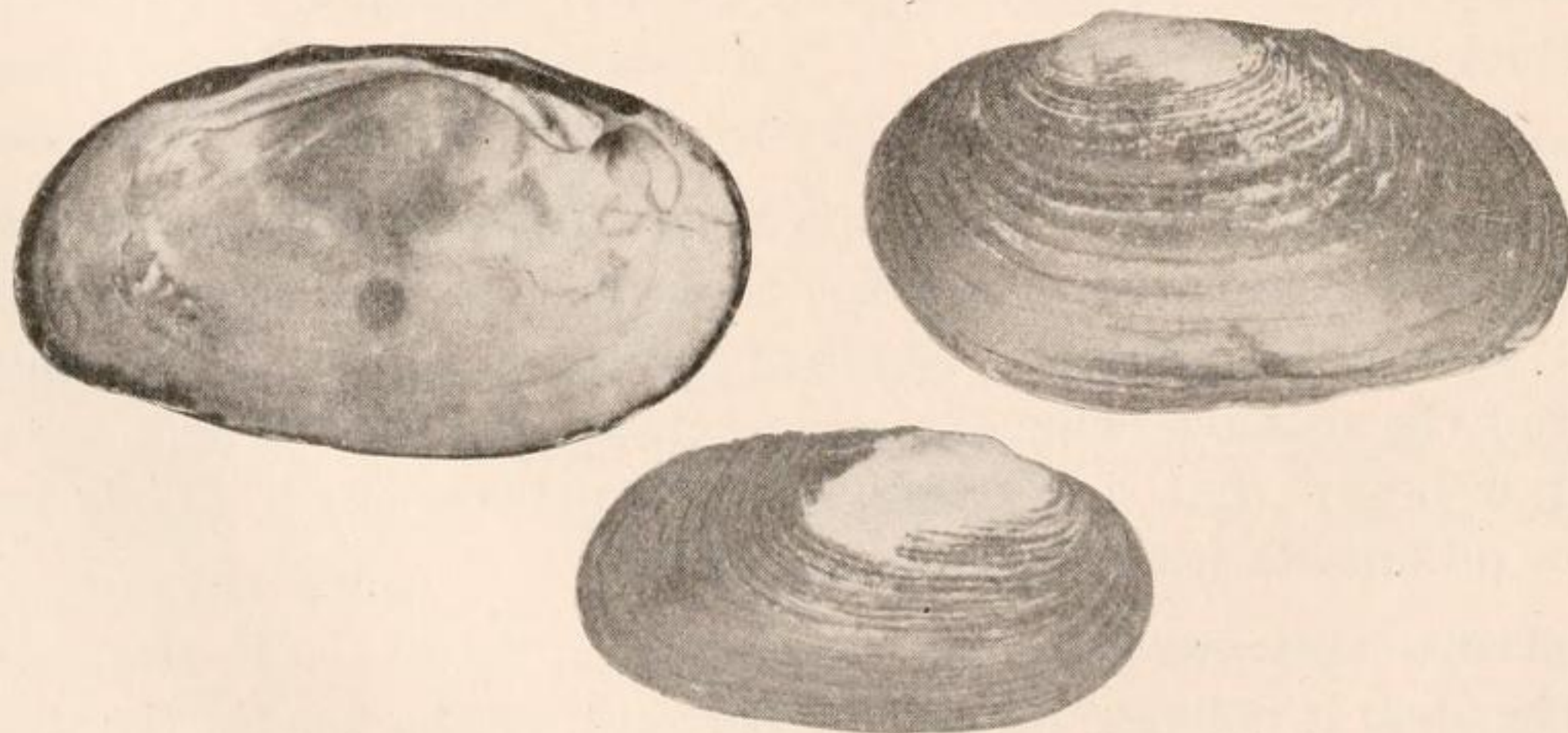


Fig. 4.—*Nephronaias aztecorum tolimanensis*. Natural size.