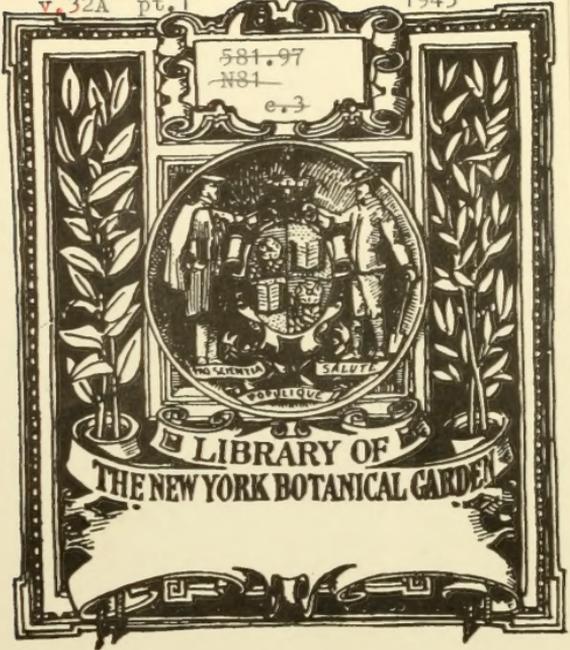


Herb.
XN
.072

HERB XN.072

v. 32A pt. 1

1943



VOLUME 32A

PART 1

NORTH AMERICAN FLORA

CAMPANULALES

CAMPANULACEAE

LOBELIOIDEAE

ROGERS McVAUGH



Subscription Price, \$2.70

Separate Copies, \$3.60

PUBLISHED BY

THE NEW YORK BOTANICAL GARDEN

JANUARY 5, 1943

CAMPANULACEAE (LOBELIOIDEAE)

BY ROGERS McVAUGH

Annual or perennial herbs, shrubs, or small trees, of various habit; sap usually milky. Leaves usually alternate (sometimes all basal), simple, exstipulate, the lower ones tending to be broader in relation to their length, more obtusely pointed and longer petiolate than the upper ones. Inflorescences simple, racemose, terminal on the branches, the central one usually much larger than the others, if any. Flowers in the axils of reduced and specialized bracts or in the axils of the upper foliage leaves. Pedicels often bearing two minute bracteoles (these in some species foliaceous) which apparently represent vestigial leafy organs. Raceme often terminating a naked portion of the stem and so appearing pedunculate. Flowers perfect, large or small (measurements are given for the greatest over-all length when the corolla is straightened out). Corolla zygomorphic, the tube very short to much elongated (usually measured from the point of insertion of the corolla to the deepest points of the lateral sinuses), entire or cleft partially or wholly to the base on one side, or with additional lateral slits. Corolla-lobes 5, erect or spreading, two of them usually narrow and erect, forming an upper lip; three remaining lobes usually broader, more or less fused to form a distinct lower lip, which is often abruptly reflexed at base; base of lower lip often white- or yellow-spotted, roughened, pubescent, or tuberculate within. Flowers usually inverted in anthesis, so that the upper lip (that nearest the inflorescence axis) is morphologically the dorsal lip; that is, abaxial. Fissure in corolla-tube, if present, between the two lobes of the upper lip (spoken of as the "dorsal fissure"). Additional lateral slits, if present, two in number, usually at or below the middle of the tube, in line with the sinuses between the upper and lower lips (the lateral sinuses); a corolla with such lateral openings is spoken of as "fenestrate"; a corolla-tube with neither lateral openings nor dorsal fissure is said to be "entire." Corolla inserted at the summit of the inferior part of the ovary, that is, at the point where the calyx becomes free, or at the summit of a rim or cup above this. Corolla usually withering-persistent, sometimes expanded by the developing fruit. Stamens 5. Anthers two-celled, introrse, united into a tube (free and all alike in 3 genera). Anther-tube zygomorphic, two of the anthers shorter than the others and usually tufted, penicillate, or cornute at tip, the three larger anthers (those alternating with the two upper corolla-lobes) usually somewhat incurved at tip so as to make the orifice of the anther-tube lateral. Filaments flattened, coherent by their edges into a tube or distinct at base, inserted with the corolla at the summit of the hypanthium at its junction with the ovary or on its free rim. Stamens free from the corolla or the filaments loosely attached to it in a few genera, usually persistent until the fruit is mature. Style 1, undivided.

Stigma 1, two-lobed. Upper lobe of the stigma and upper locule of the ovary in line with the sinus between the two lobes of the "upper" corolla-lip. Ovary usually bilocular, more or less attached to the hypanthium. Hypanthium regular (except in *Heterotoma*), varying from flattish to deeply campanulate, turbinate, or linear, sometimes oblique at base, terminating at or below the summit of the ovary or rising above it as a free rim or tube up to 10 mm. high. Calyx-lobes 5, equal or essentially so, the margins sometimes produced at base into conic, filiform, or foliaceous auricles. Fruit a fleshy berry or dry capsule; capsule dehiscent apically by loculicidal valves, or by an operculum, or laterally by slits, or indehiscent. Placentation axile (parietal in *Downingia*, *Legenere*, and *Howellia*). Seeds numerous, minute (larger and few in *Howellia*), variously marked, in shape globose or ellipsoid, trigonous, fusiform or alate. Embryo straight. Endosperm fleshy.

Anthers all alike, distinct; filaments united; fruit a capsule.

Hypanthium with 2 green bracteoles, 1 to 2 mm. long, at base; erect perennials with subopposite leaves.

Hypanthium and pedicel ebracteolate; low annuals with basal or basal and cauline leaves, the latter alternate.

Capsule dehiscent by apical valves or irregularly dehiscent; leaves all or nearly all in a basal rosette, the stem leaves mostly reduced to linear or subulate bracts; primary stems erect or essentially so.

Capsule circumsessile; some of the leaves cauline, about equaling the basal ones in size; stems diffuse or prostrate.

Anthers united into a tube; two of the anthers shorter than the others, the orifice of the tube thus oblique or appearing lateral; filaments united; fruit various.

Flowers sessile in the axils of foliaceous bracts, but appearing long-stalked because of the much elongated, linear or subulate hypanthium; capsule elastically dehiscent by long slits on the sides.

Flowers pedicellate; hypanthium and fruit fusiform to ellipsoid or globose; fruit indehiscent, or dehiscent by apical valves.

Hypanthium irregular, prolonged on lower side into a linear or conic spur, part of the spur being formed by the extended base of the corolla-tube; two of the calyx-lobes separated from the others, at or near the end of the spur; fruit a capsule.

Hypanthium regular or essentially so, at most slightly oblique or gibbous; calyx-lobes all at one level; fruit various.

Corolla minute or wanting, if present 4 mm. long or less, cleft nearly to the base on the upper side; ovary and fruit unilocular; placentation parietal.

Plants aquatic, immersed; flower-bracts linear-subulate, long-acuminate or capillary-pointed, indistinguishable from the foliage leaves, 1.5 mm. wide or less; fruit irregularly dehiscent by the rupture of the thin lateral walls; seeds 2-4 mm. long.

Plants terrestrial; flower-bracts elliptic, obtuse or sub-acute at tip, 2-3 mm. wide; fruit dehiscent at apex; seeds 0.8-1.0 mm. long.

Corolla present, 4.5 mm. long or more, cleft or the tube entire; ovary and fruit bilocular; placentation axile.

Fruit a fleshy, dry, or inflated berry, indehiscent; coarse herbs, sub-shrubs, and shrubs, the flowers red, red-purple, yellow, or green, never blue.

Anther-tube not contracted at the orifice but obliquely open, the anthers naked or sparsely soft-pilose at tips, never with tufts of stiff hairs; style jointed above the ovary and deciduous, with the corolla and stamens, from the mature fruit.

Anther-tube somewhat rounded at apex, the orifice partially closed and usually appearing lateral because of the incurved tips of the longer anthers; two shorter anthers densely tufted or with a triangular appendage at tip; style, corolla, and stamens deciduous or persistent.

Style jointed above the ovary and deciduous, with the corolla and stamens, from the fruit; corolla cleft dorsally, the dorsal sinus deeper than the lateral ones.

1. PSEUDONEMA CLADUS.

2. NEMA CLADUS.

3. PARISHELLA.

6. DOWNINGIA.

9. HETEROTOMA.

5. HOWELLIA.

4. LEGENERE.

15. BURMEISTERA.

13. PRATIA.

- Style not jointed, but persistent, with the withering corolla and stamens, on the fruit; corolla-tube not cleft dorsally, the depth of the dorsal sinus about equalling that of the lateral ones.
- Fruit a capsule, dehiscent by apical valves; plants various; flowers variously colored, often blue.
- Corolla-tube cleft at least half way to the base on the dorsal side, the sinus thus formed much deeper than the lateral sinuses between the next adjoining pairs of corolla-lobes. (See also *Heterotoma Pringlei*.)
- Corolla-tube not deeply cleft dorsally, the depth of the dorsal sinus about equalling that of the lateral ones.
- Ovary superior or essentially so, the hypanthium very short and attached to the ovary at the base only; corolla at length hyaline, much distended by the enlarging capsule; slender annual herbs with blue, purplish, or white flowers.
- Ovary partially or wholly inferior, at least the lower half adherent to the hypanthium; corolla somewhat persistent but usually neither hyaline nor distended by the capsule; plants and flowers various.
- Slender annuals with linear-subulate or lanceolate leaves 2 (rarely 4) mm. wide or less; filament-tube 7 mm. long or less; seeds fusiform, dark-apiculate.
- Perennials or coarse annuals with broader leaves; filament-tube 10 mm. long or more; seeds ellipsoid to ovoid, not dark-apiculate.
- Corolla white, salverform, the lobes subequal, the tube narrowly cylindrical, elongated, 50 to 135 mm. long.
- Corolla normally blue, red, yellow, or greenish, not white, never salverform, the tube 32 mm. long or less.
- Corolla blue or purplish-blue; pedicels in fruit 13 mm. long or less; seeds smooth, shining, without a reticulate surface.
- Corolla red to orange or yellow, varying to reddish-green; if blue, the pedicels 50 to 60 mm. long in fruit; seeds minutely foveate-reticulate.
14. CENTROPOGON.
10. LOBELIA.
8. DIASATEA.
7. PORTERELLA.
11. HIPPOBROMA.
10. LOBELIA.
12. SIPHOCAMPYLUS.

1. PSEUDONEMA CLADUS McVaugh, nom. nov.

Baclea Greene, *Erythea* 1: 238. 1893. Not *Baclea* Fourn.; Baillon, *Dict. Bot.* 1: 338. 1877.

Plants perennial, with herbaceous stems and cauline leaves. Flower not inverted; dorsal (lower) lip of corolla two-lobed; corolla-tube entire. Filaments coherent distally into a tube. Anthers distinct. Staminal glands and appendages wanting. Fruit capsular, bilocular, apically dehiscent. Seeds smooth.

Type species, *Nemacladus oppositifolius* B. L. Robinson.

1. *Pseudonemacladus oppositifolius* (B. L. Robinson)

McVaugh, comb. nov.

Nemacladus oppositifolius B. L. Robinson, *Proc. Am. Acad.* 26: 168. 1891.
Baclea oppositifolia Greene, *Erythea* 1: 238. 1893.

Whole plant glabrous; stems one or several, herbaceous, erect or decumbent from a stout woody caudex, simple or with few ascending subordinate lateral branches, up to 2 mm. in diameter at base, green, 20-60 cm. high, with prominent narrow wings from the decurrent petioles; leaves all cauline, mostly opposite or the upper alternate, the principal ones from few to 20, nearly all crowded into the lower third of the plant, thin and papery when dry, the margins sharply serrate with 4-9 teeth per cm., the teeth deltoid or narrow, sometimes almost setaceous, the blades ovate, rounded at base or the narrower ones cuneate, acute at tip, 1.0-1.5 cm. broad, 1.7-3.0 cm. long, with distinct, narrowly margined petioles 0.3-1.0 cm. long; tufts of slightly smaller leaves often present in the axils of the principal leaves; inflores-

cence 5-18 cm. long, 5-30-flowered, seemingly not at all secund, the stem leafless below it for 2-6 cm.; pedicels ascending, stiff, 3-5 mm. long in fruit, smooth or minutely glandular-ciliate near summit, each with a pair of bracteoles near the summit, these linear, entire, 1-2 mm. long, flat and more or less appressed to the hypanthium, decurrent into wings on the pedicel; flower-bracts linear to subulate, entire or the lowest toothed, 2.5-3.5 mm. long, decurrent into narrow conspicuous green wings on the stem; flower 6-7 mm. long; corolla 4-5 mm. long, glabrous except for the lower lip, which is pubescent within at base, the tube 1.0-1.7 mm. long, measured to the sinuses alternating with the three upper lobes, the two dorsal lobes (these corresponding to the lobes separated by the dorsal sinus in the genus *Lobelia*) forming a distinct lower lip about 4 mm. long, the free part of the lobes elliptic, acute, 1.2 mm. wide by 3.0 mm. long, the three upper lobes about equal in size and shape, narrowly triangular or elliptic, acute, about 1 mm. wide at base by 3 mm. long; color not certainly known, but lobes of lower lip thickened at the sinus between them, with an (apparently) yellowish callosity at this point; filaments 3.2-4.5 mm. long, coherent into a tube above for about half their length, somewhat pubescent below and adherent to the corolla-tube; filament-tube curved toward the lower lip, sharply recurved near tip so that the inclosed style-tip makes a U-shaped bend and points toward the base of the flower; anthers 0.6-0.7 mm. long, minutely roughened or viscid on back along the midline; hypanthium in anthesis campanulate, in fruit little changed in shape but slightly enlarged, nearly or quite as broad as high, 2-2.5 mm. across; capsule half inferior or slightly less, 3.2-3.7 mm. long; calyx-lobes linear-oblong or narrowly triangular, entire, 1.6-2 mm. long, subacute; seeds smooth, shining, ellipsoid, somewhat flattened, 0.6-0.7 mm. long.

TYPE LOCALITY: Dry calcareous bluffs near Cárdenas, San Luis Potosí, *Pringle 3300* (Gray).
DISTRIBUTION: Eastern San Luis Potosí; Hidalgo.

2. NEMACLADUS Nutt. 'Trans. Am. Phil. Soc. II. 8: 254. 1842.

Small annual herbs with 1-18 mostly wiry or filiform, often diffusely branched stems from an erect taproot, and thickish or fleshy leaves mostly or wholly confined to a compact basal rosette. Cauline leaves entire, largely reduced to subulate or linear bracts at the bases of the branches. Branches mostly weakly or strongly zigzag, the branching fundamentally monopodial, but often apparently dichotomous, the lateral branches frequently equalling or surpassing the main axis and the plant becoming bushy and diffuse thereby. Flowers loosely racemose on all the branches; branches floriferous nearly to the base, so that the inflorescence comprises from one-half to three-quarters or even more of the whole plant. Pedicels wiry or filiform, ebracteolate; bract at base of pedicel linear to ovate, entire, decurrent, not to be distinguished from the bract-like cauline leaves which subtend branches. Corolla irregular, more or less distinctly bilabiate, the lower lip 2-, the upper 3-lobed. Corolla-tube about equalling the lobes or much shorter. Filaments distinct at base and sometimes distally also, the staminal tube surmounted by the stellately spreading distinct anthers. Anthers elliptic-oblong to almost globose, usually obtuse at tip, often mucronate. Staminal tube and the inclosed style abruptly curved near the tip, at least in bud, the style and sometimes the stamens becoming erect in anthesis. Hypanthium adherent to the lower part of the ovary or nearly free, usually smooth and glabrous. Calyx-lobes triangular to ovate, entire, mostly smooth and glabrous, blunt-pointed. Ovary with three flattened rounded glands near the base of the free part, these opposite the three lobes of the upper lip of the corolla and alternating with the free bases of the filaments. Filaments between these glands (i.e. the two opposite the two upper calyx-lobes) usually bearing small appendages, each stipe-like and with one or more terminal, transparent rod-like cells. Capsule fundamentally bilocular, loculicidally dehiscent by two valves; loculus sometimes one only and the valves sometimes splitting longitudinally at tip so that the capsule appears 4-valved. Seeds varying from nearly globose to ellipsoid or cylindric, with longitudinal ridges or furrows and transverse lines or ridges dividing the surface into pits or transverse striae.

Type species, *Nemacladus ramosissimus* Nutt.

Corolla-tube (rarely 2.0) 3.0-5.5 mm. long, much exceeding the calyx-lobes; capsule (2.3) 3-5 mm. long, free from the hypanthium its entire length or essentially so.

Corolla-tube 1.5 mm. long or less, scarcely or not at all exceeding the calyx-lobes; capsule mostly about half-inferior, the free part not at all or very slightly exceeding the calyx-lobes.

Anthers 0.4-0.8 mm. long; filaments (1.8) 2.0-3.0 mm. long; corolla-lobes united at very base only, the lobes thus much longer than the tube; leaves entire, obscurely toothed, or pinnatifid-lobed.

Lower part of stem silvery-gray, shining; well developed plants with diffuse and spreading branches and somewhat spreading, rather lax pedicels; range centering in the deserts of southern California, north to Kern and Inyo Counties.

Lower part of stem purplish or brownish, lacking a silvery-gray sheen; well developed plants with more or less stiffly ascending branches and pedicels.

Seeds with low narrow longitudinal ridges, separated by rows of 10-12 nearly regular shallow pits; range centering in the Sierra Nevada of central and northern California, south to Kern County.

Seeds with sharply impressed lines, separating broad flattened longitudinal ridges; each ridge with 15-30 fine transverse lines.

Seeds 0.8-0.9 mm. long; Lake and Napa Counties, California.

Seeds 0.6 mm. long or less; southern California, eastward and southward.

Anthers 0.1-0.3 (rarely 0.4) mm. long; filaments (1.0) 1.3-2.0 (2.5) mm. long; corolla-lobes united at base only or the corolla-tube about equalling the lobes; leaves entire, toothed or pinnatifid.

Seeds with sharply impressed longitudinal lines separating distinct, somewhat flattened, longitudinal ridges; each ridge with 15-20 fine transverse lines; corolla usually more than 1.5 mm. long, divided nearly to base; corolla-lobes much exceeding the very short corolla-tube.

Seeds pitted or the surface with narrow zigzag ridges, the depressions usually in well-defined longitudinal rows, the ridges never separated by sharply impressed longitudinal lines; each row with 6-15 depressions or pits; corolla-tube about equalling the lobes, or, if very short, the corolla not more than 1.5 mm. long.

Stems perfectly straight, not at all zigzag; bract subtending pedicel (2) 3-5 (9) mm. long, linear, loosely spreading, not at all enfolding the base of the pedicel; seeds nearly globose, with about 6 pits in each row.

Stems zigzag, often strongly so; seeds distinctly longer than broad.

Corolla divided almost to base, 0.7-1.5 mm. long, scarcely if at all exceeding the calyx-lobes.

Plant compact, robust, mostly 5-10 cm. high; ovary much enlarged in fruit, about half-inferior, 3-4 mm. long when mature, sharp-pointed, many-seeded.

Plant delicate, with slender stems and filiform pedicels, mostly 10-15 cm. high; ovary little enlarged in fruit, 1.5-2.7 mm. long, the base long-turbinate, the free part short, rounded; seeds few, usually 5-12.

Corolla tubular below, the tube equalling the lobes or nearly so; corolla (1.0) 1.3-2.3 mm. long, usually distinctly exceeding the calyx-lobes.

Mature capsule 3.0-4.0 mm. long, firm, sharp-pointed; basal leaves usually pinnatifid; pedicels usually abruptly upcurved near tip but not spreading in a graceful double curve; base of pedicel not or scarcely enfolded by the usually linear subtending bract.

Mature capsule 1.5-2.5 mm. long, obscurely pointed, the free part delicate and often fracturing irregularly at maturity; basal leaves entire or toothed; pedicels spreading in a graceful double curve, the flower somewhat upcurved; base of pedicel completely enfolded and concealed in the subtending bract, which is lanceolate to ovate, sometimes broader than long, in dried material usually concuplicate.

1. *N. longiflorus*.

5. *N. rubescens*.

5c. *N. rubescens* var. *interior*.

7. *N. montanus*.

6. *N. glanduliferus*.

6. *N. glanduliferus*.

4. *N. ramosissimus*.

8. *N. rigidus*.

9. *N. capillaris*.

3. *N. pinnatifidus*.

2. *N. gracilis*.

1. *Nemacladus longiflorus* A. Gray, Proc. Am. Acad. 12: 60. 1876.

Branches spreading-ascending; plants (3.5) 6-18 (21) cm. tall; stem usually minutely pubescent, at least below (sometimes the whole plant pubescent except the flower), dull or somewhat lustrous, brownish or purplish; rosette-leaves few-30, oblanceolate to obovate or spatulate, usually obtuse at tip and narrowed gradually to a broadly winged base, entire or finely crenate, greenish to purplish when dry, the blades 0.15-0.3 (0.4) cm. wide by (0.2) 0.5-1.1 cm. long, mostly 1.5-3 times as long as wide, mostly densely pubescent above and below; pedicels wide-spreading to ascending, often strongly bowed upward near the base or toward the middle, mostly abruptly bent near the tip so that the flower and fruit are erect or nearly so; fruiting pedicels (6) 10-23 mm. long, slender but hardly capillary, distinctly thicker than a human hair; flower-bracts elliptic to lanceolate or ovate, ciliate on margins; bracts mostly bluntly pointed, 2-4 mm. long, apparently fleshy, in dried material folded about the bases of the pedicels and wholly or partially concealing them; corolla white (often tinged with pink?), the upper lip bearded at base on inner surface, with a yellowish spot at base of each of the three lobes; appendages below middle of filament, very small, with few very delicate, spreading terminal cells; hypanthium almost none; calyx-lobes in anthesis closely appressed to the corolla, nearly parallel, their edges approximate; in fruit the calyx-lobes separated by the expanding capsule, somewhat spreading; capsule fusiform, varying to ovoid, subacute at each end, 1.5-2.0 (2.3) mm. in diameter by (2.3) 3.0-4.5 (5.0) mm. long; calyx-lobes elliptic or lanceolate, subacute, 1.0-2.3 mm. long; seeds broadly ellipsoid, small, 0.5 mm. long or less, with obscure undulate or zigzag longitudinal ridges and poorly defined pits, the ridges mostly 8-10, the pits in each row 10-12.

TYPE LOCALITY: southern California (probably between Los Angeles and San Bernardino), Wallace (Gray!).

Filament-tube 3.5-7.5 mm. long; corolla 5.0-8.0 mm. long.

Filament-tube 2.2-2.8 mm. long; corolla 3.0-3.5 mm. long.

1a. *N. longiflorus* var. *longiflorus**

1b. *N. longiflorus* var. *breviflorus**

1a. *Nemacladus longiflorus* var. *longiflorus* McVaugh, var. nov.

Nemacladus longiflorus A. Gray, loc. cit., as to type.

Corolla 5-8 mm. long, tubular more than half its length, the tube narrowly cylindrical, 2.5-5.5 mm. long; filament-tube 3.5-7.5 mm. long, somewhat exceeding the corolla-tube, abruptly curved near tip and usually hairy above the curve; anthers 0.3-0.6 mm. long; flower-bracts pubescent on the upper (adaxial) surface or sometimes on the abaxial surface, occasionally wholly glabrous; pedicels glabrous.

DISTRIBUTION: Los Angeles and San Bernardino Counties, California, to northern Baja California.

1b. *Nemacladus longiflorus* var. *breviflorus* McVaugh,

Am. Midl. Nat. 22: 526. 1939.

Corolla 3-3.5 mm. long, the tube 2-2.5 mm. long; filament-tube 2.2-2.8 mm. long, included in the corolla-tube; anthers 0.25-0.3 mm. long; flower-bracts usually pubescent on both surfaces, often strongly so; pedicels sometimes pubescent.

TYPE LOCALITY: Roadside Mine, between Tucson and Sells, Pima County, Arizona, Peebles et al. 3754 (US!).

DISTRIBUTION: South-central Arizona; western borders of Mojave and Colorado Deserts, California.

2. *Nemacladus gracilis* Eastw. Bull. Torrey Club 30: 500. 1903.

Nemacladus ramosissimus var. *gracilis* Munz, Am. Jour. Bot. 11: 240. 1924.

Branches weakly or strongly zigzag, often divaricate; plants 4-12 (19) cm. tall; stem wholly glabrous or pubescent below (the whole plant infrequently pubescent), dull or somewhat lustrous, brownish or purplish; rosette-leaves usually fewer than 10, ovate to elliptic,

usually obtuse at tip and often narrowed abruptly to a very short petiolar base, entire or minutely dentate, rarely subpinnatifid, the blades 0.1-0.3 (0.45) cm. wide by 0.25-0.6 (0.8) cm. long, mostly 1.25-2.5 times as long as wide, when dry variable in color, from green to brownish or purplish, sometimes yellowish, mostly pubescent at least on the lower (abaxial) surface, often densely so; pedicels wide-spreading to ascending, often strongly bowed upward near base or toward the middle, mostly abruptly bent or curved near tip so that the flower and fruit are erect or nearly so, the double curve of the pedicel often a conspicuous feature of the plant; fruiting pedicels (S) 10-16 mm. long, slender but hardly capillary, distinctly thicker than a human hair, smooth and glabrous (rarely minutely ciliate on upper side near base); flower-bracts usually ovate, when flattened out almost as wide as long (sometimes wider than long), glabrous or ciliate on margins or on adaxial surface, blunt at tip, apparently fleshy, 0.7-2.0 (3.0) mm. long, sometimes as much as 2.5 mm. wide, usually conduplicate at base and wholly concealing the base of the pedicel; corolla white, 1-3 mm. long, campanulate, the tube 0.5-1.5 mm. long, 0.3-0.6 times as long as the whole corolla; filament-tube 1.0-2.0 mm. long, abruptly curved near tip; appendages near base of filament; stipe very short and bearing several (6-10) very delicate spreading hairlike and pointed cells, which are about 0.25 mm. in length; anthers 0.2-0.35 mm. long; hypanthium rounded at base or acute, cup-shaped in anthesis, little modified in fruit; capsule half inferior or slightly less, (1.2) 1.5-2.0 (2.5) mm. in diameter, about as wide as high, the free part rounded; calyx-lobes narrowly triangular to rounded-deltoid or lance-ovate, subacute, 0.6-1.5 (2.0?) mm. long; seeds broadly ellipsoid, slightly exceeding 0.5 mm. in length, with about 10 obscurely defined undulate or zigzag longitudinal ridges and rows of 10-12 irregular shallow pits alternating with the ridges.

TYPE LOCALITY: "Alcalde, Fresno County, California," *Eastwood* (Cal. Acad.).

DISTRIBUTION: Southern Washoe County, Nevada, and Monterey County, California, south to Baja California, mostly west of the Mojave and Colorado Deserts.

3. *Nemacladus pinnatifidus* Greene, Bull. Calif. Acad. 1: 197. 1885.

Nemacladus ramosissimus var. *pinnatifidus* A. Gray, Syn. Fl. N. Am. ed. 2. 2: 393. 1886.

Branches usually strongly ascending and more or less stiffly erect, often intricately tangled, at least in dried material; plants 6-15 (20) cm. tall, almost wholly glabrous, the stems purplish or brownish; rosette leaves few-30, oblanceolate, rounded to acute at tip and narrowed gradually to a long petiolar base, the blades 0.15-0.4 cm. wide by 0.5-2.0 cm. long, mostly 3-6 times as long as wide, mostly deeply pinnatifid with toothed lobes (some plants with merely toothed or nearly entire blades), green to purplish or brownish (when dry); pubescence usually wanting; cauline leaves sometimes well developed, up to 1 cm. long, toothed or subpinnatifid; pedicels ascending, leaving the stem at an angle of 60°-90°, somewhat flexuous, straight at base or somewhat bowed upward, mostly bent above the middle so that the flower and fruit are erect; fruiting pedicels glabrous, 7-13 mm. long, slender but not capillary, distinctly thicker than a human hair; flower-bracts linear to elliptic, smooth and glabrous, blunt at tip, 2-5 mm. long, usually somewhat conduplicate at base or occasionally their whole length, but not or scarcely concealing the base of the pedicel; corolla white (?), 1.6-2.0 mm. long, campanulate, the tube 0.5-1.0 mm. long; filament-tube 1.3-2.0 mm. long, glabrous, curved near tip; appendages with thickened base and few-5 spreading linear cells about 0.25 mm. in length; anthers 0.1-0.2 mm. long; hypanthium in anthesis short-campanulate, rounded or subacute at base; fruiting hypanthium ellipsoid or campanulate; capsule 1.7-2.2 mm. in diameter by (2) 3-4 mm. long, about half inferior, the free part acutely pointed; calyx-lobes linear to narrowly triangular or elliptic, subacute, 1.2-1.8 (2.3) mm. long; seeds ellipsoid, more than 0.5 mm. long, with 8-10 longitudinal rows of 8-10 broad rounded pits each; rows of pits separated by narrow ridges.

TYPE LOCALITY: Bahía de Todos Santos ("All Saints Bay"), Baja California, *Greene*, May 16, 1885 (Cal. Acad.).

DISTRIBUTION: Los Angeles County, California, to northern Baja California.

4. *Nemacladus ramosissimus* Nutt. Trans. Am. Phil. Soc. II.
8: 254. 1842.

Nemacladus tenuissimus Greene, Bull. Calif. Acad. 1: 198. 1885. (Greene, Cal. Acad.)

Stems several times forked, the ultimate branches straight and slender, not at all zigzag, often strongly ascending, their length above the last fork often comprising three-fourths the height of the plant; plants 5-20 (32) cm. tall; stem pubescent, at least below, or wholly glabrous, dull or obscurely lustrous, brownish or purplish below; rosette leaves few-20, oblanceolate, obtuse at tip, narrowed gradually to a slender or sometimes broadly winged petiolar base, irregularly toothed to subpinnatifid, greenish, brownish, or purplish when dry, the blades 0.1-0.14 cm. wide by (0.3) 0.5-1.8 cm. long, mostly 5.5-6 times as long as wide; pubescence sparse near base on margins and upper surface, or lacking; pedicels lax, spreading at base at an angle of about 90° from the stem (often slightly ascending or drooping), often somewhat curved at the middle or above, so that the flower is erect or nearly so; racemes often strongly secund; fruiting pedicels (6) 8-16 (22) mm. long, finely capillary, as thick as a human hair or more slender, smooth and glabrous; flower-bracts linear, glabrous, blunt-pointed or rounded at tip, (2) 3-6 (9) mm. long, usually loosely spreading or even reflexed, mostly quite or nearly flat and not at all concealing the base of the pedicel; corolla white (?), glabrous, 1.3-2.0 (2.7) mm. long, campanulate, the tube slightly less than half this length; filament-tube (1.0) 1.3-2.0 mm. long, smooth and glabrous, mostly recurved near tip, and often hidden by the corolla; appendages consisting of a small cluster of almost sessile clear cells projecting in all directions, these hardly 0.25 mm. in length; anthers 0.2-0.3 mm. long; hypanthium in anthesis campanulate, becoming broadly conic in fruit; capsule half inferior or less, (1.2) 1.5-2.0 mm. in diameter by 1.6-2.5 mm. long, the free part rounded or obscurely pointed; calyx-lobes linear to elliptic or lanceolate, blunt at tip, 0.6-1.2 mm. long; seeds about 0.5 mm. long, almost globular, with 10 rows of about 6 rounded pits.

TYPE LOCALITY: Near San Diego, California, Nuttall (Acad. Phila.).

DISTRIBUTION: Monterey and Inyo Counties, California, to northern Baja California, west of the Mojave and Colorado Deserts.

5. *Nemacladus rubescens* Greene, Bull. Calif. Acad. 1: 197. 1885.

Plants usually much-branched and bushy, often 25 cm. tall and broad; rosette-leaves few-30; capsule about half-inferior, the apex rounded or obscurely pointed; corolla large, up to 5 mm. long, the lobes free almost to base, spreading; filament-tube glabrous, up to about 3 mm. long, often about equaling the corolla but appearing strongly exerted because of the spreading corolla-lobes and short tube; anthers up to 0.8 mm. long, often purplish; seeds broadly ellipsoid, 0.5-0.75 mm. long, bearing 8-12 undulate or zigzag longitudinal ridges and poorly defined pits between the ridges.

TYPE LOCALITY: Mojave Desert, California, M. K. Curran (Cal. Acad.).

Lower part of stem silvery-gray, shining; well developed plants with diffuse and spreading branches and somewhat spreading, rather lax pedicels; range centering in the deserts of southern California, north to Kern and Inyo Counties.

Leaves usually elliptic, entire or nearly so, mostly 2-3 times as long as wide; pedicels much coarser than a human hair; stipe of staminal appendage shorter than the reflexed terminal cells, which are more than 0.5 mm. in length.

Leaves oblanceolate, pinnatifid-toothed, mostly 5-8 times as long as wide; pedicels finely capillary, the diameter about equaling that of a human hair; stipe of staminal appendage much longer than the spreading terminal cells, which are much less than 0.5 mm. in length.

Lower part of stem purplish or brownish, lacking a silvery-gray sheen; well developed plants with more or less stiffly ascending branches and pedicels; Sierra Nevada of central and northern California, south to Kern County.

5a. *N. rubescens* var. *rubescens*.

5b. *N. rubescens* var. *tenuis*.

5c. *N. rubescens* var. *interior*.

5a. *Nemacladus rubescens* var. *rubescens* McVaugh, var. nov.

Nemacladus rubescens Greene, loc. cit., as to type.

Nemacladus adenophorus Parish, Bull. So. Calif. Acad. 2: 28. 1903. (Parish 4956, U. of Cal.)

Nemacladus rigidus var. *rubescens* Munz, Am. Jour. Bot. 11: 245, in part. 1924.

Branches repeatedly forked and spreading-flexuous, so that nearly all well developed plants are diffuse and bushy; plants 5-15 (25) cm. tall; stem slightly pubescent below, sometimes at very base only, or wholly glabrous, the lower part and often the branches as well with a conspicuous silvery-gray sheen; rosette leaves oblanceolate to elliptic, most often obtuse at tip and narrowed gradually to a broadly winged base, entire or obscurely toothed, when dry light yellowish-green or yellow, only very rarely purplish, the blades 0.3-0.7 cm. wide by 0.7-1.8 (2.7) cm. long, 2-3 (5) times as long as wide; pubescence of leaves sparse, on lower part of margin, or lacking; pedicels somewhat ascending, leaving the stem at an angle of 90° or less, perfectly straight or slightly bowed upward at base, straight or flexuous at tip, the flower and capsule often turned upward; fruiting pedicels (6) 8-15 mm. long, slender but not finely capillary, distinctly thicker than a coarse human hair, smooth and glabrous; flower-bracts lanceolate to ovate, glabrous, blunt at tip, 1-2 (3) mm. long, strongly decurrent at base, in dried material usually conduplicate so as partially to inclose the pedicel but mostly leaving the base of the pedicel visible on the upper side; corolla (1.5) 2.0-3.0 (3.5) mm. long, yellow or nearly white, with purplish-brown markings toward the tips of the lobes, the tube very short (0.5 mm. or less), the margins of the lobes, at least the upper three, ciliate; filament-tube 2-3 mm. long, straight or very slightly curved above; appendages consisting of a stipe bearing 3-5 reflexed clavate cells 0.6-0.7 mm. in length and much exceeding the stipe; anthers 0.5-0.7 mm. long; hypanthium broadly rounded at base in anthesis, becoming cup-shaped or hemispheric in fruit; capsule obscurely pointed, 1.5-2.0 mm. in diameter, about as broad as high; calyx-lobes elliptic to deltoid-ovate, subacute, 0.7-1.2 (1.4) mm. long.

DISTRIBUTION: Mojave and Colorado Deserts, from Kern and San Diego Counties, California, to northern Baja California, western Arizona, and southern Nevada.

5b. *Nemacladus rubescens* var. *tenuis* McVaugh,
Am. Midl. Nat. 22: 536. 1939.

Branches several-times forked, spreading-flexuous and usually very diffuse, weakly zigzag below, the ultimate branchlets often practically straight; plants 9-20 cm. tall; rosette-leaves oblanceolate, subacute or blunt-pointed at tip, deeply pinnatifid with entire or toothed lobes, gradually narrowed to a long-drawn-out petiolar base, yellowish to green when dry, rarely purplish, their blades 0.15-0.4 cm. wide by (0.7) 1.0-2.3 cm. long, mostly 4-8 times as long as wide, sparsely pubescent on both surfaces, especially near base; pedicels wide-spreading, leaving the stem at an angle of 90° or somewhat less, mostly somewhat bowed upward near the middle and abruptly curved near tip so that the flower and fruit are erect or even slightly incurved; fruiting pedicels 10-17 mm. long, smooth and glabrous, capillary, the thickness about equaling that of a coarse human hair; bracts similar to those of var. *rubescens* but somewhat more strongly folded, often concealing the base of the pedicel; flower essentially as in var. *rubescens*, except for the anthers, which have an average length of 0.4-0.5 mm., and the staminal appendage which consists of a stipe 0.5-1.0 mm. in length, with 6-12 spreading terminal clavate cells less than 0.25 mm. in length; capsule 1.3-1.6 mm. in diameter by 1.5-2.0 mm. long; calyx-lobes mostly narrowly triangular, acute, (1.0) 1.2-1.7 (2.2) mm. long.

TYPE LOCALITY: Eastern base of Indio Mt., Colorado Desert, Riverside County, California, Hall 5819 (US!).

DISTRIBUTION: Southeastern California, principally in the Colorado Desert, north to Inyo County.

5c. *Nemacladus rubescens* var. *interior* (Munz) McVaugh,
Am. Midl. Nat. 22: 537. 1939.

Nemacladus rigidus var. *interior* Munz, Am. Jour. Bot. 11: 243. 1924.

Plants resembling those of var. *rubescens* but taller and more strict, (7) 15-25 (32) cm. tall, the branches rather stiff and strongly ascending; stems brownish or purplish, dull or somewhat shining, never with a silvery-gray sheen; leaves similar to those of var. *rubescens*, but with mostly irregularly serrate margins, green to brownish or purplish when dry, rarely yellow, their blades 0.2-0.5 cm. wide by 0.4-2.2 cm. long, usually about twice as long as wide, narrowed

gradually to a margined petiolar base or abruptly to a distinct petiole which may be 0.3–0.5 cm. long; pubescence almost none, rarely of a few hairs along the margins and on the upper surface near base; pedicels usually conspicuously ascending, mostly forming an angle of 60° or less with the stem, stiff and straight or essentially so or curved near the end, 7–13 (17) mm. long, about as thick as those of var. *rubescens*, usually somewhat ciliate on upper side near base; flower-bracts linear to lanceolate, blunt, often slightly ciliate on margin, 1–3 (6) mm. long, scarcely or not at all enfolding the pedicel; corolla (2.0?) 2.5–5.0 mm. long, "pale lilac, blotched red-violet" (*Keck 1175*) or "white, pink-tinged on backs of lobes; each of the 3 lobes of the upper lip with transverse wine-red band near base and tint of yellow below the band" (*Carlotta C. Hall 192*), the lobes without ciliation on margin, nearly free, spreading; filament-tube 1.8–3.0 mm. long, appearing conspicuously exerted, somewhat curved above, glabrous throughout; appendages similar to those of var. *rubescens*, but the terminal cells shorter, about 0.4 mm. in length and equaling the stipe; anthers 0.5–0.8 mm. long; hypanthium turbinate or obconic in anthesis and in fruit, the base acute and narrowing rather gradually into the pedicel; capsule 1.3–2.0 mm. in diameter by 2.0–3.5 mm. long, the free part rounded or obscurely pointed and containing more seeds than the narrow inferior basal portion; calyx-lobes as in var. *rubescens*, 0.7–1.3 (1.5) mm. long; seeds like those of var. *rubescens* in size and shape, their surface usually plainly pitted, the 10–12 rows of pits with 8–10 pits in each row.

TYPE LOCALITY: "North Fork, Peckinpah, Fresno Co., California" (Madera County, according to maps), *K. Brandegee* (Pomona!).

DISTRIBUTION: Western slopes of the Sierra Nevada, California, from Kern County to Butte County; doubtfully in southern Oregon.

6. *Nemacladus glanduliferus* Jepson, Man. Fl. Pl. Calif. 975. 1925.

Branches usually ascending and rather stiff, but occasionally loose and flexuous; plants 5–15 (25) cm. tall; stems pubescent below and sometimes in the axils of the bracts or essentially glabrous, dull or slightly lustrous, brownish or purplish, at least below; rosette-leaves few–20, usually oblanceolate but sometimes elliptic, usually obtuse at tip and narrowed gradually to a broadly winged base (leaves with elliptic blades often with a distinct slender petiole), the blades usually toothed (sometimes obscurely so) or pinnatifid, green to brownish or purplish when dry, 0.1–0.3 cm. wide by 0.3–1.6 cm. long, usually 3–6 times as long as wide, pubescence present near base only (on margins and upper side of blade) or almost wanting; seeds varying from cylindrical, with perfectly straight sides and truncate ends, to somewhat ellipsoid; length 0.6 mm. or less; each seed divided into 6–8 longitudinal ridges separated by sharply impressed lines; each longitudinal ridge divided by fine transverse lines into 15–20 (30?) narrow cross ridges.

TYPE LOCALITY: Wagon Wash near Sentenac Canyon, Colorado Desert, San Diego County, California, *Jepson 8766* (herb. Jepson!).

Plants diffuse, less than 5 cm. tall; known only from Baja California.

Plants erect, seldom diffuse, 5–25 cm. tall; extreme northern Mexico and southwestern United States.

Pedicels usually curved near the tip, the flower and fruit erect; calyx-lobes (1.3) 1.5–2.5 (3.0) mm. long.

Pedicels stiffly spreading-ascending, not or scarcely curved; calyx-lobes 0.8–1.5 (2.3) mm. long.

6b. *N. glanduliferus* var. *australis*.

6a. *N. glanduliferus* var. *glanduliferus*.

6c. *N. glanduliferus* var. *orientalis*.

6a. *Nemacladus glanduliferus* var. *glanduliferus*

McVaugh, var. nov.

Nemacladus glanduliferus Jepson, loc. cit., as to type.

Pedicels widely spreading at base, mostly leaving the stem at an angle of 60°–90°, often bowed upward near base, usually curved abruptly near tip so that the flower and fruit are stiffly erect; fruiting pedicels 7–13 mm. long, smooth and glabrous, slender but not capillary, distinctly thicker than a coarse human hair; flower-bracts linear to lanceolate, glabrous or ciliate on the margins, blunt at tip, 2–5 mm. long, flat or somewhat folded at base, often wide-spreading or reflexed and scarcely concealing (or even enfolding) the base of the pedicel;

filament-tube 1.6-2.3 mm. long, glabrous, the tip curved; appendages apparently always lacking; anthers 0.2-0.35 mm. long; hypanthium in anthesis mostly broadly rounded at base, becoming hemispheric in fruit; capsule about half inferior or a little less, 2.0-2.3 mm. in diameter by 2.2-3.0 (4.0) mm. long, acute at tip; calyx-lobes linear or narrowly triangular, acute, (1.3) 1.5-2.5 (4.5) mm. long.

DISTRIBUTION: Southern San Bernardino County, California, to northern Baja California, mostly in the Colorado Desert.

6b. *Nemacladus glanduliferus* var. *australis* (Munz) McVaugh,
Am. Midl. Nat. 22: 540. 1939.

Nemacladus rigidus var. *australis* Munz, Am. Jour. Bot. 11: 242. 1924.

Differs from var. *glanduliferus* by its much stouter and shorter stems, which rarely exceed 5.0 cm. in height, by its more diffuse plant-body, its stouter pedicels and its somewhat larger capsules, which average 3.5-4.0 mm. in length; the staminal appendages are essentially like those of var. *orientalis* but with the terminal cells less sharply reflexed.

TYPE LOCALITY: Rosario, Baja California, C. R. Orcutt 1348 (Gray!).

DISTRIBUTION: Vicinity of Rosario, Baja California.

6c. *Nemacladus glanduliferus* var. *orientalis* McVaugh,
Am. Midl. Nat. 22: 540. 1939.

Pedicels usually conspicuously ascending, mostly forming an angle of 60° or less with the stem, characteristically stiff and straight but sometimes curved upward near the tip; fruiting pedicels 6-11 (16) mm. long, slender but not at all capillary, two or more times as thick as a coarse human hair, usually ciliate on upper side near base; flower-bracts lanceolate to ovate, glabrous or ciliate on the margins, blunt at tip, 1-3 (6) mm. long, somewhat conduplicate and enfolding the base of the pedicel, but usually not completely concealing it; filament-tube 1.2-1.7 (2.0) mm. long, equaling or slightly shorter than the corolla, appearing exerted because of the spreading corolla, usually curved near tip, smooth and glabrous throughout; appendages with terminal cells sharply reflexed, clavate, about equaling the stipe, slightly less than 0.5 mm. in length; anthers 0.2-0.3 (0.4) mm. long; hypanthium turbinate, somewhat enlarged above; fruiting hypanthium cup-shaped, somewhat acute at base; capsule one-third to half inferior, acute at tip, 1.5-2.0 mm. in diameter by 2.0-2.5 (3.5) mm. long; calyx-lobes linear to elliptic or narrowly deltoid, 1.0-1.6 mm. long, subacute.

TYPE LOCALITY: Shore of Lake Mead, near Boulder Dam, Clark County, Nevada, Train 1566 (U. S. Nat. Arb.).

DISTRIBUTION: Inyo and Los Angeles Counties, California, to northern Baja California, northern Sonora, southern and western Arizona and southwestern Utah.

ILLUSTRATION: Bot. Mex. Bound. Surv. pl. 35, excl. f. A. 1859.

7. *Nemacladus montanus* Greene, Bull. Calif. Acad. 1: 197. 1885.

Nemacladus ramosissimus var. *montanus* A. Gray, Syn. Fl. N. Am. ed. 2, 2¹: 393. 1886.

Nemacladus rigidus var. *montanus* Munz, Am. Jour. Bot. 11: 243. 1924.

Branches several-times forked, stiffish and strongly ascending, the habit almost exactly that of *N. rubescens* var. *interior*; plants 10-18 cm. tall, the stems brownish or purplish, somewhat lustrous, glabrous or essentially so; leaves entire or obscurely toothed, oblanceolate, or elliptic with a petiolar base, the blades 0.2-0.5 cm. wide by 0.6-1.8 cm. long, the pubescence almost none; pedicels conspicuously ascending, about as in *N. rubescens* var. *interior* in position and thickness, 12-15 mm. long, usually ciliate on upper side near base (stem also ciliate in axil opposite pedicel); flower-bracts linear to lanceolate, blunt or subacute, 1-3 mm. long, scarcely or not at all enfolding the pedicel; corolla white or purplish, 1.5-2.5 mm. long, the lobes free nearly to the base; filament-tube 2.0-2.5 mm. long, glabrous, usually somewhat curved above; appendages indistinguishable from those of *N. rubescens* var. *interior*; anthers 0.6-0.7 mm. long; hypanthium in anthesis turbinate, often oblique, in fruit enlarging somewhat and with the tube distended unequally by the seeds, the base narrowing gradually into the pedicel;

capsule about half inferior, blunt-pointed, 1.5–2.0 mm. in diameter by 2.5–3.0 mm. long; calyx lobes 1.2–1.6 mm. long, blunt; seeds ellipsoid, varying from fusiform to nearly as wide as long, 0.8–0.9 mm. long, each divided by sharply impressed longitudinal lines into 10–12 broad ridges; each longitudinal ridge divided by fine transverse lines into about 30 narrow cross ridges.

TYPE LOCALITY: Allen's Springs, Lake County, California, *D. Cleveland* (Cal. Acad.).
DISTRIBUTION: Mountains of Lake and Napa Counties, California.

8. *Nemacladus rigidus* Curran, Bull. Calif. Acad. 1: 154. 1885.

Stems simple or sparingly forked, mostly spreading-decumbent, fruiting to the base of the plant or nearly so; plants (2) 4–9 (13) cm. tall; stems sparsely pubescent, especially below, somewhat lustrous, purple; rosette-leaves 5–7, elliptic, narrowed to the blunt tip and the broad petiolar base (or sometimes with a suggestion of a division into an ovate blade and a broad petiole), green or purplish when dry, the blades 0.2–0.4 cm. wide by 0.8–1.0 cm. long, the pubescence sparse, mostly confined to margins of petiole and to upper (adaxial) side near base; pedicels spreading, leaving the stem at an angle of 60°–90°, stiff and straight; fruiting pedicels 8–11 mm. long, sometimes as much as 0.3 mm. in diameter, smooth or ciliate near base; flower-bracts broadly elliptic, foliaceous, smooth or ciliate on the margins, rounded at tip, 2–3 mm. long by as much as 1 mm. wide, flat or somewhat rounded on back at base, not surrounding nor concealing the base of the pedicel; corolla purplish, 1.0–1.5 mm. long, the tube very short, 0.2–0.3 mm. long; filament-tube 1.0–1.3 mm. long, glabrous, slightly curved or straight; appendages minute, reflexed, the few terminal cells clavate; anthers 0.2–0.3 mm. long; hypanthium in anthesis short-campanulate, mostly rounded at base, in fruit much enlarged and often oblique; capsule about half inferior, acute at tip, 2.0–2.5 mm. in diameter by 3.0–4.0 mm. long; calyx-lobes lanceolate to ovate, somewhat foliaceous, strongly unequal in size, the larger ones 1.0–1.3 mm. across by 1.5–2.5 mm. long, blunt or subacute; seeds ellipsoid, about 0.75 mm. long, each with 8–10 narrow longitudinal ridges and rows of about 15 narrow pits between the ridges.

TYPE LOCALITY: Geiger Grade, near Virginia City, Nevada, *Curran* (Cal. Acad.).
DISTRIBUTION: Southeastern Oregon and northeastern California, south to southern Washoe County, Nevada.

9. *Nemacladus capillaris* Greene, Bull. Calif. Acad. 1: 196. 1885.

Nemacladus rigidus var. *capillaris* Munz, Am. Jour. Bot. 11: 244. 1924.

Branches few-several-times forked, usually rather stiffly ascending; plants (5) 7–15 (18) cm. tall; stems wholly glabrous or minutely pubescent, somewhat lustrous, brownish or purplish; rosette-leaves mostly 6–8, usually ovate, acute or blunt at tip, narrowed rather abruptly at base to a definite short, broad petiole 0.2–0.4 cm. long, the blades obscurely crenate or entire, green to brown or purplish when dry, 0.15–0.6 cm. wide by 0.3–1.5 cm. long, mostly 1.25–2.5 times as long as wide; pubescence usually wanting; pedicels spreading or ascending, rather weak and lax but characteristically straight and ordinarily without a definite or symmetrical curve, so that the flower and fruit are not strongly upturned; fruiting pedicels (6) 8–12 (15) mm. long, slender to almost capillary, smooth and glabrous; flower-bracts elliptic to narrowly ovate, smooth and glabrous, blunt at tip, 1–2.5 (3) mm. long, flat or slightly folded at base, but not at all or scarcely surrounding the base of the pedicel; corolla white (?), 0.7–1.3 mm. long, the tube almost none; filament-tube (0.6) 0.8–1.2 mm. long, smooth and glabrous, slightly curved at tip; appendages minute, reflexed, scarcely 0.1 mm. in length; anthers 0.2 mm. long or slightly less; hypanthium turbinate in anthesis and in fruit; fruiting hypanthium acute at base; capsule about half inferior, 1.0–1.5 mm. in diameter by 1.5–2.7 mm. long, the free part rounded, the base narrow, very few-seeded; calyx-lobes elliptic or obtusely triangular, blunt, 0.6–1.2 (1.5) mm. long; seeds broadly ellipsoid, 0.5–0.75 mm. long with 8–10 low narrow longitudinal ridges and rows of 9–12 shallow pits between the ridges.

TYPE LOCALITY: Mojave Desert, California, *Curran* (Cal. Acad.).
DISTRIBUTION: Northern Coast Ranges, and Sierra Nevada, California, north to Jackson County, Oregon, and southeast to the Mojave Desert.

3. *PARISHELLA* A. Gray, Bot. Gaz. 7: 94. 1882.

Diffuse annual plants. Flower not inverted. Corolla lobes subequal, the tube entire. Filaments connate distally into a tube, appendaged at base (except the dorsal one). Anthers distinct. Fruit capsular, circumscissile, imperfectly bilocular; placentae axile, on a central septum which divides the inferior part of the ovary and capsule into 2 loculi; lid of the capsule without partition at maturity. Seeds pitted.

Type species, *Parishella californica* A. Gray.

1. *Parishella californica* A. Gray, Bot. Gaz. 7: 94. 1882.

Low branching annuals with diffusely branched stems 1-8 cm. long; stems one or several from the base of the plant, usually purple, glabrous or nearly so; leaves in a basal rosette (or occasionally the bract-like cauline leaves as large as the basal leaves), 1-10, usually entire, thick in texture, smooth and glabrous or sparsely pubescent, the blades up to 0.5 cm. wide by 1.2 cm. long, oblanceolate, obtuse at tip, narrowed gradually to a margined petiole, or sometimes ovate and abruptly narrowed to a slender petiole up to 0.7 cm. long; inflorescences of capitate clusters of few-20 flowers each, the clusters actually terminal but each appearing lateral because of the elongation of a branch from the axil of the bract below the inflorescence, the lowest node of the inflorescence thus appearing proliferous; well developed stems may be 3-times branched, thus bearing 3 apparently lateral flower-clusters and a terminal one; pedicels stout, straight or nearly so, glabrous or sparsely ciliate, ebracteolate, 2-5 mm. long in fruit; flower-bracts oblanceolate or spatulate, resembling reduced basal leaves, up to 1 mm. wide by 9 mm. long; flower not inverted, a corolla-lobe thus facing the inflorescence-axis; corolla 3-4.5 mm. long, white, glabrous or sparsely ciliate without, tubular-campanulate with slightly flaring lobes, the tube 2.0-2.8 mm. long, the lobes subequal, oblong, acute, up to about 1 mm. wide, 1.5-2.0 mm. long; filaments 2.5-3.5 mm. long, connate about half their length, the tube pubescent just beneath the point of attachment of the anthers, with the inclosed style abruptly recurved near tip, the direction of curve toward the ventral corolla-lobe, the filament on the outside of the curve (the dorsal) naked, the others appendaged at base; appendages consisting of sessile clusters of few minute transparent slender cells, these radiating from points near both edges of the two inner filaments and from single points near the inner edge of the two outer filaments; anthers broadly elliptic, glabrous, 0.5-0.6 mm. long; hypanthium in anthesis short-campanulate, glabrous or very sparsely ciliate, enlarged in fruit, becoming 2.5-3 mm. across, slightly higher than broad, the base usually abruptly narrowed and then merging gradually into the pedicel; capsule one-half to two-thirds inferior, 4-5 mm. long, the free part dome-like, tipped by the point formed by the style-base, circumscissile at the rim of the hypanthium; calyx-lobes foliaceous, entire, glabrous or rarely minutely stiff-ciliate, oblanceolate or spatulate, rounded or subacute at tip, 1-1.5 mm. wide at the widest part, 2-6 mm. long; seeds broadly ellipsoid to oblong, brown, about 0.7 mm. long, pitted, the pits in 8-10 longitudinal rows of 10-12 each.

TYPE LOCALITY: Rabbit Springs, Mojave Desert, San Bernardino County, California, *Parish 1328* (Gray!).

DISTRIBUTION: Mojave Desert, California; perhaps in adjacent Nevada.

4. *LEGENERE* McVaugh, gen. nov.*

The generic name is an anagram of the name of E. L. Greene, the discoverer of the type species.

Plants annual. Flowers (? inverted) both petaliferous and apetalous; corolla of the petaliferous flower deft dorsally. Filaments connate into a tube. Anthers connate, two of them shorter than the others. Fruit capsular, unilocular, apically dehiscent, the placentae parietal. Seeds small, numerous, smooth.

Type species, *Howellia limosa* Greene.

1. *Legenere limosa* (Greene) McVaugh, comb. nov.

Howellia limosa Greene, *Pittonia* 2: 81. 1890.

Stems weakly erect, simple or with few to many subordinate lateral branches, sometimes 2 mm. in diameter at base, green, 10-30 cm. high, the whole plant smooth and glabrous; leaves

* *Legenere*, gen. nov.; a *Lobelia ovario uniloculare*, placentis parietalibus differt.

few, cauline, loosely spreading, entire, sessile, the lowest acute, soon deciduous, only the flower-bracts remaining at flowering time; plants annual, the base of the stem often immersed and corky-parenchymatous; inflorescence 8-14 cm. long, loosely 6-12-flowered, often interrupted by slender lateral floriferous branches; pedicels spreading-ascending, filiform, 11-31 mm. long in fruit, ebracteolate; flower-bracts elliptic, leafy, entire, obtuse or subacute at tip, narrowed to a sessile base, 2-3 mm. wide by 6-12 mm. long; flower inverted (?), 7.5-8 mm. long, including hypanthium; corolla 3.5-4.0 mm. long, yellowish (?), the tube 1.3-1.6 mm. long (measured at the lateral sinuses), cleft to a point 0.25 mm. from the base, the two lobes next the dorsal fissure about 0.8 mm. wide, 2 mm. long, the three lower lobes 1.2 mm. wide by 2 mm. long; filament-tube 0.7-1.2 mm. long; anther-tube 0.8-0.9 mm. long, the two shorter anthers about 0.6 mm. long, with minute pointed appendages at tip; hypanthium in anthesis narrowly turbinate, in fruit clavate-oblong, acute at base, truncate at summit, 1.3-2.0 mm. in diameter, 6-9 mm. long, firm; capsule wholly inferior, dehiscent at apex by thin-walled short valves, the ovules 20 or fewer to each placenta; calyx-lobes subulate to broadly deltoid, acute, entire, 1.0-1.6 mm. long, usually 4 in number in the lower (apetalous) flowers, varying to 5 or 6; petaliferous flowers mostly with 5 calyx-lobes; seeds rarely more than 20, chestnut-brown, smooth and shining, ellipsoid, 0.8-1.0 mm. long.

TYPE LOCALITY: Fields of the lower Sacramento Valley near Elmira, Solano County, California, Greene, May, 1890 (herb. Greene!).

DISTRIBUTION: Lower Sacramento and San Joaquin Valleys, California.

5. *HOWELLIA* A. Gray, Proc. Am. Acad. 15: 43. 1879.

Immersed annual aquatic plants. Flowers (? inverted) both petaliferous and apetalous; corolla of the petaliferous flowers cleft dorsally. Filaments and anthers connate, two of the anthers shorter than the others. Fruit capsular, unilocular, irregularly dehiscent by the rupture of the very thin lateral walls. Placentae parietal; ovules few; seeds large, up to 4 mm. long, smooth.

Type species, *Howellia aquatilis* A. Gray.

1. *Howellia aquatilis* A. Gray, Proc. Am. Acad. 15: 43. 1879.

Stems rooted, naked below for 7-10 cm., then several-branched, the branches spreading or floating; maximum diameter at base about 1.5 mm.; whole plant glabrous, green, 20-50 cm. in length; leaves alternate, occasionally appearing opposite or whorled in 3's at individual nodes, very numerous on the branches, flaccid, membranous when dry, linear-subulate, long-attenuate or capillary-pointed, entire or distantly serrate with minute teeth, sessile, 0.4-1.5 mm. wide, 20-45 mm. long; short lateral branches often present in the axils, appearing like tufts of leaves; flowers 3-10, the inflorescence usually interrupted by one or more sterile nodes between successive pairs of flowers; branches often floriferous nearly to the base; pedicels stout, up to 0.5 mm. in diameter, 1-4 (8) mm. long, merging imperceptibly into the base of the capsule, ebracteolate; flower-bracts indistinguishable from the foliage leaves, or somewhat shorter; flower 7-16 mm. long, measured from the base of the hypanthium to the tips of the calyx-lobes; corolla (white?), shorter than or equaling the calyx-lobes, 2.0-2.7 mm. long, the lobes about half this length, incurved, cucullate, subulate, the dorsal sinus much deeper than the lateral ones, the tube divided nearly to the base; earlier flowers apparently lacking corolla (and stamens?); filament-tube 0.8-1.2 mm. long; anther-tube 0.5-0.9 mm. long, the two shorter anthers minutely appendaged at tip; hypanthium in anthesis ellipsoid, in fruit distended by the seeds, 1.0-1.7 mm. in diameter by 5-13 mm. long; ovary wall and hypanthium together very thin, membranous, the outlines of the mature seeds plainly visible through both; ovary wholly inferior, in fruit with a depressed-conic summit topped by the base of the style, the ovules mostly 5 or fewer; calyx-lobes narrowly triangular, acute to acuminate, entire, 1.5-7.0 mm. long; seeds 0.8-1.0 mm. in diameter, 2-4 mm. long, chestnut-brown, smooth and shining, cylindrical, rounded at one end, acute at the other; number of seeds maturing, 1-5.

TYPE LOCALITY: Sauvie Island, Multnomah County, Oregon, J. Howell 137, May, 1879 (Gray!).
DISTRIBUTION: Northern Idaho, west-central Washington and northwestern Oregon.

6. **DOWNINGIA** Torr. Pacif. R. R. Rep. 4 (Part 5): 116. 1857;
nomen conservandum.

Clintonia Lindl. Bot. Reg. 15: pl. 1241. 1829. Not *Clintonia* Raf. 1818.

Bolelia Raf. Atl. Journ. 120. 1832. (Based on *Clintonia* Lindl.)

Gynampsis Raf. Herb. Raf. 48. 1833; Fl. Tell. 3: 5. 1837. (Based on *Clintonia* Lindl.)

Willtia Kunth, Abh. Akad. Berlin 1848: 32. 1850. (Based on *Clintonia* Lindl.)

Soft-stemmed annual herbs, simple or somewhat branched, erect or decumbent, sometimes rooting at the lower nodes, often corky-parenchymatous below. Vegetative parts wholly glabrous, or rarely the upper part of the stem or the calyx-lobes minutely scabrous-ciliate; ovary and capsule often minutely scabrous. Leaves cauline, numerous, much smaller than the flower-bracts, early deciduous and often not functional at flowering time, lanceolate to subulate or the uppermost broader, sessile, entire or rarely with a few minute teeth, the upper usually obtuse, the lower acute to acuminate or awn-pointed. Terminal flowers of the raceme often aborting and overtopped by the earlier developing ones. Flowers perfect, 5-merous (except for the gynoeceum, in which the placentae are 2, the loculi one or 2, and the valves 3-5), sessile in the axils of foliaceous bracts but appearing long-stalked because of the great elongation of the hypanthium, inverted in anthesis by the twisting of the capsule. Corolla blue, occasionally varying to pink or white, usually with a symmetrical white or yellow blotch on the lower lip; the tube entire, neither fenestrate nor cleft to the base between the two smaller corolla-lobes; the limb more or less strongly bilabiate, the 2 lobes of the upper lip mostly smaller and narrower than the 3 prominently fused lobes of the lower, which is often furnished with folds and ridges or nipples at the basal angle. Two smaller anthers each with a terminal tuft of bristles and usually with a terminal hornlike process as well. Ovary wholly inferior, topped by the free calyx-lobes. Calyx-lobes normally entire except for a minute tooth on each edge near base, the three upper lobes (those alternating with the two narrower lobes of the corolla) usually longer than the other two. Capsule linear to fusiform, 10-75 times as long as wide when mature, opening elastically by 3-5 longitudinal slits extending nearly the entire length of the capsule. Ovary and capsule unilocular with 2 parietal placentae extending the length of the loculus, or bilocular, with the 2 placentae extending the length of the two faces of the delicate longitudinal central septum. Ovules and seeds many, the mature seeds fusiform, apiculate, light brown with darker tips, smooth and polished or with faint longitudinal cellular lines and but slightly lustrous, mostly 0.7-1.0 mm. long.

Type species, *Clintonia elegans* Dougl.

Corolla 2-7 mm. long, not at all or scarcely exceeding the calyx-lobes; lower lip ascending, never sharply reflexed; filament-tube 1.0-2.8 mm. long; anther-tube not incurved, its long axis nearly or quite parallel with that of the filament-tube.

Corolla 2-4 mm. long; filament-tube 1.0-1.8 mm. long; anther-tube 0.6-1.1 mm. long; seeds appearing as if twisted, the very fine cellular lines of the surface running obliquely to the long axis of the seed, at least in part.

Corolla 4-7 mm. long; filament-tube 1.8-2.8 mm. long; anther-tube 1.3-2.2 mm. long; seeds not appearing twisted.

Corolla 5-20 mm. long, usually much exceeding the calyx-lobes; lower lip of corolla sharply reflexed or the anther-tube sharply incurved and standing almost at right-angles to the filament-tube.

Anther-tube strongly incurved, usually standing almost at right-angles to the filament-tube; lower lip of corolla not sharply reflexed nor forming an angle with the corolla-tube; corolla-tube broadly funnel-form or campanulate, the lateral sinuses conspicuously deeper than the dorsal so that the two upper corolla-lobes form a distinct cleft upper lip.

Ovary and capsule bilocular, the ovules attached to the two faces of a longitudinal septum;* anther-tube relatively short and thick, 2.4-3.5 mm. long, 1.0-1.3 mm. in diameter, nearly uniformly dirty-white in color; anthers minutely granular-roughened over the whole surface; flowering season from March to mid-June.

Ovary and capsule unilocular, the ovules attached to the ovary-wall along two longitudinal lines;* anther-tube relatively slender, 2-4 mm. long, 0.6-1.0 mm. in diameter, pale bluish-gray (when dry) with pale gray or white connectives forming longitudinal stripes; anthers smooth and glabrous or sparsely pilose, never granular-roughened; flowering season from June to September.

6. *D. pusilla*.

9. *D. laeta*. ✓

8. *D. insignis*.

12. *D. elegans*. ✓

* This is readily discernible, even in immature fruits, if the calyx and ovary-wall be slit longitudinally with the point of a needle, under a dissecting lens.

Anther-tube not at all or very slightly incurved; lower lip of corolla reflexed, forming a sharp angle with the corolla-tube.

Pair of bristles at apex of anther-tube usually tightly twisted together, forming an appendage 0.6-2.7 mm. in length; corolla-tube prominently bearded within on lower side; base of lower lip with dark purple nipple-like projections.

Pair of bristles at apex of anther-tube, if present, never twisted together; corolla-tube glabrous within, or, in *D. ornativissima*, sparsely pilose; base of lower lip without purple nipple-like projections.

Ovary and capsule unilocular, the ovules attached to the ovary-wall along two longitudinal lines.

Three larger anthers usually abundantly pilose near tip, with an additional tuft of minute bristles at the extreme tip; seeds dull or scarcely lustrous, with faint but plainly visible longitudinal lines (magnification about 15); lower lip of corolla with three purple grooves alternating with greenish-yellow ridges at base; range from Shasta Co., Calif., south along the Sierra Nevada to Tuolumne Co.

Three larger anthers glabrous or sparsely pilose near tip, the bristle-like tufts at the extreme tips usually reduced to minute serrulations; seeds smooth, shining, with no lines visible on the surface (magnification 15); range from Humboldt Co., Calif., north to Washington.

Ovary and capsule bilocular, the ovules attached to the two faces of a longitudinal septum.

Seeds appearing as if twisted, the very fine cellular coat marked by minute lines running obliquely to the long axis of the seed; base of lower lip of corolla yellow, without purple areas.

Seeds not appearing twisted, the markings, if any, paralleling the long axis of the seed; lower lip of corolla with or without purple markings.

Filament-tube equaling or shorter than the corolla-tube as measured on the dorsal side, the base of the anther-tube thus normally included (in pressed corollas); corolla glabrous within, without projecting folds or hornlike processes at the sinuses; anther-tube bluntly rounded at tip, never long-tapering.

Two upper corolla-lobes minutely ciliate-spiny on margins near tip (visible with a magnification of 15); lower lip of corolla with large purple spot at base, the purple color covering the low ridges at basal angle of lip.

Two upper corolla-lobes smooth on margins; corolla with two or three small purple spots at base of lower lip (at mouth of tube).

Filament-tube exceeding the corolla-tube as measured on the dorsal side, the anther-tube thus wholly exerted (in pressed corollas).

Corolla-tube sparsely pilose within; corolla with no purple spots at the base of the lower lip; dorsal sinus of the corolla usually produced backward and outward into a short hornlike process; anther-tube bluntly rounded at tip, not long-tapering.

Corolla-tube glabrous within; corolla with three purple spots at base of lower lip; dorsal sinus not produced into a hornlike process; anther-tube long-tapering to an acute or slightly rounded apex.

4. *D. bicornuta*.10. *D. montana*.11. *D. Yina*. ✓5. *D. cuspidata*.1. *D. concolor*.2. *D. bella*.3. *D. ornativissima*.7. *D. pulchella*.

1. *Downingia concolor* Greene, Bull. Calif. Acad. 2: 153. 1886.

Plants few-20 (33) cm. high, glabrous except for the hypanthium which is mostly somewhat scabrous but sometimes glabrous; leaves 0.4-2.0 mm. wide by 5-18 mm. long; inflorescence few-15 cm. long, loosely few-15-flowered; flower-bracts elliptic to ovate, usually obtuse or at least blunt-tipped, 1-3 (4) mm. wide by 5-16 mm. long, usually 3-6 (10) times as long as wide; corolla 7-13 mm. long, glabrous except for the two upper lobes, which are ciliate-scabrous on the margins near tips and sometimes on the inner surface near tips, blue (or "deep blue"), the lower lip with a quadrate or two-lobed purple or red-purple (velvety purple according to Jepson) spot at the base of the central white area, the white sometimes much reduced or lacking, leaving the whole lip blue except for the purple spot at base, the base of the lower lip with two low ridges or nipple-like processes arising in the purple spot; corolla-tube (2.5) 3.0-4.0 (5.5) mm. long, measured to dorsal sinus 3.0-4.5 (5.5) mm. long, narrowly funnel-shaped (turbinate according to Greene), the lateral sinuses usually cut well below the plane of the lower lip (sometimes as much as 1 mm.), about as deep as or slightly deeper than the

dorsal sinus, the two upper corolla-lobes mostly 0.8–1.2 mm. wide by (2.5) 3.5–5.0 mm. long, lanceolate or shortly ovate, mostly recurved and often appressed to the corolla-tube but sometimes erect or only slightly recurved, the tips acute, the lobes of the lower lip rounded to truncate, oblong to obovate, usually mucronate; filament-tube (2) 2.5–4.0 (5) mm. long, glabrous, the filaments united their whole length or nearly so; anther-tube 1.8–2.3 (2.6) mm. long, its base usually covered by the dorsal side of the corolla-tube (whole anther-tube sometimes included), the anthers glabrous or somewhat pubescent on the backs, all minutely tufted at tips, the two shorter ones prominently so and each bearing also a short hornlike process; hypanthium linear, in fruit unchanged in shape or becoming narrowly fusiform (rarely somewhat subulate), the mature capsule 0.8–1.5 (2.0) mm. in diameter by (12) 30–50 (62) mm. long; calyx-lobes elliptic to linear or oblanceolate, obtuse or subacute, ascending or rotately spreading, 3–8 mm. long, subequal, or the two lower ones distinctly shorter; seeds not twisted, the fine cellular markings running longitudinally.

TYPE LOCALITY: Wheat field near the village of Suisun, Solano County, California, *Greene*, May 2, 1886 (herb. *Greene*!).

Mature capsule tough, firm-papery when dry, tardily dehiscent, without hyaline divisions between the valves, mostly 30–50 mm. long; range from Lake Co. to Monterey Co., Calif.

Mature capsule soon dehiscent, the valves separated by delicate hyaline lines of tissue; capsule mostly 12–25 mm. long; San Diego Co., Calif.

1a. *D. concolor* var. *tricolor*.

1b. *D. concolor* var. *brevior*.

1a. *Downingia concolor* var. *tricolor* (*Greene*) *Jepson*,

Fl. W. Middle Calif. ed. 2. 402. 1911.

Downingia concolor *Greene*, loc. cit., as to type.

Downingia tricolor *Greene*, *Pittonia* 2: 79. 1890.

Boletia concolor *Greene*, *Pittonia* 2: 127. 1890.

Boletia tricolor *Greene*, *Pittonia* 2: 127. 1890.

Boletia concolor var. *tricolor* *Jepson*, *Fl. W. Middle Calif.* 481. 1901.

Mature capsule mostly 30–50 mm. long, tough, firm-papery when dry, tardily dehiscent, without hyaline divisions between the valves.

TYPE LOCALITY: Fields of the lower Sacramento Valley near Elmira, Solano County, California, *Greene*, May, 1890 (herb. *Greene*!).

DISTRIBUTION: Coastal regions of California, Lake County to Monterey County.

1b. *Downingia concolor* var. *brevior* *McVaugh*, *Mem.*

Torrey Club 19⁴: 20. 1941.

Mature capsule mostly 12–25 mm. long, early dehiscent, the valves separated by lines of delicate hyaline tissue.

TYPE LOCALITY: Cuyamaca Lake, San Diego County, California, *Abrams* 3851 (NY!).

DISTRIBUTION: Vicinity of Cuyamaca Lake, at an elevation of about 1400 m.

2. *Downingia bella* *Hoover*, *Leaf. W. Bot.* 2: 2. 1937.

Plants few–17 cm. high, entirely glabrous or the capsule somewhat scabrous; stems fistulous (according to *Hoover*); leaves 1–1.5 mm. wide by 5–12 mm. long; inflorescence 6–8 cm. long, loosely 3–7-flowered; flower-bracts oblong to elliptic, acute or obtuse, 1.0–2.5 mm. wide, 7–18 mm. long, mostly 4–9 times as long as wide; corolla 10–12 mm. long, glabrous, deep bright blue, the lower lip with central white area with yellow center (according to *Hoover*) and two yellow ridges or projections at base, these alternating with three small purple spots or the central purple spot absent; the tube about the same color as the limb, or lighter just below the lower lip, 3–4 mm. long, narrowly funnelform or nearly cylindrical, the lateral sinuses cut about as deeply as the dorsal and cut slightly below the plane of the lower lip, the two upper lobes lanceolate or nearly ovate, 1.3–2.0 mm. wide, 3.0–4.5 mm. long, acute, erect or somewhat recurved but parallel with each other and with the corolla-tube, never curving to the side, the lower lip plane or essentially so, the lobes divergent, rounded or truncate, mucronate, filament-tube 2.7–3.5 mm. long, glabrous, the filaments united their whole length or

nearly so; base of anther-tube covered by dorsal side of corolla-tube; anther-tube 1.6–2.4 mm. long; hypanthium linear, in fruit probably more or less unchanged in shape (mature fruit not seen); nearly mature capsule about 1 mm. in diameter by 35–50 mm. in length, the lateral walls tough and tardily dehiscent, the divisions between the valves obscurely or not at all marked; calyx-lobes linear or elliptic, ascending or rotately spreading, blunt-tipped, (2) 3–6 mm. long; mature seeds not seen; markings of seeds longitudinal, the seeds not twisted.

TYPE LOCALITY: Near San Joaquin River southwest of Modesto, Stanislaus County, California, Hoover 837 (herb. Jepson!).

DISTRIBUTION: Vernal pools of alkaline plains, Great Valley of California, from Colusa County to Tulare County.

3. *Downingia ornatissima* Greene, Pittonia 2: 80. 1890.

Plants few–20 (30) cm. high, entirely glabrous except for the hypanthium, which is usually scabrous; leaves 0.5–2 mm. wide by 5–12 mm. long; inflorescence few–12 (21) cm. long, loosely few–20-flowered; flower-bracts lanceolate to elliptic or ovate, 1–4 (6) mm. wide by 6–12 (16) mm. long, usually 3–5 (10) times as long as wide, obtuse or acute; corolla (7) 8–13 mm. long, glabrous without, the lower lip bright or dark blue to pale lilac or nearly white, with squarish white center bearing two yellow or yellowish-green spots which contract into folds at the angle of the throat, the tube blue or nearly white, sparsely pilose within on lower side, 2.5–4 (5) mm. long, narrowest at base and gradually wider to apex, the lateral sinuses cut so deeply that the lower lip often appears hinged, the dorsal sinus cut about as deeply as the lateral, the margin of fissure (sinus) between the two upper lobes projected backward so as to appear like a short horn with upcurved tip (this hornlike projection may be very small or lacking; similar but smaller projections occur at the lateral sinuses); two upper corolla-lobes lanceolate or narrowly triangular, somewhat enlarged at base, 2.5–6 mm. long, divergent, with the tip of each curled backward and outward into a ring, horizontally spreading with recurved tips, or ascending and appressed and only very slightly divergent; lower lip plane or somewhat concave, the folds at base sometimes prominent and nipple-like, the lobes oblong, rounded or truncate, mucronulate; filament-tube 3.0–4.5 (6) mm. long, the filaments pubescent near base, connate nearly their whole length; anther-tube 1.7–2.5 mm. long, wholly exerted, the base surpassing the dorsal sinus of the corolla by an appreciable amount, the distance usually 0.5–1.0 mm. (sometimes 2.5 mm.), the tube often bent abruptly downward, the anthers all white-tufted at tips, the two shorter ones prominently so, each with a sharp hornlike process in addition; anthers glabrous or pubescent on the backs, the pubescence often with bulbous tips; hypanthium linear, unchanged in fruit or becoming narrowly subulate, the mature capsule 0.5–1.5 mm. in diameter by 25–65 mm. in length, the lateral walls tough and not easily ruptured even when dry, with no evidence of scarious valves; calyx-lobes linear to broadly elliptic, widest at or near the middle, all subequal in length or the two lower shorter, all rounded to blunt or acute at tip, 1.7–6 (9) mm. long, erect or somewhat rotately spreading; seeds not twisted, the very fine lines longitudinal.

TYPE LOCALITY: Fields of the lower Sacramento Valley near Elmira, Solano County, California, Greene, May 1890 (herb. Greene!).

Two upper corolla-lobes glabrous within, divergent, with the tip of each curled outward and backward into a ring or at least strongly recurved.

Two upper corolla-lobes minutely pubescent within near tips, divergent but not curled into a ring.

3a. *D. ornatissima* var. *ornatissima*.

3b. *D. ornatissima* var. *eximia*.

3a. *Downingia ornatissima* var. *ornatissima* McVaugh,

Mem. Torrey Club 19⁴: 23. 1941.

Downingia ornatissima Greene, loc. cit., as to type.

Bolelia ornatissima Greene, Pittonia 2: 127. 1890.

Two upper corolla-lobes glabrous within, divergent with the tip of each curled outward and backward into a ring, or at least strongly recurved.

DISTRIBUTION: Sacramento Valley, California, south about to Merced County.

3b. *Downingia ornatissima* var. *eximia* (Hoover) McVaugh,
Mem. Torrey Club 19⁴: 24. 1941.

Downingia mirabilis J. T. Howell, Leaf. W. Bot. 1: 221. 1936. (Howell 4200, Cal. Acad.)
Downingia mirabilis var. *eximia* Hoover, Leaf. W. Bot. 2: 6. 1937.

Two upper corolla-lobes minutely pubescent within near tips, divergent but not curled into rings.

TYPE LOCALITY: Three miles west of Orange Cove, Fresno County, California, Hoover 1000 (herb. Jepson!).

DISTRIBUTION: San Joaquin Valley, California, south to Tulare County; occasionally north to Butte County.

4. *Downingia bicornuta* A. Gray, Syn. Fl. N. Am. ed. 2.
2¹: 395. 1886.

Plants few-25 (40) cm. high, entirely glabrous (hypanthium very rarely obscurely scabrous); leaves 0.4-1.0 (2.0) mm. wide by (3) 6-15 (20) mm. long; inflorescence few-12 (28) cm. long, loosely 1-10-(17-) flowered; flower-bracts linear to broadly lanceolate, usually 5-10 times as long as wide, 1-3 (4) mm. wide, 5-15 (28) mm. long, obtuse or subacute; corolla glabrous without, the tube densely white-bearded within on the lower side, the lower lip deep purplish-blue with a central area of white, yellow, or yellowish-green, this central area marked with two yellow or green spots, the upper lip purplish-blue, slightly darker than the lower; corolla-tube broadly funnel-shaped, the lateral sinuses cut so deeply that the lower lip appears hinged, the distance from summit of hypanthium to lateral sinuses slightly less than that to dorsal sinus, the two upper lobes ovate or triangular, acute, 1.0-1.3 mm. wide by 4-7 (8.5) mm. long, the lower lip dark-purple at base with two ascending horns or nipples at the inner angle, the lateral margins folded into two less prominent nipples, making four in all in a transverse line, the lobes rounded or truncate, mucronulate; filament-tube (2.3) 3.0-4.0 (4.8) mm. long; anther-tube (1.8) 2.0-2.5 (3.0) mm. long, usually partially included in the corolla-tube and often concealed by the two upper corolla-lobes, the anthers minutely tufted at tip, smooth or sparsely bristly on the backs, the two shorter each with a recurved hornlike process from the apex, the processes tightly twisted together (rarely absent or not twisted); hypanthium linear, at maturity becoming linear to narrowly subulate, tapering very gradually from just above the base to the apex; capsule with lateral walls thin but tough and not easily fractured, the valves scarcely apparent even at maturity, or rarely conspicuous; calyx-lobes linear or narrowly elliptic, rounded at tip or bluntly pointed, widest near the middle, usually plainly of two lengths, (2.5) 3-8 (13) mm. long, often rotate-spreading; seeds not twisted, the markings very faint, longitudinal; placentation axile, the ovary bilocular.

TYPE LOCALITY: Chico, Butte County, California, Mrs. Bidwell (Gray!).

Twisted bristles 0.6-1.5 mm. in length; corolla-tube (measured at lateral sinuses) 2.5-4.5 mm. long, blue, with purple veins.

4a. *D. bicornuta* var. *bicornuta*.

Twisted bristles 1.6-2.7 mm. in length; corolla-tube 1.5-2.6 mm. long, usually with a brownish-yellow spot on the upper side.

4b. *D. bicornuta* var. *picta*.

4a. *Downingia bicornuta* var. *bicornuta* McVaugh, Mem.
Torrey Club 19⁴: 27. 1941.

Downingia bicornuta A. Gray, loc. cit., as to type.

Lobelia bicornuta Greene, Pittonia 2: 127. 1890.

Downingia sikota Appleg. Contr. Dudley Herb. 1: 97. 1929. (Applegate, Stanford U.)

Corolla 9-19 mm. long, the tube (2.5) 3.0-4.0 (4.5) mm. long, blue, with darker veins, the lower side lighter-colored, with two white or yellow longitudinal spots or streaks, the two upper lobes divergent, erect or recurved, the lower lip usually plane or nearly so; hornlike processes of the apex of the anther-tube 0.6-1.5 mm. long; mature capsule 1-2 mm. in diameter by 35-65 (90) mm. long.

DISTRIBUTION: Southeastern Oregon and southwestern Idaho to northern and western Nevada, mostly at elevations of 1200-1800 m.; southward, often at lower elevations, to the northern end of the interior valley of California.

4b. *Downingia bicornuta* var. *picta* Hoover,
Leaf. W. Bot. 2: 4. 1937.

Flowers and fruit slightly smaller than in var. *bicornuta*; corolla 7–10 mm. long, the tube (1.5) 2.0–2.6 mm. long, with a brownish-yellow spot on upper side, the lower lip strongly concave, the two upper lobes white or pale blue, often tipped with darker blue, not divergent but directed toward each other so that the tips cross, sharply reflexed and appressed to the corolla-tube; hornlike processes of the anther-tube 1.6–2.7 mm. long, often longer than the anthers themselves; mature capsule 0.5–1.5 mm. in diameter by 35–57 mm. long.

TYPE LOCALITY: Seven miles southeast of LeGrand, Merced County, California, Hoover 1083 (herb. Jepson!).

DISTRIBUTION: Great Valley of California, particularly in the San Joaquin Valley.

5. *Downingia cuspidata* (Greene) Greene; Jepson, Fl. W. Middle
Calif. ed. 2. 403. 1911.

Boletia cuspidata Greene, Erythraea 3: 101. 1895.

Downingia pulchella var. *arcana* Jepson, Madroño 1: 100. 1922. (Jepson 6678, herb. Jepson!)

Downingia immaculata Munz & Johnston, Bull. Torrey Club 51: 300. 1924. (Munz 5093, Pomona!)

Downingia pallida Hoover, Leaf. W. Bot. 2: 1. 1937. (Hoover 1042, herb. Jepson!)

Plants few–25 (30) cm. high, entirely glabrous or the hypanthium sparsely scabrous, especially when young; leaves 0.2–2 mm. wide, 3–13 mm. long; inflorescence few–10 (17) cm. long, loosely 1–15- (25-) flowered; flower-bracts linear to broadly elliptic or less often lanceolate, obtuse or subacute, 1–3 (4) mm. wide by 4–10 (13) mm. long, mostly about 3–5 times as long as wide; corolla 7–15 mm. long, glabrous, bright or pale blue or lavender, sometimes white, the tube pale below base of lower lip but sometimes darker at base, the lower lip with a central white area, this with a central or basal yellow spot or two more or less confluent spots, the two upper lobes often darker than the lower and with purplish veins; corolla-tube (2.3) 3.0–4.0 (5.2) mm. long, measured to dorsal sinus 3.0–4.5 (5.0) mm. long, almost cylindrical but slightly expanded distally, the lateral sinuses usually slightly deeper than the dorsal one and cut very slightly (0.5 mm. or less) below the plane of the lower lip; two upper corolla-lobes ovate, acute, slightly divergent or recurved and overlapping in age, 1.0–2.5 mm. wide by (2.5) 3–6 (7) mm. long; lower lip plane or nearly so, with two low, inconspicuous yellow ridges at base, the lobes broadly ovate or oblong, mucronate, rounded to retuse or even obovate; filament-tube (2.0) 2.5–4.0 (4.5) mm. long, glabrous, the filaments united their whole length or nearly so, the summit of the tube mostly exceeded by the base of the dorsal sinus of the corolla, the base of the anther-tube thus included; anther-tube 1.4–2.5 mm. long (the mean about 1.7 mm.), the anthers smooth or sparsely pubescent on the backs, all minutely white-tufted at tip, the three shorter prominently so and each bearing a short hornlike process as well; hypanthium linear, in fruit becoming fusiform, the mature capsule (0.6) 1.0–1.6 (2.0) mm. in diameter by (15) 20–40 (55) mm. in length, the lateral walls tough but the 4 or 5 valves easily separated and marked by conspicuous impressed lines or distinct hyaline slits, the lines or slits evident even in the young condition; calyx-lobes elliptic to oblanceolate, obtuse or rounded, ascending, subequal in length, about 1 mm. wide or less, (1.3) 3–8 (11) mm. in length; seeds lustrous, twisted, the very fine cellular markings running obliquely to the long axis of the seed.

TYPE LOCALITY: "Grain field west of Yountville, Napa Co., Calif. . . . also . . . in Los Guilucos Valley, Sonoma Co." Los Guilucos Valley, Bioletti, June 10, 1893 (Gray!).

DISTRIBUTION: California: Coast Ranges from Humboldt County to San Diego County, at elevations of 450 m. or less; Sierra Nevada foothills, from Calaveras County to Madera County; Egg Lake, Modoc County.

6. *Downingia pusilla* (G. Don) Torr. U. S. Expl. Exped.
17: 375. 1874.

Lobelia pusilla Poeppig; Cham. Linnaea 8: 217. 1833. (Nomen nudum.)

Clintonia pusilla G. Don, Gen. Hist. 3: 718. 1834.

Boletia humilis Greene, Pittonia 2: 226. 1892. (Bioletti, herb. Greene!)

Downingia humilis Greene, Leaflets 2: 45. 1910.

Plants 2–12 cm. high, entirely glabrous or the hypanthium minutely scabrous; stems relatively stout for their height, up to 1.5 mm. in diameter at base; leaves 0.5–1.0 mm. wide

by 4-7 mm. long; inflorescence 2-5 cm. long, 1-7-flowered; flower bracts 1.0-1.5 mm. wide by 2-8 mm. long, 5-7 times as long as wide, elliptic or lanceolate, obtuse; corolla 2.5-4.0 mm. long, glabrous, white or the lower lip blue-tipped, with white center and yellowish patch near base; the tube 1.3-2.0 mm. long, narrowly funnel-shaped, the lateral sinuses cut about as deeply as the dorsal one, the two upper lobes deltoid-lanceolate, about 0.8 mm. wide by 1.2-1.5 mm. long (somewhat recurved?), the lower lip (more or less erect?), not sharply deflexed at base, the three deltoid lobes about 0.8 mm. wide by 1.2 mm. long; filament-tube 1.0-1.8 mm. long, glabrous, the filaments connate nearly their whole length; anther-tube 0.6-1.1 mm. long, the anthers white-apiculate, the two shorter ones with a few bristles and each with a blunt horn-like process at the tip; hypanthium linear, in fruit becoming narrowly ellipsoid or subulate; mature capsule 1.0-1.2 mm. in diameter, 20-27 mm. long, the lateral walls firm and not easily ruptured, the valves appearing as impressed lines or as scarious divisions; calyx-lobes elliptic to linear, blunt-tipped, widest at or near the middle, erect and often appressed, 3-8 mm. long, the two lower ones usually plainly shorter than the others; seeds twisted, the cellular lines markedly oblique to the long axis of the seed; placentae axile, the ovary bilocular.

TYPE LOCALITY: Chile, *Poeppig*.

DISTRIBUTION: Sacramento Valley and San Joaquin Valley, California; Chile, from about latitude 32° southward; southern Argentina.

7. *Downingia pulchella* (Lindl.) Torr. Pacif. R. R. Rep.

4 (Part 5): 116. 1857.

Clintonia pulchella Lindl. Bot. Reg. 22: pl. 1909. 1836.

Bolelia pulchella Greene, Pittonia 2: 126. 1890.

Plants few-25 (40) cm. high, entirely glabrous or the hypanthium sparsely scabrous; leaves 1-2 mm. wide by 4-12 mm. long; inflorescence few-15 (20) cm. long, loosely few-15- (20-) flowered; flower-bracts elliptic to lanceolate or ovate, usually obtuse, 2-7 mm. wide, 8-20 (25) mm. long, usually 3-6 times as long as wide; corolla 8-13 mm. long, glabrous, "deep bright blue," less often pink or pure white, the lower lip with a central white area bearing two yellow spots which pass into low narrow yellow folds at the base of the lip, three dark purple spots alternating with the folds at the base of the lip, the tube purple, (1.5) 2.0-3.0 mm. long, measured to dorsal sinus 2.0-3.0 (3.3) mm., funnel-shaped, with narrow base, the lateral sinuses usually cut slightly deeper than the dorsal; two upper lobes elliptic or oblanceolate, strongly divergent and spreading, acute at tip, 2-3 (4) mm. wide by 6-8 mm. long; lower lip reflexed, the lobes oblong, acute or mucronate, 3.5-5.0 mm. wide by 4.5-6.0 mm. long; filament-tube (2.5) 3.0-4.5 (5.0) mm. long, glabrous, the filaments united their whole length or nearly so; summit of the tube usually considerably exceeding the dorsal sinus of the corolla, the anther-tube thus prominently exerted; anther-tube (2.2) 2.6-3.5 mm. long, attenuate and pointed at tip; anthers glabrous or minutely ciliate on the backs, the two shorter ones minutely white-tufted at tip and each with a slender hornlike process as well; hypanthium linear, in fruit little changed in shape or becoming narrowly subulate or fusiform; mature capsule 1.0-1.5 (2.0) mm. in diameter by 30-75 mm. long, the lateral walls tough and ruptured with difficulty when dry, the valves never apparent; calyx-lobes elliptic, obtuse or rounded at tip, usually rotately spreading in flower and fruit, subequal in length, 0.5-2.0 mm. wide, 3-7 (10) mm. long; seeds shining, not twisted nor lined.

TYPE LOCALITY: California, *Douglas* in 1833 (isotype, Gray!).

DISTRIBUTION: Central California from Monterey and Merced Counties to Colusa County; Lassen County.

ILLUSTRATIONS: Bot. Reg. pl. 1909; Paxton's Mag. Bot. 4: 145; Sweet, Brit. Fl. Gard. II, pl. 412.

8. *Downingia insignis* Greene, Pittonia 2: 80. 1890.

Bolelia insignis Greene, Pittonia 2: 126. 1890.

Plants slender, the stems attaining a maximum diameter of about 2 mm. at base, often somewhat zigzag, (6) 10-24 (30) cm. high, the whole plant glabrous or the capsule sometimes minutely scabrous; leaves 1-2 mm. wide by 5-15 mm. long; inflorescence 4-12 (20) cm. long,

loosely 1-8- (16-) flowered (the mean about 5 flowers), the axis often poorly defined and overtopped by the tips of the capsules even of the lower flowers; flower-bracts 1-5 mm. wide by 6-20 mm. long, mostly about 2-6 times as long as wide, elliptic to ovate, rounded or sometimes subacute; corolla 9-15 mm. long, glabrous, sky-blue (according to Greene), the veins darker, the lower lip with central white area (this sometimes with two oblong parallel green spots), and two low golden-yellow folds in a field of dark violet-purple, or the latter reduced to three purple spots at the summit of the tube; corolla-tube (3.0) 3.5-5.0 mm. long, measured at dorsal sinus 4.5-6.0 mm., broadly funnellform (campanulate according to Greene), the lateral sinuses deeper than the dorsal one; two upper lobes ascending and parallel, elliptic, acute, 2-3 mm. wide by 6-10 mm. long; lower lip concave, usually exceeded in length by the two upper corolla-lobes, not reflexed, not forming an angle with the tube, the three lobes oblong to ovate, acute or mucronate, 2.5-7.0 mm. long; filament-tube (7.0) 9.0-10.5 (11.5) mm. long, glabrous, the filaments united very nearly their whole length; anther-tube 2.4-3.0 (3.5) mm. long, 1.0-1.3 mm. in diameter, usually strongly incurved and standing about at right angles to the filament-tube; anthers a dirty white in color, the cells hardly darker than the connectives, all the anthers minutely granular-roughened over the whole surface, the two shorter anthers white-tufted at tip, each with a short hornlike process in addition; hypanthium linear, enlarged in fruit, the mature capsule terete or slightly angled, linear or narrowly subulate, usually strongly appressed, 0.8-1.5 (2.0) mm. in diameter by (25) 45-80 mm. in length; lateral walls tough when dry and ruptured with difficulty, with no evidence of impressed or scarious valves; calyx-lobes elliptic, obtuse or rounded, ascending, 1-2 (3) mm. wide by 3-8 (12) mm. long, usually broadest about the middle; seeds not twisted.

TYPE LOCALITY: Fields of the lower Sacramento Valley near Elmira, Solano County, California, Greene (herb. Greene!).

DISTRIBUTION: Great Valley of California, from Stanislaus County northward; Lassen and Modoc Counties, California; Washoe County, Nevada.

ILLUSTRATION: Bot. Mag. pl. 6257.

9. *Downingia laeta* (Greene) Greene, Leaflets 2: 45. 1910.

Boelia laeta Greene, *Erythraea* 1: 238. 1893.

Boelia brachyantha Rydb. Mem. N. Y. Bot. Gard. 1: 483. 1900. (*Williams 712*, NY!)

Downingia brachyantha Nelson & Macbr. Bot. Gaz. 55: 382. 1913.

Plants few-20 (30) cm. high, entirely glabrous; leaves 0.5-2.0 mm. wide by 5-18 (25) mm. long; inflorescence few-10 cm. long, rather closely 1-10-flowered; flower-bracts elliptic to lanceolate or ovate, obtuse or subacute, 1-4 mm. wide by 7-22 mm. long, usually 3-6 (8) times as long as wide; corolla 4-7 mm. long, glabrous, light blue or purplish, the lower lip with central area white or yellow and with a transverse band of purple at base, this sometimes reduced to two or three purple spots, the tube yellow on lower side below the purple area, (1.0) 1.3-1.6 (2.0) mm. long, measured at dorsal sinus (1.1) 1.5-2.0 mm., funnellform, the lateral sinuses cut about as deeply as the dorsal one or very slightly deeper; two upper lobes ascending (?), lanceolate or triangular, acute, 1-2 mm. wide, 2.0-4.5 mm. long; lower lip concave (?), not reflexed nor forming a sharp angle with the tube, the three lobes oblong, acute, 1.5-3.5 mm. long; filament-tube 1.8-2.5 (2.8) mm. long, glabrous, the filaments united their whole length or nearly so; anther-tube 1.3-2.0 (2.2) mm. long, little or not at all incurved, its long axis nearly or quite parallel with that of the filament-tube; anthers glabrous or ciliate on the backs, the two shorter ones white-tufted at apex and each with a slender hornlike process as well; hypanthium linear, in fruit becoming narrowly subulate or fusiform, terete, bilocular, the placentae axile; mature capsule 1.0-2.0 mm. in diameter by 21-43 mm. in length; lateral walls thin but rather tough and tardily dehiscent, the valves inconspicuous, sometimes appearing as faintly impressed lines; calyx-lobes elliptic, rounded to subacute at tip, 1-2 mm. wide, (2.5) 3-7 (9) mm. long, ascending; seeds not at all or very slightly twisted.

TYPE LOCALITY: Humboldt Wells, Elko County, Nevada, Greene, July 6, 1893 (herb. Greene!).

DISTRIBUTION: Southwestern Saskatchewan to southwestern Wyoming, south-central Oregon, northeastern California, and western Nevada.

10. *Downingia montana* Greene, Pittonia 2: 104. 1890.*Bolelia montana* Greene, Pittonia 2: 127. 1890.*Downingia bicornuta* var. *montana* Jepson, Madroño 1: 102. 1922.

Plants few-15 cm. high, slender, entirely glabrous or the hypanthium minutely scabrous; upper part of the stem rarely minutely scabrous; leaves linear to elliptic or subulate, sometimes few-toothed, 0.3-1.0 (1.5) mm. wide by (2) 5-13 (18) mm. long, acute to attenuate; inflorescence 3-12 cm. long, loosely 1-10-flowered; flower-bracts similar to the leaves but slightly larger, often toothed, 0.8-1.5 mm. wide by 8-16 mm. long, 8-13 times as long as wide; corolla 9-12 mm. long, glabrous, the lobes of the lower lip light blue or violet, the central part of lip white, the base dark bluish-purple, with two prominent purple folds at the angle, the tube blue becoming violet, the lower side within with two greenish yellow ridges alternating with three purple grooves, the central part of the lower lip usually appearing bright yellow in dried material; corolla-tube 3.3-5.0 mm. long, narrowly funnel shaped, often nearly cylindrical below and expanded near the summit, the lateral sinuses extending well below the angle of the lower lip, cut more deeply than the dorsal by a distance of from 0.5-1.0 mm.; two upper corolla-lobes narrowly triangular, erect, usually concealing the anther-tube (in dried material), 4.0-5.5 mm. long, sometimes minutely roughened on the margins near tips; filament tube 3-4 (4.7) mm. long, its apex usually not surpassing the dorsal sinus of the corolla, the filaments connate nearly their whole length, glabrous or very minutely pubescent on the margins at base; anther-tube 1.7-2.2 mm. long, all 5 anthers prominently bearded at tip, the two shorter ones with stiff tufts of bristles and each with a short hornlike process as well; hypanthium linear, becoming narrowly subulate in fruit, the mature capsule 0.6-1.5 mm. in diameter by 15-35 (45) mm. long, the lateral walls firm, usually with three evident hyaline valves, these apparent as impressed longitudinal lines at an early stage; calyx-lobes linear-subulate or very narrowly elliptic, acute, sometimes scabrous-ciliate on the margins, the two lower ones usually conspicuously shorter than the others, all ascending, often appressed in anthesis, (2) 4-8 (11) mm. long; seeds not twisted, the surface scarcely lustrous, the fine longitudinal markings easily visible with a magnification of about 20 diameters.

TYPE LOCALITY: Lake Eleanor, Tuolumne County, California, *Drew*, June 1889 (herb. Greene!).

DISTRIBUTION: Western slopes of the Sierra Nevada, California, from Tuolumne County to Siskiyou County.

11. *Downingia Yina* Appleg. Contr. Dudley Herb. 1: 97. 1929.

Plants (3) 10-35 cm. high, often diffusely branched from the base, entirely glabrous or the hypanthium scabrous; leaves 0.5-2 mm. wide, (3) 8-23 mm. long; inflorescence few-15 (25) cm. long, with few-35 flowers; flower-bracts narrowly elliptic or lanceolate to ovate, usually acute, (1) 2-7 mm. wide, 6-27 mm. long, 3-8 times as long as broad; the corolla 7-12 (16) mm. long, glabrous, lavender to deep bright blue, the lower lip with a central yellow area surrounded by white except at base, where the yellow is continued over two low ridges into the tube, three purplish patches (which may be faint or entirely wanting), alternating with these ridges, which are parallel to the long axis of the tube, the tube about the same color as the limb, or lighter-colored on the ventral side, (3.2) 3.5-6.5 mm. long, measured to dorsal sinus 4-6.5 mm. long, nearly cylindrical but slightly dilated distally, the lateral sinuses usually slightly deeper than the dorsal one and cut very slightly below the plane of the lower lip; two upper corolla-lobes acute, linear-lanceolate or linear-oblanccolate, rarely broader, slightly divergent, erect or somewhat curled backward, 1-1.5 (2.2) mm. wide, (4) 5-7 mm. long; lower lip plane or slightly concave, the lobes oblong to obovate, rounded and mucronate; filaments connate their whole length or nearly so; base of anther-tube usually covered by dorsal side of corolla-tube, the anthers somewhat pubescent on the backs; ovary unilocular; placentae parietal; central septum none.

TYPE LOCALITY: Four Mile Lake, Klamath County, Oregon, *Applegate 4479* (Stanford U.).

Valves of the capsule separated by hyaline lines extending the length of the capsule, these visible as impressed lines even before maturity; mature capsule terete, linear or fusiform, broadest about the middle; plants 10 cm. high or less, diffusely branched from the base; range from northern Siskiyou Co., Calif., to Klamath Co., Ore.

11a. *D. Yina* var. *Yina*.

Valves of the capsule usually invisible before splitting, with no impressed lines nor hyaline divisions on hypanthium; mature capsule subulate, broadest near base; plants up to 35 cm. high, usually erect; range from Humboldt Co., Calif., north to Washington, mostly west of the Cascade Ranges.

11b. *D. Yina* var. *major*.

11a. *Downingia Yina* var. *Yina* McVaugh, var. nov.

Downingia Yina Appleg. loc. cit., as to type.

Corolla usually 8–10 mm. long, the tube 3.5–4.5 mm. long; filament-tube 2.5–3.5 mm. long; anther-tube 1.6–2 mm. long, the short anthers white-tufted at tip and each with a short hornlike process as well; longer anthers scarcely tufted at tips; hypanthium in fruit becoming fusiform, terete, not conspicuously twisted, broadest about the middle, about 1.5 mm. in diameter, 20–25 mm. long; lateral walls thin and easily fractured, the three valves separated by thin hyaline divisions; calyx-lobes elliptic to subulate, acute, up to about 1 mm. wide by 6 mm. long; seeds not twisted, unlined, dull or slightly lustrous.

DISTRIBUTION: Cascade Ranges of southern Oregon and northern California.

11b. *Downingia Yina* var. *major* McVaugh, var. nov.

Downingia willamettensis M. E. Peck, Proc. Biol. Soc. Wash. 47: 187. 1934.

Downingia pulcherrima M. E. Peck, Proc. Biol. Soc. Wash. 50: 94. 1937. (Peck 18919, Willamette U.)

Corolla usually 7–12 mm. long, the tube usually 3.5–5.5 (6.5?) mm. long; filament-tube 2–4 (5) mm. long; anther-tube (1.7) 2–2.5 (3.1) mm. long, the two short anthers prominently white tufted at tips and each bearing a short hornlike process as well; hypanthium linear, in fruit becoming subulate, usually somewhat angled, upcurved distally, usually prominently twisted near base; mature capsule 1–1.5 (2) mm. in diameter, 20–40 (50) mm. long, the lateral walls thin and papery, the three valves usually invisible before splitting, with no impressed lines nor hyaline divisions on the hypanthium; calyx-lobes linear to narrowly elliptic, usually strongly ascending and acute, mostly of two distinct lengths, 1.5 mm. wide or less, (2,7) 4–8 mm. long; seeds usually shining as if varnished, untwisted, unlined (at least without lines visible at a magnification of 20 diameters).

TYPE LOCALITY: (of *Downingia willamettensis*): Two miles east of Aumsville, Marion County, Oregon, Peck 16291 (Willamette U.).

DISTRIBUTION: Central and western Washington, south to Humboldt County, California, mostly west of the Cascade Ranges.

12. *Downingia elegans* (Dougl.) Torr. U. S. Expl. Exped.

17: 375. 1874.

Clintonia elegans Dougl.; Lindl. Bot. Reg. 15: pl. 1241. 1829.

Plants mostly 10–40 (50) cm. high, glabrous except for the scabrous hypanthium; stems mostly stoutish, sometimes 4 mm. in diameter at base; leaves 0.2–4 (6) mm. wide by 5–25 mm. long; inflorescence few–20 (30) cm. long, loosely or closely few–25- (50-) flowered (the mean about 10 flowers), the axis well-marked and straight, usually much overtopping the early flowers; flower-bracts elliptic to lanceolate or ovate, (1) 2–9 mm. wide by (6) 8–26 mm. long, usually 3–6 times as long as wide; corolla glabrous, minutely roughened within at base, "blue," "wisteria blue," "deep navy blue," varying to "lavender-pink" or pure white, the lower lip with a central white spot, this marked near base by two low yellow ridges which are distinctly white-margined, the tube lighter, with purple veins and often with three oblong purple blotches at very base on the lower side, broadly funnellform (campanulate according to Jepson), the lateral sinuses usually much deeper than the dorsal; two upper lobes ascending and somewhat divergent, acute, lanceolate or elliptic, 1.0–2.5 mm. wide by 3.5–13 mm. long; lower lip concave, in length somewhat exceeded by the two upper lobes, not reflexed nor forming an angle with the tube, the three lobes parallel, in shape oblong, ovate, or deltoid, acute, 2–4 mm. long; filament-tube glabrous, the filaments united their whole length; anther-tube 0.6–1.0 mm. in diameter, usually strongly incurved and often standing at right angles to the filament-tube; anthers bluish-gray with white connectives, these forming (usually) conspicuous longitudinal

bands; surface of anthers smooth and glabrous or few-ciliate, not scabrous nor granular-roughened; the two shorter anthers white-tufted at tip, each with a short, usually recurved, hornlike process as well; hypanthium linear, in fruit becoming subulate, the mature capsule broadest near the base, (1.0) 1.5–2 mm. in diameter by (15) 25–45 (55) mm. in length, terete or somewhat angled at maturity; lateral walls papery and easily ruptured when dry, splitting along longitudinal lines but with no evidence of impressed or hyaline divisions; calyx-lobes linear or elliptic, broadest about the middle, obtuse or subacute, 1.0–2.5 mm. broad by (3) 4–10 (14) mm. long, ascending; seeds shining, not lined nor twisted.

TYPE LOCALITY: "Plains of the Columbia, near Wallawallah R., and near the head springs of the Multnomah," Douglas.

Filament-tube 4.5–10.5 mm. long; corolla 8–18 mm. long.

12a. *D. elegans* var. *elegans*.

Filament-tube less than 4.5 mm. long; corolla 5–9 mm. long.

12b. *D. elegans* var. *brachypetala*.

12a. *Downingia elegans* var. *elegans* McVaugh, Mem.

Torrey Club 19⁴: 51. 1941.

Clintonia elegans Dougl.; Lindl. loc. cit., as to type.

Gymnopsis flexuosa Raf. Herb. Raf. 48. 1833. (Nomen nudum.)

Clintonia corymbosa A. DC. in DC. Prodr. 7: 347. 1839. (Douglas in 1830, herb. DC., photo!)

Downingia elegans Torr. U. S. Expl. Exped. 17: 375. 1874.

Boletia elegans Greene, Pittonia 2: 126. 1890.

Downingia corymbosa Nelson & Macbr. Bot. Gaz. 55: 382. 1913.

Downingia elegans f. *rosea* St. John, Res. Stud. State Coll. Wash. 1: 105. 1929. (St. John 9627; isotype, Gray!)

Corolla 8–13 (18) mm. long, the tube (1.5) 2.0–3.2 (4.3) mm. long (measured to lateral sinuses) and (3.3) 4.0–5.5 mm. long (measured to dorsal sinus); filament-tube (4.5) 6.0–8.0 (10.5) mm. long; anther-tube (2.2) 2.5–3.5 (4.0) mm. long.

DISTRIBUTION: Northern Idaho and northeastern Washington, south in the mountains to Elko County, Nevada, and Plumas and Humboldt Counties, California.

12b. *Downingia elegans* var. *brachypetala* (Gand.) McVaugh,

Mem. Torrey Club 19⁴: 55. 1941.

Downingia brachypetala Gand. Bull. Soc. Bot. Fr. 65: 55. 1918.

Corolla 5–9 mm. long, the tube 1.5–2.5 (3.5) mm. long, measured to dorsal sinus 3.6–4.0 mm.; filaments 3–4 mm. long; anther-tube 2.0–2.5 mm. long; capsule apparently slightly broader in proportion to its length than in var. *elegans*.

TYPE LOCALITY: Falcon Valley, Kliekita County, Washington, Snksdorf 2762 (isotype, Gray!).

DISTRIBUTION: Lake and Mendocino Counties, California, and northward along the Cascade Ranges to southern Washington; rarely in northeastern California and northern Idaho.

7. PORTERELLA Torr. Rep. U. S. Geol. Surv. Terr. 5: 488. 1872.

Plants annual. Flowers inverted; corolla-tube entire, not cleft dorsally. Filaments and anthers connate, two of the anthers shorter than the others. Fruit capsular, bilocular, apically dehiscent. Seeds numerous, smooth, apiculate. Chromosome number, $n = 12$.^{*}

Type species, *Lobelia carnosula* H. & A.

1. *Porterella carnosula* (H. & A.) Torr. Rep. U. S.

Geol. Surv. Terr. 5: 488. 1872.

Lobelia carnosula H. & A. Bot. Beech. Voy. 362. 1838.

Laurentia carnosula Benth.; A. Gray, Bot. Calif. 1: 444. 1876.

Porterella eximia A. Nelson, Bull. Torrey Club 27: 270. 1900. (Nelson 6544, Rocky Mt. herb.!).

Laurentia eximia A. Nelson in Coult. & Nels. Man. 475. 1909.

Stems erect, simple or with few lateral branches, rarely diffuse and bushy, somewhat fleshy, very slender or stoutish, the maximum diameter at base about 4 mm.; entire plant smooth and glabrous, green, few 32 cm. high, occasionally with mature fruit when no more than 1.5 cm. high; cauline leaves few-20, soft and lax, early deciduous and often not persistent

* McVaugh 6282, from Adel, Lake County, Oregon.

until flowering time, usually narrower than the flower-bracts, the blades sessile, entire or rarely sinuate in luxuriant specimens, linear-subulate or rarely lanceolate, 1-2 (4) mm. wide, (4) 10-20 (30) mm. long, the tip acute to attenuate or almost capillary; roots slender, fibrous; stem, in wet places, continued downward as an erect rootstock with roots at several nodes, plainly corky-parenchymatous below; inflorescence 6-20 cm. long (correspondingly less in dwarfed plants), loosely 1-15- (25-) flowered; pedicels ebracteolate, spreading-ascending, slender (maximum diameter about 0.5 mm.), 5-20 (35) mm. long in fruit, expanded gradually into the base of the capsule, straight or arcuate; flower-bracts linear to ovate, similar to the foliage leaves but usually broader and often longer than these, 1-4 mm. wide by 4-18 (27) mm. long, mostly 2.5-6 times as long as wide; flower (9) 13-18 (20) mm. long, including hypanthium, with an odor said to resemble that of the cultivated heliotrope; corolla strongly zygomorphic, blue (rarely all white), with yellow or whitish eye and two folds at base of lower lip, the tube linear or slightly enlarged distally, its long axis slightly oblique to that of the hypanthium, (3.5) 4.5-6 mm. long, the two upper lobes erect, elliptic, 1.0-2.5 mm. wide, 3.5-5.5 mm. long, the lobes of the lower lip elliptic or obovate, apiculate, 2-6 mm. wide, 4.5-9 mm. long; filaments 3-6 (7) mm. long, coherent their whole length into a tube, free from the corolla; anther-tube 1.5-2.6 mm. long, gray, all five anthers minutely white-tufted at tip, the two shorter ones plainly so, and with short hornlike processes in addition; hypanthium in anthesis narrowly obconic or turbinate, in fruit becoming turbinate or cylindrical, long-acute and usually slightly oblique at base, (1.5) 2-3 mm. in diameter; ovary inferior or essentially so; placentation axile; capsule opening by apical loculicidal valves, (5) 7-10 (16) mm. long, wholly inferior or with 1-2 mm. of the tip not adherent to the hypanthium; calyx-lobes linear, varying to narrowly triangular or elliptic, entire, rounded or subacute at tip, about 1 mm. wide (rarely as much as 2.5 mm.), 3-8 (11) mm. long; seeds fusiform, light brown with minutely dark-apiculate tips, slightly lustrous, about 1 mm. long.

TYPE LOCALITY: "Blackfoot River, Snake Country" (southeastern Idaho), *Tolmie* (NY!).

DISTRIBUTION: Northwestern Wyoming to southeastern Oregon, south in the mountains to northern Utah, Coconino County, Arizona, northern Nevada, and Tulare County, California.

8. *DIASTATEA* Scheidw. *Allg. Gart.* 9: 396. 1841.

Stems erect, simple or with few to many ascending subordinate lateral branches from the basal half. Plants annual, with branched fibrous roots. Leaves cauline, membranaceous or chartaceous in dried material, the upper and middle ones largest and acutely pointed, the lower ones decreasing in size downward and the lowest often obtuse or rounded. Racemes slightly to strongly secund, loosely flowered (flowers usually 1 cm. apart on the axis, or more). Pedicels ebracteolate, filiform, spreading-ascending, often upwardly curved or bent distally so that the mature capsule is erect or nearly so. Flower-bracts foliaceous, the lowest similar to the upper leaves in size and shape, the upper narrower, the uppermost linear. Flower inverted in anthesis. Corolla glabrous, purplish-blue. Tube in anthesis narrowly cylindrical (except in *D. expansa*), entire, not cleft dorsally, the dorsal sinus about as deep as the lateral ones. Tube much stretched by the expanding capsule and becoming at length scarious and hyaline. Upper lobes (the two opposite the three larger anthers) oblanceolate or with an elliptic blade and a long claw, mostly with an expanded deltoid base. The three lower lobes fused into a distinct lip, this more or less abruptly flexed and bituberculate at base. Filaments equaling or slightly exceeding the corolla-tube, connate distally a part of their length, distinct at base and there loosely adherent to the corolla-tube. Anther-tube bluish-gray; two of the anthers shorter than the others and minutely white-tufted at tip; three larger anthers mostly glabrous. Hypanthium in anthesis broadly cup-shaped, varying to flattish or to obconic, glabrous, or roughened at base, much exceeded by the ovary, in fruit nearly unchanged or becoming obconic or turbinate. Capsule superior or nearly so, inclosed by the stretched persistent corolla, not more than one-fifth of its length contained in the calyx-tube (rarely nearly one-half its length in exceptional individuals of *D. tenera*), bilocular, dehiscing loculicidally by apical valves. Placentae axile. Seeds many, light-brown, ellipsoid, smooth and shining, 0.5-0.6 mm. in length.

Type species, *Diastatea virgata* Scheidw.

Corolla-tube narrowest at base and much enlarged distally; filaments 4.0-4.5 mm. long; middle and upper leaves lanceolate or narrowly elliptic, 4-8 times as long as wide, 0.3-0.4 cm. wide.

Corolla-tube (in anthesis, before being swollen by the expanding capsule) linear, narrowly cylindrical, not at all enlarged distally.

Middle cauline leaves linear or narrowly elliptic, 0.1-0.25 cm. wide; filaments 6.0-7.5 mm. long (rarely 5-9 mm.); calyx-lobes glabrous, entire or toothed, 1.0-3.5 mm. long.

Middle cauline leaves linear-lanceolate or broader, 0.3-4.0 cm. wide; if less than 1 cm. wide, the filaments 3.0-4.8 mm. long.

Filaments 3.0-4.8 mm. long; flower, including hypanthium, 4.5-10 mm. long.

Calyx-lobes strongly prickly-ciliate on margins, 0.5-1.0 mm. wide at base, 4.0-6.0 mm. long; pedicel usually plainly scabrous as seen under a lens; capsule 2.5-3.5 mm. in diameter; flower-bracts linear or nearly so, mostly strongly appressed to the stem; pubescence mostly confined to the wing-like angles of the stem.

Calyx-lobes glabrous or sparingly ciliate, rarely as much as 0.5 mm. wide at base, 1.5-3.5 (rarely 5.5) mm. long; pedicel smooth and glabrous; capsule 1.5-2.5 mm. in diameter; flower-bracts not appressed, the lower lanceolate or broader; pubescence evenly distributed around the terete or angled stem.

Filaments 7.5-11 mm. long; flower, including hypanthium, 12-22 mm. long.

1. *D. expansa*.

4. *D. tenera*.

3. *D. costaricensis*.

2. *D. micrantha*.

5. *D. virgata*.

1. *Diastatea expansa* McVaugh, Bull. Torrey Club 67: 787. 1940.

Stems simple or with a few weak side branches, slender (1 mm. in diameter at base), purplish below, 20-25 cm. high, glabrous, minutely scabrous on the somewhat winged angles; leaves 8-14, thin, glabrous, spreading or somewhat appressed, the middle and upper ones elliptic or lanceolate, acute at tip, acute or rounded at base, sessile, 0.3-0.4 cm. wide by 1.3-2.5 cm. long, the margins finely and regularly serrate with 5-7 prominent teeth per cm., the lower ones smaller and relatively broader, the lowest obtuse, suborbicular, subpetiolate, about 0.3 by 0.3 cm.; inflorescence weakly secund, few-11-flowered, few-11 cm. long; pedicels ascending (in flower), up to 11 mm. long in flower, smooth and glabrous; flower-bracts leafy (except sometimes the uppermost), elliptic or lanceolate to linear, the lower ones 0.4-0.5 cm. wide by 1.8-2.5 cm. long; flower 8.5-9.5 mm. long, including hypanthium; corolla purplish-blue (when dried), the tube 4.0-4.5 mm. long, slightly gibbous at base on lower side (in line with the two smaller anthers), narrowest at base and gradually expanded distally, the two upper lobes oblanceolate, 1-1.3 mm. wide by 4-5 mm. long, the lobes of the lower lip elliptic, 2-2.5 mm. wide by 4 mm. long; filaments 4.0-4.5 mm. long; anther-tube 1.3-1.5 mm. long; hypanthium in anthesis conic or shallowly cup-shaped, glabrous, 1 mm. long or less; ovary fusiform, 3 mm. long in anthesis; fruit not seen; calyx-lobes linear-lanceolate, acute, glabrous with 1 or 2 minute teeth on each edge, 2.5-3.5 mm. long; seeds not seen.

TYPE LOCALITY: Cortera, Dist. Temascaltepec, Mexico (state), at 1230 m. elevation, *Hinton 2644* (Gray!).

DISTRIBUTION: Known only from the type locality.

2. *Diastatea micrantha* (H. B. K.) McVaugh, Bull. Torrey Club 67: 143. 1940.

Lobelia micrantha H. B. K. Nov. Gen. & Sp. 3: 316. 1819.

Lobelia subtilis H. B. K. Nov. Gen. & Sp. 3: 317. 1819. (Type from Ecuador, *Humboldt & Bonpland*.)

Lobelia ruderalis Willd.; R. & S. Syst. Veg. 5: 56. 1819. (Type from "Peru," *Humboldt & Bonpland*.)

Lobelia Draba Willd.; R. & S. Syst. Veg. 5: 67. 1819.

Rapuntium micranthum Presl, Prodr. Mon. Lob. 25. 1836.

Rapuntium subtile Presl, Prodr. Mon. Lob. 25. 1836.

Lobelia parviflora Mart. & Gal. Bull. Acad. Brux. 9: 41. 1842. (*Galeotti 1970*, Brux.)

Lobelia minutiflorum Kunze, Linnaea 16: 318. 1842. (Based on a cultivated plant.)

Isaentia ovalifolia B. L. Robinson, Proc. Am. Acad. 26: 166. 1891. (*Pringle 2985*, Gray!)

Isaentia michoacana var. *ovalifolia* B. L. Robinson, Proc. Am. Acad. 26: 167, as syn. 1891.

Laurentia michoacana B. L. Robinson, Proc. Am. Acad. 26: 167, as syn. 1891.

Lobelia Turekheimii Vatke, B. L. Robinson, Proc. Am. Acad. 26: 167, as syn. 1891.

Dortmannia micrantha Kuntze, Rev. Gen. 972. 1891.

Dortmannia minutiflora Kuntze, Rev. Gen. 972. 1891.

Dortmannia parviflora Kuntze, Rev. Gen. 973. 1891.
Laurentia micrantha Zahlbr. Bull. Torrey Club 24: 386. 1897. Not *Laurentia micrantha* A. DC. 1839.
Laurentia pedunculata Brand. Univ. Calif. Publ. Bot. 6: 73. 1914. (*Purpus* 6705, U. of Calif.)
 ? *Laurentia Maximiliana* F. E. Wimmer, Repert. Sp. Nov. 38: 78. 1935. (*Schultze*, herb. Berlin.)
Laurentia micrantha var. *longibracteata* F. E. Wimmer, Revista Sudam. Bot. 2: 104. 1935.
Laurentia micrantha var. *ovatifolia* F. E. Wimmer, Field Mus. Publ. Bot. 13: 476. 1937.

Stem simple or with many ascending branches, very slender to somewhat coarse (maximum size about 3 mm. in diameter at base), green, or purplish below, or sometimes purple throughout, few-50 (75) cm. high, chaffy-pubescent, especially below, or varying to practically glabrous; hairs, when present, nearly uniformly distributed around the terete or angled stem, flaccid and collapsed when dried; plants exceedingly variable in size and pubescence; leaves mostly about 10 on the main stem, the middle and upper ones lanceolate to ovate, acute at tip, narrowed to a margined petiole or a distinct slender petiole as much as 1.3 cm. long, the blades less often sessile, usually 1-2 times as long as broad, up to 2.2 cm. wide by 5.5 cm. long, chartaceous or membranaceous, the pubescence, when present, mostly concentrated near margin, on veins of lower surface, and on upper surface near base, the margin variously serrate with the principal serrations mostly sharp and 5-6 per cm., but sometimes sinuate or coarsely jagged-toothed, or minutely serrulate with as many as 12 teeth per cm., the lower leaves smaller, ovate to orbicular, mostly obtuse and petiolate; inflorescences often somewhat secund, the principal one few-25- (30-) flowered, few-25 (30) cm. in length; pedicels 6-27 (42) mm. long in fruit, the distal end often upcurved in fruit, smooth and glabrous (less often ciliate or chaffy-hirsute); lower flower-bracts lanceolate, resembling reduced leaves; upper bracts narrower, linear to filiform, toothed; lower bracts 0.2-1.5 cm. wide by 1.0-3.5 cm. long; upper ones 0.3-1.5 cm. long; flower 4.5-6.5 (8) mm. long, including hypanthium; corolla dark purplish-blue to pale lilac, pale blue, or white, the tube 2.5-4.0 mm. long, the two upper lobes broadly triangular, about 1.5 mm. long, the lobes of the lower lip rounded-spatulate, about 1 mm. broad by 2 mm. long; filament-tube (3.0) 3.5-4.0 (4.5) mm. long; anther-tube (0.5) 0.7-1.1 (1.3) mm. long, the three larger anthers glabrous or somewhat pubescent; hypanthium in anthesis cup-shaped, mostly glabrous, in fruit becoming conic, slightly higher than broad, 0.5-1 mm. high; capsule narrowly ellipsoid, 1.5-2.5 mm. in diameter by 3-6 (8) mm. long (average size 2 by 5 mm.); calyx-lobes linear, usually less than 0.5 mm. in width at base, acute or attenuate, entire or ciliate-toothed, 1.5-3.5 (5.5) mm. long; seeds about 0.5 mm. in length.

TYPE LOCALITY: Ecuador ("in Regno Quitensi, prope pagum Puenbo, alt. 1300 hex."), *Humboldt & Bonpland* (Field Mus. Neg. 9110).

DISTRIBUTION: Mostly at elevations of 1000 to 2700 m., San Luis Potosí and Jalisco to Peru and Bolivia.

3. *Diastatea costaricensis* McVaugh, Bull. Torrey Club

67: 789. 1940.

Laurentia irazuensis F. E. Wimmer; Standl. Field Mus. Publ. Bot. 18: 1415. 1938. Not *Lobelia irazuensis* Planch. & Oerst. 1857.

Stem simple or with few-many ascending branches, 0.5-2 mm. in diameter at base, usually purplish at least at base, few-34 cm. high, usually somewhat wing-angled below the decurrent leaf-bases; pubescence of subrigid chaffy hairs, mostly confined to the wing-angles of the stem, especially the basal portion, some of the hairs, at least the shortest ones, usually remaining erect and not collapsed in dried specimens; leaves mostly about 10 on the main stem, papery, somewhat appressed, the middle and upper ones lanceolate to linear-lanceolate, acute or attenuate at tip, narrowed to a sessile cuneate base, the lower ones smaller and relatively broader, acute or obtuse at tip, sessile or subpetiolate, the pubescence of all leaves mostly confined to the margin, to the veins of the lower surface, and to the base of the blade on the upper surface, the margin finely but somewhat irregularly serrate with 4-8 teeth per cm., the blades 0.3-0.6 cm. wide by 1.0-2.5 cm. long, those of the lowest leaves as small as 0.2 by 0.3 cm., the upper and middle blades mostly 3-4.5 (6) times as long as wide; inflorescences usually plainly secund, the principal one 5-16 cm. in length, few-13-flowered; pedicels 4-16 mm. long in fruit, usually plainly scabrous under a lens, the distal end usually strongly upcurved in fruit, so that the capsule is erect; flower-bracts narrowly elliptic to linear, all appressed to the axis, usually

strongly so, the lower resembling reduced leaves, 0.2-0.4 cm. wide by 1.0-2.7 cm. long; flower 5-7 mm. long, including hypanthium; corolla blue-purple or violet, the tube cream-yellow within (according to Austin Smith), 3-4 mm. long, the two upper lobes broadly triangular, 1.3-1.5 mm. long, the lobes of the lower lip rounded-spatulate, about 1 mm. broad by 1.5 mm. long; filaments 3.5-4.0 mm. long; anther-tube 0.9-1.1 mm. long, the three larger anthers minutely pubescent; hypanthium glabrous, about as broad as high, 0.8-1.1 mm. high; capsule broadly ellipsoid, 2.5-3 mm. in diameter by 5.0-6.5 mm. long; calyx-lobes narrowly triangular, usually plainly tapering from base to apex, 0.5-1.0 mm. wide at base, strongly prickly-ciliate on margins, 4-6 mm. long; seeds about 0.5 mm. in length.

TYPE LOCALITY: Near San José, Costa Rica, *Oersted 9238* (Copenhagen!).

DISTRIBUTION: Southern Guatemala to Costa Rica, at elevations of 800-2400 m.

4. *Diastatea tenera* (A. Gray) McVaugh, Bull. Torrey Club 67: 143. 1940.

Palmerella tenera A. Gray, Proc. Am. Acad. 22: 433. 1887.

Lobelia Palmeri Greene, Pittonia 1: 297. 1889. (Based on *Palmerella tenera* A. Gray.)

Laurentia pinetorum Brand. Univ. Calif. Publ. Bot. 4: 92. 1910. (*Purpus 3665*, U. of Calif.!).

Stem simple or with few subordinate side branches from the lower part, slender, usually not exceeding 1 mm. in diameter at base, purplish at least below, few-30 (64) cm. high, glabrous or minutely scabrous-puberulent, scabrous below on the angles; leaves usually 6-8, thin, glabrous, somewhat appressed, the middle and upper ones linear or narrowly elliptic, acute at both ends, sessile, 0.1-0.25 cm. wide by 0.8-3.5 cm. long, the margins finely and shallowly serrulate with about 4 teeth per cm., the lower leaves smaller and relatively broader, obtuse or acute, mostly 0.2-0.4 cm. wide by 0.3-0.8 cm. long, sessile, or less often subpetiolate; inflorescence usually strongly secund, few-15 (32) cm. long, loosely 1-10- (20-) flowered; pedicels usually arcuate (sometimes abruptly upcurved near tip) so that the mature capsule is erect or nearly so, often somewhat thickened beneath the hypanthium and merging imperceptibly with it, 6-20 (48) mm. long, smooth and glabrous; flower-bracts (except occasionally the lowest) linear, resembling reduced leaves, 1-2 mm. wide by 5-15 (20) mm. long; flower 10-16 mm. long, including hypanthium; corolla purplish-blue (purple or deep lilac according to Mexico), with white or yellowish eye, the lower lip bituberculate at base, the tube narrowly cylindrical, not expanded above (the lobes flaring abruptly), slightly gibbous at base on lower side (in line with the two shorter anthers), 5-7.5 (8) mm. long, the two upper lobes linear-spatulate, 1.0-1.5 mm. wide by 3.5-5 mm. long, the lobes of the lower lip obovate, rounded or truncate at tip, mucronate, 1.5-2.5 (4) mm. wide by 4-7 mm. long; filaments (5) 6-7.5 (9) mm. long; anther-tube (0.8) 1.0-1.3 (1.5) mm. long, the three larger anthers minutely puberulent or glabrous; hypanthium usually oblique, glabrous, becoming conic or turbinate in fruit, as long as or longer than broad, 1.0-1.5 (3) mm. high; capsule 1.5-2.5 (3.5) mm. in diameter by 5-7 (8) mm. long; calyx-lobes linear to elliptic or lanceolate, acute at tip, glabrous, with 1 or 2 minute teeth on each edge or less often entire, (1.0) 1.5-3 (3.5) mm. long; seeds about 0.5 mm. in length.

TYPE LOCALITY: Rio Blanco, Jalisco, *Ed. Palmer 552*, Sept. 17-23, 1886 (Gray!).

DISTRIBUTION: Jalisco to Puebla and Guerrero, at elevations of 1400-2600 m.

5. *Diastatea virgata* Scheidw. Allg. Gart. 9: 396. 1841.

Stems simple or with few-many branches, sometimes with much-branched bushy habit, green or purplish at base, sometimes more than 2.5 mm. in diameter at base, 12 to more than 50 cm. high, the branches strongly ascending; leaves thin and papery, glabrous or sparsely hispid near the base and on margin, few-10, spreading.

TYPE LOCALITY: Mexico (probably Oaxaca).

Calyx-lobes entire but closely and prominently ciliate on margins; pedicels prickly-ciliate as seen under a lens; stem terete or angled, not winged, pubescent below with evenly distributed soft hairs.

Calyx-lobes glabrous but with minute teeth on margins; pedicels smooth and glabrous, stem winged from the decurrent leaf-bases, with stiffish hairs on the margins of the wings and few if any elsewhere.

8b. *D. virgata* var. *ciliata*.

5a. *D. virgata* var. *virgata*.

5a. *Diastatea virgata* var. *virgata* McVaugh, var. nov.

Diastatea virgata Scheidw. loc. cit., as to type.

Lobelia ramosissima Mart. & Gal. Bull. Acad. Brux. 9²: 42. 1842. (Galeotti 1971, Brux.)

Laurentia ramosissima Benth. & Hook.; Hemsf. Biol. Centr. Am. Bot. 2: 265. 1881.

Stems winged from the decurrent leaf bases, the wings chaffy-pubescent with stiffish hairs, especially on the lower parts of the stem; leaves coarsely incised-dentate, those at base of inflorescence about 1.3 cm. broad by 4.3 cm. long, the middle cauline ones 1.5–2.5 cm. broad by 2.5–6 cm. long, the blades elliptic to lance-ovate (the lower ovate-subrhomboid according to Martens and Galeotti), or the upper ones narrowly lanceolate to linear, merging into the flower-bracts; tips of blades blunt-pointed, mucronulate, the bases cuneate, sessile or subpetiolate, or the lowest leaves with a petiole up to 0.8 cm. long, and the base rounded; inflorescence secund (9) 15–30 cm. long, loosely 10–25-flowered; pedicels smooth, often arcuate, strongly ascending or the lowest widely spreading, 12–30 (55) mm. long in fruit; flower-bracts linear or the lower broader, leafy, the middle and upper ones usually about 1 cm. long; flower 17–22 mm. long, including hypanthium; corolla blue (according to Martens and Galeotti), the tube 8–11 mm. long, in anthesis narrowly linear, about 1 mm. in diameter, the lobes of the lower lip spreading, deflexed, obovate or elliptic, 2.5–3.5 mm. broad by 6–8.5 mm. long, the two upper lobes linear to elliptic-oblancoate, usually clawed, 1.5–2 mm. wide by 4–6 mm. long; filament-tube 8–11 mm. long, the filaments connate near apex only; anther-tube 1.6–2.0 mm. long; hypanthium in anthesis broadly obconic, about 1 mm. long, glabrous, in fruit about the same size; capsule 2–2.5 mm. in diameter by 9–13 mm. long, ellipsoid to linear, often slightly curved; calyx-lobes narrowly linear, acutely pointed, 2.5–6.5 mm. long, minutely callose-denticulate on margins; seeds about 0.6 mm. in length.

DISTRIBUTION: Oaxaca and (?) Vera Cruz, at elevations of 1000–2000 m.

5b. *Diastatea virgata* var. *ciliata* McVaugh, Bull. Torrey Club 67: 793. 1940.

Stem terete or angled, not winged, chaffy-pubescent, especially below, with soft hairs which are more or less evenly distributed; height 12–52 cm.; leaves thin and papery, about 10, sparsely pubescent on the veins beneath and on the upper surface and margin, the middle and upper ones broadly ovate, acute at tips, rounded at base, and narrowed abruptly into a margined petiole 1–5 mm. long, the blades 2–4 cm. wide by 2.5–6 cm. long, the margins irregularly and usually sharply serrate with 4–8 teeth per cm., the lower leaves smaller, the lowest often rounded and obtuse, petiolate; inflorescence secund, 9–17 cm. long, loosely 10–16-flowered; pedicels usually abruptly upcurved distally in fruit, 10–15 mm. long, rough-ciliate; lower flower-bracts leafy, usually ovate, the upper lanceolate to linear; flower essentially as in var. *virgata*, 12–14 mm. long, including hypanthium; corolla purplish-blue (when dried), the tube 7–8.5 mm. long, the two upper lobes 1.0–1.5 mm. broad by 3–4 mm. long, the lobes of the lower lip 1.5–3 mm. broad by 3.5–5 mm. long; filaments 7.5–8.5 mm. long; anther-tube 1.2–2.0 mm. long; hypanthium roughened at base, little changed in fruit, becoming 1–1.2 mm. high; capsule ellipsoid, 2–2.5 mm. in diameter by 8–11 mm. long; calyx-lobes linear or very narrowly triangular, long-pointed, entire but closely and prominently ciliate on the margins, 4.5–6.5 mm. long; seeds as in var. *virgata*.

TYPE LOCALITY: Mountains above Iguala, Guerrero, Pringle 8375 (Gray!).

DISTRIBUTION: Guerrero; Mexico (state); Michoacán; Morelos; at elevations of 900–1200 m.

9. *HETEROTOMA* Zucc. Flora 15²: Beibl. 100. 1832.

Myopsia Presl, Prodr. Mon. Lob. 8. 1836. Type species, *Myopsia mexicana* Presl.

Annual or perennial herbs with erect, decumbent, or creeping stems. Leaves simple, toothed or incised, sometimes palmately veined. Inflorescence usually secund and appearing pedunculate because of the naked upper part of the stem. Pedicels spreading-ascending, slender, bracteolate or (in some species) the lowest with filiform bracteoles. Flower inverted in anthesis. Corolla strongly zygomorphic, the tube prolonged on the lower side and extending into the spur. Tube cleft dorsally two-thirds of its length or more, otherwise entire, or

in some species fenestrate laterally. Filaments free from the corolla, connate distally, distinct at base; two lower filaments more or less prolonged into the spur. Two smaller anthers densely tufted at tip, the three longer ones curved apically. Hypanthium more or less one-sided, the lower part more or less reduced, bearing the two calyx-lobes opposite the two shorter anthers, and produced into a conic or linear spur. Calyx-lobes on the spur often shorter than the other three. Capsule inclosed by hypanthium-tube on the upper side for two-thirds to three-fourths of its length; hypanthium-tube on the lower side much shorter, little or not at all inclosing the capsule; capsule bilocular, apically dehiscent by loculicidal valves. Seeds minute, numerous, ellipsoid, smooth and lustrous.

Type species, *Heterotoma lobelioides* Zucc.

Flowers red or yellow; filament-tube 13-17 mm. long.

Flowers blue, purple, or white; filament-tube 6 mm. long or less.

Spur linear or essentially so, elongated, 2.0-7.5 mm. long; the two lower calyx-lobes at or near the end of the spur and separated from the base of the hypanthium-tube by the linear body of the spur.

Plants creeping or decumbent; filament-tube 5.0-5.5 mm. long; corolla-tube about 6 mm. long.

Plants erect; filament-tube 2.0-2.7 mm. long; corolla-tube 2.5-3.0 mm. long.

Spur conic, appearing as a projection on one side of the hypanthium, rarely more than 1 mm. in length; if more than 1 mm. in length, the two lower calyx-lobes at or scarcely removed from the base of the hypanthium-tube, the spur prolonged beyond them.

Flower, when straightened out, 13-16 mm. long, including hypanthium; corolla-tube 3.5-5 mm. long, fenestrate laterally at least in age; filament-tube 3.0-3.7 mm. long; anther-tube 1.6-2.0 mm. long.

Flower, when straightened out, 10 mm. long or less, including hypanthium; corolla-tube 3.5 mm. long or less, entire except for the dorsal fissure; filament-tube 3.0 mm. long or less; anther-tube 1.3 mm. long or less.

Plants purplish nearly throughout, glabrous; pedicels in fruit 6-8 mm. long, ebracteolate; calyx-lobes 1.5 mm. long or less; known from Nuevo León only.

Plants green, or purplish at base, usually pubescent at least near base; pedicels in fruit 15-45 mm. long, rarely shorter, the lowest often with 2 filiform bracteoles near base; calyx-lobes 1.5-4.0 mm. long; southern and western Mexico and southward.

Leaf-blades mostly ovate, cordate or rounded at base; middle and upper leaves mostly with incised-serrate margins.

Leaf-blades linear to elliptic, cuneate or rarely rounded at base; middle and upper leaves shallowly dentate or sinuate.

1. *H. lobelioides*.

4. *H. macrocentron*.

3. *H. Goldmani*.

2. *H. aurita*.

7. *H. Pringlei*.

6. *H. cordifolia*.

5. *H. flexuosa*.

1. *Heterotoma lobelioides* Zucc. Flora 15²: Beibl. 101. 1832.

Lobelia calcarata Bertol. Nov. Comm. Bonon. 4: 409. 1840. (Type from Guatemala.)

Stem erect, simple or branched, somewhat woody at base (maximum diameter about 7 mm.), green, or rough and brownish below, 0.3-2.0 m. high, pubescent throughout or below only, rarely nearly glabrous; leaves cauline, spreading, few-20, thin and papery, the blades 3-9.5 cm. wide by 6-15 cm. long, ovate, the tip long-acuminate, the base rounded or cordate, the petiole 3-7 (9-5) cm. long, the pubescence usually dense on petiole and on veins of the lower surface and sparse elsewhere, the margins varying from repand-denticulate with 2-7 callous teeth per cm., to coarsely serrate with spreading teeth as much as 7 mm. long; inflorescence not round, 7-20 (40) cm. long, on a peduncle 5-19 cm. long, loosely 10-30- (50-) flowered; pedicels ascending or the lower spreading at right angles to the stem, slender (the maximum diameter about 1 mm.), 25-70 mm. long in fruit, smooth and glabrous or somewhat obtuse, ebracteolate or with a pair of filiform bracteoles 2-4 mm. long at or near base; flower-bracts mostly linear, the lowest about 1 mm. wide, 5-13 mm. long, ciliate, denticulate, the lowest rarely broader, leafy; all bracts exceptionally ovate, leafy; flower 24-30 mm. long (measured from apex of pedicel to tips of longest corolla-lobes); corolla glabrous, or puberulent within, red or yellow, or part-colored, the spur blood-red to dull rose (according to collectors) and the lobes and upper corolla-tube yellow, the tube 16-18 mm. long, fenestrate laterally, the two upper lobes slightly recurved, narrowly triangular or lanceolate, attenuate, about 1 mm. wide, 3-8 mm. long, the three lower lobes fused into a (very slightly recurved) lip

slightly shorter than the two upper lobes; lower lobes free about 1.5–2 mm., triangular; filament-tube 13–17 mm. long, deflexed and exerted from the corolla, glabrous, the filaments connate about half their length; anther-tube (3.5) 4.0–5.0 mm. long, yellow, the two smaller anthers conspicuously yellow-tufted at tip, the three larger smooth or ciliate; hypanthium unilaterally campanulate, the lower side, with the two lobes opposite the short anthers, prolonged at right angles to the pedicel into the spur; hypanthium-tube pubescent or less often glabrous, in fruit 3.5–5.5 mm. in diameter; spur 14–25 mm. long (measured from the base of the hypanthium), consisting of the linear elongation of the hypanthium and a conic, somewhat inflated portion of the corolla which is about 4–6 mm. in diameter at base; capsule about three-fourths inferior, 8–9 mm. long; calyx-lobes (1.5) 2–4.5 (6) mm. long, entire, ciliate or nearly glabrous, narrowly triangular, the two lower ones at or near the tip of the spur, at right angles to the spur or pointing backward, mostly slightly shorter than the other three; seeds ellipsoid-fusiform, smooth, somewhat lustrous, about 0.5 mm. in length, with faint longitudinal markings as seen with a magnification of about 20 diameters.

TYPE LOCALITY: "La Cumbre de San Antonio, 8000 pedes supra oceanum."

DISTRIBUTION: Costa Rica to San Luis Potosí and Michoacán, at elevations of 1500–3000 m.

ILLUSTRATION: Bot. Mag. pl. 7849.

2. *Heterotoma aurita* Brand. Proc. Calif. Acad. II. 3: 149. 1891.

Lobelia cotensis M. E. Jones, Contr. W. Bot. 15: 152. 1929. (Jones 24147, Pomona!)

Lobelia amabilis M. E. Jones, Contr. W. Bot. 18: 68. 1933. (Jones 27428, Pomona!)

Annual, from a woody taproot; stems erect, simple or with slender ascending lateral branches, slightly woody at base, the maximum diameter about 3 mm., purplish below, 10–65 cm. high, glabrous above, whitish-pilose below; leaves cauline, few–10, spreading or appressed, thin and papery, pubescent on the petiole and on the veins beneath, and sparsely so on both surfaces, or nearly glabrous, the blades 1.5–3 cm. broad by 2–5 cm. long, mostly 1.5–2 times as long as broad, lanceolate to ovate, the lower broader, at least the upper ones acute at tip, the lower obtuse or rounded, rarely acute, the base of blade rounded or cuneate, or those of the lowest cordate, the margins of the upper leaves coarsely and irregularly sharp-serrate, usually finely callose-denticulate between the serrations, those of the lower leaves less deeply serrate, the teeth sometimes rounded, the petiole slender, 1.5–2.5 cm. long; inflorescence strongly secund, few–22 cm. long, few–30-flowered, on a peduncle 10–23 cm. long; pedicels filiform, 10–30 mm. long in fruit, smooth and glabrous, somewhat 2-winged below, ebracteolate; flower-bracts linear-subulate, acute, entire, ciliate-margined or glabrous, 2.0–4.5 mm. long; flower 13–16 mm. long, including hypanthium; corolla blue-purple (magenta according to Gentry), glabrous, the lower lip rough within at base, the tube 3.5–5.0 mm. long, fenestrate laterally (rarely not so), the two upper lobes linear or oblanceolate, 1.0–1.5 mm. wide by 4–6 mm. long, the lobes of the lower lip 3–4 mm. wide, 5–6 mm. long; filament-tube 3.0–3.7 mm. long, mostly included, the filaments united about half their length or less, glabrous or bristly-ciliate on the outer side near base; anther-tube 1.6–2.0 mm. long, bluish-gray, the two shorter anthers white-tufted at tip, the three larger bearded on the backs; hypanthium unilaterally ellipsoid or campanulate, glabrous, the lower side very short, produced backward into the short conic spur 1–2 mm. long; hypanthium-tube in fruit 2–3 mm. in diameter; capsule two-thirds to three-fourths inferior, 4.5–5.5 mm. long; calyx-lobes narrowly triangular, entire, acute, glabrous, 1.7–3.0 mm. long, green or purplish, the two lower ones about the middle of the spur, directed somewhat forward; seeds shining, light brown, about 0.5 mm. in length.

TYPE LOCALITY: Cape Region, Baja California, *T. S. Brandegee 353* (U. of Calif.!). There are in the Brandegee herbarium, under the number 353, two sheets of this species. One was collected in the Sierra de la Laguna, Jan. 21, 1890, and the other in the Sierra de San Francisquito, Oct. 18, 1890.

DISTRIBUTION: Mountains of the Cape Region, Baja California.

3. *Heterotoma Goldmanii* Fernald, Proc. Am. Acad. 36: 504. 1901.

Plants annual; stem erect, mostly with ascending subordinate lateral branches, slender, to 2.0 mm. in diameter at base, purplish below, few–50 cm. high, short bristly-pubescent below the inflorescence; cauline leaves 10 or fewer, often purplish, the lower often approximate and

forming a basal rosette, spreading, thin and papery, pubescent on the petiole and near the margins and usually sparsely so on the upper surface and on the veins beneath, the blades 1.5-4.5 cm. broad by 1.8-5 cm. long, lanceolate to ovate, the uppermost usually lanceolate, incised-toothed, often deeply so, acute at tip, cuneate at base, sessile or short-petiolate, those of the lower leaves ovate or rounded, obtuse at tip, cordate at base, on a slender petiole 1-2 cm. long, those of the middle leaves sometimes palmatifid; margins finely callose-denticulate, those of the lowermost leaves often appearing entire or nearly so; inflorescence somewhat secund, few-25 cm. long, loosely few-21-flowered, the peduncle 3-10 cm. long; pedicels filiform, straight or flexuous, 20-27 mm. long in fruit, smooth and glabrous, ebracteolate; flower-bracts linear, acute, entire, glabrous or ciliate-margined, 3-5 mm. long or the lowest to 1.5 mm. wide by 15 mm. long; flower 9-12 mm. long, including hypanthium; corolla purple, glabrous, the tube 2.5-3.0 mm. long, entire except for the dorsal fissure, the two upper lobes oblanceolate to linear, 1.0-1.3 mm. broad, 3.0-5.5 mm. long, the lobes of the lower lip elliptic to obovate, 2-4 mm. broad, 4-6.5 mm. long; filament-tube 2.0-2.7 mm. long, glabrous, the filaments connate about two-thirds their length; anther-tube 1.0-1.7 mm. long, the two smaller anthers white-tufted at tip, the three larger sparsely pubescent on the backs; hypanthium in anthesis short-campanulate or nearly hemispheric, one-sided, the lower part and the two lower lobes prolonged backward into the spur, glabrous or pubescent, about 2.5 mm. in diameter in the immature fruit; spur linear, 2.0-5.5 mm. long (measured from the base of the linear portion), straight or strongly arcuate, extending backward so as to form an acute angle with the pedicel; capsule three-fourths inferior, 4 mm. long, about 3 mm. in diameter; calyx-lobes linear-subulate, smooth and glabrous, entire, acute, 2-3 mm. long, the two lower ones at or very near the tip of the spur, equaling the other three or slightly shorter; seeds smooth, polished, about 0.5 mm. long.

TYPE LOCALITY: Sinaloa ("road from Las Flechas to La Rostra"), Goldman 324 (Gray!).

DISTRIBUTION: Durango to Sinaloa and southern Sonora.

4. *Heterotoma macrocentron* Benth. in Hook. Ic. 12: 68.

pl. 1177. 1876.

Stems decumbent or trailing, few-branched, up to 1.0 mm. in diameter at base, purple at least below, few-20 cm. long, hirsute below the inflorescence with sharp spreading light-colored hairs; leaves cauline, few-20, sparsely hairy above and beneath with hairs like those of the stem, often purplish, the blades ovate to orbicular or reniform, cordate at base, rounded or bluntly angled at tip, their size very variable, 2-25 mm. long and wide, on a slender petiole up to 2 cm. long, the margins varying from subentire, with minute callose teeth, to sharply serrate with about 6-8 teeth per cm.; flowers 1-6, in a corymbiform raceme, the lowest pedicels sometimes elongating and surpassing the unopened buds; inflorescence sometimes appearing stalked, the stem naked below it as much as 5 cm.; pedicels filiform, strongly ascending, 12-50 mm. long in flower, smooth and glabrous or hairy near base, ebracteolate; flower-bracts narrower than the leaves, 1-2 mm. wide, 3-5 mm. long; flower 15 mm. long, measured from tips of corolla-lobes to base of hypanthium; corolla purplish (?—not seen fresh), glabrous, the tube 5.5-6.0 mm. long, entire except for the dorsal fissure, the two upper lobes 1.0-1.5 mm. broad, 4-6 mm. long, the three lower lobes about 2.5 mm. broad, 5-7 mm. long; filament-tube 5.0-5.5 mm. long, glabrous, the filaments connate near apex or nearly half their length; anther-tube 1.5-1.9 mm. long, the two smaller anthers white-tufted at tips; all anthers pubescent on the backs; hypanthium in anthesis turbinate, glabrous, about 3 mm. long, one-sided, the lower part and the two lower lobes prolonged backward into the spur; spur linear, 4-7.5 mm. long, straight or somewhat arcuate, nearly paralleling the pedicel or diverging from it; fruit not seen; calyx-lobes linear, acute, entire, 3-5 mm. long, smooth and glabrous, the two lower ones slightly shorter, less than 1 mm. from the distal end of the spur; seeds not seen.

TYPE LOCALITY: "Sierra Madre, north-west of Mexico" (probably between Mazatlán, Sinaloa, and the city of Durango), Seemann 2049 (Kew!).

DISTRIBUTION: Western Chihuahua; "northwestern Mexico."

ILLUSTRATION: Hook. Ic. pl. 1177.

5. *Heterotoma flexuosa* (Presl) McVaugh, Bull. Torrey Club
67: 143. 1940.

- Rapuntium flexuosum* Presl, Prodr. Mon. Lob. 23. 1836.
Lobelia arabioides H. & A. Bot. Beech. Voy. 301. pl. 66. 1838. (Beechey, Kew!)
Lobelia flexuosa A. DC. in DC. Prodr. 7: 379. 1839.
Heterotoma arabioides Benth. in Hook. Ic. 12: 68. 1876.
Heterotoma intermedia Hemsl. Biol. Centr. Am. Bot. 2: 269. 1881. (Seemann 2051, Kew!)
Dortmannia mexicana Kuntze, Rev. Gen. 972. 1891. (Based on *Rapuntium flexuosum* Presl.)

In habit and vegetative characters very similar to *H. cordifolia*; cauline leaves linear to elliptic or oblanceolate, the tip usually blunt, the base narrowed to a margined petiole, the blades of upper and middle leaves 0.1–0.7 cm. wide by 3–8 cm. long, 5–15 times as long as wide, the margins shallowly dentate with callose teeth, or sinuate; basal rosette usually present, the leaves narrowly or broadly elliptic or rarely ovate, narrowed and blunt-pointed at tip, the base cuneate or rarely rounded, the petioles of basal leaves mostly 1–2 cm. long, the blades usually shorter and broader than the cauline, 1.5–6 times as long as wide, the margins regularly dentate; inflorescence few–18 cm. long, few–15-flowered, the peduncle (2) 5–10 cm. long; pedicels 17–45 mm. long in fruit; bracteoles as in *H. cordifolia*; flower-bracts linear, 3–6 (15) mm. long, the lowest, if leafy, linear and entire or essentially so; flower 7–9 mm. long, including hypanthium, the color unknown, apparently white; corolla glabrous, the tube 2.5–3.3 mm. long, the two lobes next the dorsal fissure 2–4 mm. long, the lobes of the lower lip 1.3–2.5 mm. wide by 3.0–4.5 mm. long; filament-tube 1.5–2.5 mm. long; anther-tube 1.0–1.3 mm. long; hypanthium in fruit and flower as in *H. cordifolia*, 1.7–2.5 mm. in diameter in fruit; spur and capsule as in *H. cordifolia*, the capsule 2.5–4 mm. long; calyx-lobes 1.5–3.0 mm. long; spur exceptionally as long as 2 mm., usually 1 mm. long or less; seeds as in *H. cordifolia*.

TYPE LOCALITY: Mexico, *Th. Haenke* (Praha!).

DISTRIBUTION: Nayarit to Jalisco and Guerrero, at elevations up to about 1500 m.

ILLUSTRATION: H. & A. Bot. Beech. Voy. pl. 66.

6. *Heterotoma cordifolia* (H. & A.) McVaugh, Bull. Torrey Club
67: 143. 1940.

- Lobelia cordifolia* H. & A. Bot. Beech. Voy. 301. 1838.
Heterotoma tenella Turcz. Bull. Soc. Nat. Mosc. 25^e (No. 3): 175. 1852. (Type from Vera Cruz, Galotti.)
Heterotoma gibbosa S. Wats. Proc. Am. Acad. 23: 280. 1888. (Pringle 1478, Gray!)
Heterotoma Endlichii F. E. Wimmer, Repert. Sp. Nov. 26: 1. pl. 71, f. 1. 1929. (Endlich 1172, 1172a, Berlin.)

Stem erect, simple or with few–many ascending subordinate branches, up to 3 mm. in diameter at base, green, or purplish below, few–55 cm. high, pubescent below the inflorescence with soft sharp whitish hairs or exceptionally nearly glabrous; cauline leaves few–10, spreading, thin and papery, smooth above or sparsely strigose, the lower surface bristly-pubescent at least on the veins, the blades ovate to suborbicular or reniform, cordate or rounded at base, mostly 1–3 cm. broad by 1.5–3 (5) cm. long, about as broad as long, the lower ones smaller, the middle and upper leaves usually acute at tip, with incised-serrate margins, sometimes palmately lobed or cleft, the lower leaves obtuse or rounded at tip, varying to acute, the margins sinuate or subentire, seldom serrate; petioles slender, 1–1.5 (2.5) cm. long; venation of blades often appearing palmate; lower internodes sometimes approximate, the leaves appearing as a basal rosette; inflorescence mostly strongly secund, few–25 cm. long, few–20-flowered, appearing pedunculate for a distance of 4–7 cm.; pedicels filiform, (6) 15–30 (35) mm. long in fruit, smooth and glabrous, straight or somewhat arcuate, the mature capsule often strongly incurved by an abrupt bend at the very end of the pedicel, which is ebracteolate or with a pair of filiform bracteoles 1.5 mm. long or less at or near the base, these often present on pedicels of lowest flowers only; flower-bracts linear, entire, glabrous or ciliate on the margins, 2–6 mm. long, the lowest sometimes leafy, incised-toothed; flower 5–9 mm. long, including hypanthium; corolla white or pale bluish lavender, glabrous, the tube 2.0–2.7 (3.5) mm. long, entire except for the dorsal fissure, which extends to a point about 0.5 mm. from the base, the two lobes next the dorsal fissure linear or narrowly elliptic, with triangular base, 1.8–3 mm. long, the lobes of the lower lip elliptic to obovate, 1–2 mm. wide by 2–3.5 mm. long; filament-tube 1.6–

2.5 (3) mm. long, glabrous, the filaments connate about half their length; anther-tube 0.6-1.3 mm. long, the two shorter anthers white-tufted at tip, the three larger ones smooth or pubescent; hypanthium in anthesis ellipsoid, glabrous, in fruit ellipsoid or cup-shaped, longer than broad, (1.5) 2.0-2.5 (3) mm. in diameter; spur conic, in flower 1 mm. long or less (only exceptionally longer), in fruit appearing as a small projection at or below the middle of the strongly asymmetrical hypanthium (rarely entirely lacking and the hypanthium regular); capsule usually about three-fourths inferior (measured on the long side of the hypanthium-tube), 3.5-5.5 mm. long; calyx-lobes narrowly triangular or nearly linear, usually with a slightly dilated base, smooth and glabrous or with a few marginal cilia, 1.5-3 (4) mm. long; seeds light brown, about 0.5 mm. in length.

TYPE LOCALITY: Western Mexico (vicinity of Tepic, Nayarit), *Beechey* (Kew!).

DISTRIBUTION: Chihuahua and southern Sonora to Jalisco and Vera Cruz, southward to Costa Rica, at elevations up to about 2000 m.

7. *Heterotoma Pringlei* B. L. Robinson, Proc. Am. Acad.

44: 615. 1909.

Stem erect, simple or nearly so, slender and wiry, up to 1 mm. in diameter at base, purplish nearly throughout, 6-35 cm. high, the whole plant glabrous; leaves all radical or nearly so, 10 or fewer, rigid and thickish when dry, purplish or greenish, spatulate or oblanceolate, acute or obtuse at tip, the base cuneate, narrowed to a petiole 1 cm. long or less, the blades sometimes broadly elliptic, sharply set off from the petiole; blades 2-4 mm. broad, 4-6 mm. long, with 2 or 3 sharp teeth on the margin on each side of the midrib, the cauline leaves, if present, linear, entire, obtuse, 5-20 mm. long; inflorescence secund, 2.5-15 cm. long, loosely 5-10-flowered, the stem sometimes naked below it or with 1 or 2 small bracts; pedicels wide-spreading, filiform, 6-15 mm. long in fruit, smooth and glabrous, nearly straight except the distal end, which is sharply curved outward so that the mature capsule is pendent; bracteoles none; flower-bracts linear or nearly so, entire, blunt, 2-15 mm. long; flower 7-8 mm. long, including hypanthium; corolla light-blue when dry, the tube 1.7-2.0 mm. long, entire except for the dorsal fissure which extends about two-thirds its length, the two upper lobes about 0.5 mm. broad by 2-2.3 mm. long, the lower lip 3.5-5 mm. long, the lobes elliptic or obovate; filament-tube 1.5 mm. long, the filaments connate about one-third their length; anther-tube 1.0-1.2 mm. long, the two shorter anthers white-tufted at tip, the three larger very minutely pubescent on the backs; hypanthium unilaterally short-campanulate, often appearing oblong with a truncate base, in fruit becoming ellipsoid, about 1.5 mm. in diameter; spur broadly conic, about 1 mm. high and broad, formed by a pouch-like enlargement of the hypanthium; hypanthium varying to regular or essentially so, the spur then wanting; capsule about two-thirds inferior, about 2.5 mm. long; calyx-lobes linear or nearly so, entire, rounded or blunt at tip, green or purplish, 1.0-1.5 mm. long, the two lower erect (in line with long axis of flower) or slightly spreading; seeds light brown, about 0.3 mm. in length.

TYPE LOCALITY: San Lázaro Mountains, Nuevo León, *Pringle 13274* (Gray!).

DISTRIBUTION: Calcareous areas, mountains of southeastern Nuevo León.

DOUBTFUL SPECIES

MYOPSEA MEXICANA Presl, Prodr. Mon. Lob. 8. 1836. The type locality is "Mexico," and the type was perhaps collected by Haenke between Acapulco and Mexico City, but has not been located (see Bull. Torrey Club 67: 143-144. 1940).

10. *LOBELIA* [Plumier] L. Sp. Pl. 929. 1753;

L. Gen. Pl. ed. 5. 401. 1754.

Dortmannia [Rudbeck f.] Hill, Brit. Herb. 126. 1756.

Rapuntium [Tourne.] Mill. Gard. Diet. ed. 8. *Rapuntium*. 1768.

Tupa G. Don, Gen. Hist. 3: 700, in part. 1834.

Dortmannia Steud. Nom. Bot. ed. 2. 1: 526. 1840.

Petromarula [Chussin] Nieuwl. & Lunell, Lunell. Am. Mill. Nat. 5. 13. 1917. *Not Petromarula* Vent. 1806.

Annual or perennial herbs, or shrubs. Leaves variously serrate, toothed or subentire, the margins always beset with minute yellowish or brownish callosities. Flowers inverted in

anthesis except in a few species of the section *Tyloomium*. Corolla with the dorsal fissure extending from apex of the tube nearly to the base in most species; corolla-tube often fenestrate. Stamens usually free from the corolla. Orifice of the anther-tube partially closed by the incurved tips of the longer anthers; two shorter anthers usually tufted or penicillate at tips. Corolla, stamens, and style withering-persistent on the fruit. Fruit capsular, dehiscent by apical valves. Calyx-tube mostly divided down to the ovary (except in the section *Tyloomium*). Seeds various.

Type species, *Lobelia Dortmanna* L.

Flower red, reddish-brown or purplish-brown, yellow or green, the corolla never blue; pedicels bibracteolate, the bracteoles subopposite, sometimes reduced to filiform or knoblike processes 1 mm. long or less; flower, when straightened out, 15 mm. long or more.

Bracteoles minute (or apparently wanting), rarely more than 1 mm. long.

Corolla not fenestrate laterally, "orchid purple," drying red; pedicels 30-35 mm. long in fruit, ebracteolate at maturity.

Corolla fenestrate laterally, bright red to orange or yellow; pedicels bracteolate, the bracteoles often very minute.

Bracteoles at or near the base of the pedicels (rarely as much as 5 mm. above the base), usually thickened and simulating gland-like callosities; corolla bright red; pedicels 20 mm. long or less; seeds markedly roughened, the surface deeply and irregularly foveate-reticulate.

Plants frutescent; leaves coriaceous, 4-6 cm. long, mostly 2-3 times as long as wide; corolla-tube strongly arcuate; native of the Greater Antilles.

Plants strictly herbaceous, coarse; leaves thin or membranous, mostly 8-20 cm. long, 3-10 times as long as wide; corolla-tube straight or essentially so; native of continental North America.

Bracteoles (often apparently wanting at maturity) at or near the middle of the pedicels, never basal, often very slender; hypanthium not produced into a rim above the inferior part of the ovary; seeds narrowly ellipsoid or oblong, with faint longitudinal markings.

Leaves broadest about the middle, 3-7 cm. wide, on definite stout petioles 1-3 cm. long; inflorescence and whole upper part of plant, including lower surface of leaves, clothed with matted or floccose white woolly hairs.

Leaves usually broadest below the middle, 4 cm. wide or less, nearly sessile or the lowest with a petiole 0.2-1 cm. long; plants glabrous to tomentose, rarely with white matted hairs.

Pedicels 100-210 mm. long in fruit; Guatemala and adjacent Chiapas, at elevations of 2800 meters and above.

Pedicels (10) 30-75 (100) mm. long in fruit; mountains, from southern Arizona to Colombia.

Bracteoles 1 mm. long or more, evident (usually 3-6 (10) mm. long); hypanthium produced into a tube or rim 1-5 (10) mm. high, this surrounding the free part of the ovary; seeds globose to oblong-ovoid, shallowly pitted or tuberculate.

Anthers all lacking apical tufts of hairs, some of them sometimes minutely beaded at apex.

Calyx-lobes lanceolate to linear, 2-3 mm. wide or less.

Leaf-margins appearing subentire, the small callose teeth 5-10 per cm. of margin; native of Puerto Rico.

Leaf-margins coarsely serrate, the teeth 1-3 per cm. of margin; native of eastern Cuba.

Calyx-lobes foliaceous, broadly lanceolate, 5-7 mm. wide, nearly hiding the corolla; native of Haiti.

At least the two shorter anthers bearing a tuft of white or yellowish hairs at apex.

Flowers in the axils of the uppermost leaves, these little or not at all smaller than the sterile leaves; corolla red or rose-colored; plants annual (?), slightly woody at base; natives of the Lesser Antilles.

Filament-tube 17-21 mm. long; corolla-tube straight or nearly so, fenestrate at base; fruiting hypanthium 4.5-6.0 mm. in width at widest point; native of Dominica and Martinique.

Filament-tube 23-32 mm. long; corolla-tube strongly arcuate, not fenestrate; fruiting hypanthium 7.0-8.0 mm. in width at widest point; native of Guadeloupe.

77. *L. nubicola*.

57. *L. rotundifolia*.

56. *L. Cardinalis*

80. *L. Ghiesbreghtii*.

79. *L. aguana*.

78. *L. laxiflora*.

64. *L. portoricensis*.

63. *L. imberbis*.

65. *L. Christii*.

75. *L. Kraussii*.

76. *L. persicifolia*.

Flowers in a definite inflorescence, the subtending bracts much smaller than the sterile cauline leaves; raceme often separated from the leafy part of the stem by a naked "peduncle."

Inflorescence subcapitate, apparently determinate through the abortion of the extreme tip; foliage-leaves clustered near the summit of the stem; calyx-lobes linear-subulate, pectinately toothed, 12-15 mm. long; anther-tube about 3 mm. long, all the anthers densely white-tufted at tips; native of Martinique.

Inflorescence racemose or spicate, normally elongated, at least in fruit; if apparently subcapitate, the anther-tube 4.5 mm. long or more and the calyx-lobes not as above.

Flower not inverted, the pedicel not twisted and the dorsal fissure of the corolla turned away from the inflorescence axis at anthesis; inflorescence strongly secund, the terminal portion curled away from the opening flowers, appearing scorpioid; inflorescence often appearing corymbose when young, the opening flowers usually surpassing the crowded mass of unopened buds; shrubs, natives of the Greater Antilles.

Teeth of the leaf-blade spreading at right angles, those of the basal half of the blade and of the margined subpetiolar base mostly distant, 1-1.5 cm. apart and prolonged into slender spines as much as 0.6-0.9 cm. long.

Filament-tube 16-25 mm. long; anther-tube 7-9 mm. long; corolla 24-30 mm. long.

Filament-tube 8-12 (15) mm. long; anther-tube 5-6 mm. long; corolla 15-19 mm. long.

Teeth of leaf-blade various, the basal ones not prolonged into slender spines.

Flower 27-30 mm. long, including hypanthium; filament-tube 10-14 mm. long; anther-tube 7-8 mm. long; leaves with a definite petiole 2.5-3.5 cm. long.

Flower 20 mm. long or less, including hypanthium; filament-tube 8-10 mm. long; anther-tube 3.5-4.5 mm. long; petioles 1.5 cm. long or less.

Leaves coarsely toothed, about equally contracted to base and apex.

Leaves inconspicuously crenate-dentate, often subtire, mostly abruptly contracted at apex and long-attenuate at base.

Flowers normally inverted, the pedicels twisted and the dorsal fissure of the corolla facing the inflorescence axis at anthesis; inflorescence spicate or racemose, the terminal portion erect or essentially so, the unopened buds surpassing the opening flowers; coarse herbs or suffrutescens species.

Flower-bracts leafy, lanceolate to ovate, 0.8-2.5 cm. wide by 3-11 cm. long; calyx-lobes narrowly deltoid to lanceolate or oblong, 4-6 mm. wide by 10-16 mm. long, conspicuously pectinate-serrate; three larger anthers not bearded at tip; native of Jamaica.

Flower-bracts narrower, 0.2-0.5 (1) cm. wide or the lowermost one somewhat wider; calyx-lobes not as above.

All 5 anthers densely white-tufted at tip; natives of the Lesser Antilles.

Filament-tube 13-23 mm. long; pedicels in fruit 20-30 mm. long or, if longer, the corolla greenish; calyx-lobes 4-9 mm. long.

Corolla pink; leaves obscurely crenate-dentate; native of St. Lucia.

Corolla green; leaves sharply serrate; native of the Lesser Antilles and Trinidad.

Filament-tube 25-32 mm. long; pedicels in fruit 30-65 mm. long; corolla reddish- or brownish-purple; calyx-lobes 10-18 mm. long.

The 2 smaller anthers with a tuft of white hairs at tip, the others glabrous or nearly so.

66. *L. conglobata*.

58. *L. assurgens*.

59. *L. robusta*.

60. *L. cubana*.

61. *L. cacuminis*.

62. *L. oxyphylla*.

74. *L. Martagon*.

69. *L. santa-luciae*.

70. *L. cirsifolia*.

68. *L. digitalifolia*.

- Leaves of the current season in a rosette at the summit of the flowering stem; blades coriaceous, oblanceolate, mostly 3-5 times as long as wide; inflorescence a long dense spike with foliaceous bracts; native of the Lesser Antilles.
- Leaves scattered along the stem; leaves not coriaceous, the blades linear to linear-elliptic, 6-14 (25) times as long as wide; inflorescence racemose, scarcely spike-like; natives of the Greater Antilles.
- Filament-tube 17-21 mm. long; native of Jamaica.
- Filament-tube 7-10 (15) mm. long.
- Leaves pectinately toothed, with 2-4 spine-tipped teeth per cm. of margin, the teeth 1-5 mm. long; native of Jamaica.
- Leaves finely and evenly crenate or serrate; native of Hispaniola and eastern Cuba.
- Flowers blue to purplish-blue or purple, often pale or nearly white; corolla occasionally pale rose, but never red. Flower, when straightened out, often less than 15 mm. long. Pedicels bibracteolate or ebracteolate.
- Seeds sharply trigonous; flowers light blue or white, less than 10 mm. long; bracteoles of pedicel basal, foliaceous, 1-2 mm. long, resembling stipules; all five anthers stiff-bearded at tips.
- Seeds ellipsoid, ovoid or oblong, or subglobose, never trigonous.
- Corolla not cleft dorsally except at base, the dorsal sinus not appreciably deeper than the lateral ones; three larger anthers not white-tufted; inflorescence usually corymbose or subcapitate, not pedunculate. Seeds smooth and polished.
- Corolla cleft dorsally (the dorsal sinus much deeper than the lateral ones and usually extending nearly to the base of the corolla-tube), or, if not so, all the anthers white-tufted and the inflorescence spicate, long-pedunculate.
- Pedicels bibracteolate at or about the middle, never at extreme base; seeds elongated, markedly roughened and foveate-reticulate.
- Filament-tube 12-15 mm. long; calyx-lobes with broad leafy auricles at their bases, the auricles 2-3 mm. long.
- Filament-tube 2.5-8.0 mm. long; auricles at base of hypanthium wanting or small, 1 mm. long or less, not foliaceous.
- Bracteoles minute, not foliaceous; corolla glabrous; filament-tube 2.5-3.5 mm. long; seeds fusiform, dark-apiculate; United States and Canada, in glaciated regions.
- Bracteoles evident, green, somewhat foliaceous; corolla pubescent within at base of lower lip; filament-tube 5-8 mm. long; seeds oblong, not apiculate; Coastal Plain, southern United States.
- Pedicels bibracteolate at or very near the base, or ebracteolate.
- Plants aquatic, scapose; leaves in a basal rosette, fleshy, linear, hollow; United States and Canada, in glaciated regions.
- Plants terrestrial or aquatic, with flat leaves; leaves cauline or sometimes nearly all basal.
- Corolla-tube 7.0 mm. long or more, measured from the base of the calyx-lobes to the deepest point of the lateral sinus of the corolla; filament-tube usually more than 5.0 mm. long.
- Corolla-tube fenestrate laterally near base.
- Hypanthium almost completely covered by the broad foliaceous fimbriate auricles at the bases of the calyx-lobes; leaves numerous, as many as 200, 3 cm. long or less.
- Auricles at base of calyx-lobes minute or wanting, not enveloping the hypanthium; leaves fewer, larger.
- Corolla strongly hirsute within at base of lower lip; leaves mostly linear, 1.5 cm. wide or less, mostly about 15 times as long as wide; calyx-lobes usually prominently callose-toothed.
67. *L. stricta*.
71. *L. viridiflora*.
72. *L. caudata*.
73. *L. salicina*.
1. *L. aquatica*.
37. *L. Dunnii*.
55. *L. siphilitica*.
39. *L. Kalmii*.
47. *L. flaccidifolia*.
38. *L. Dortmanna*.
51. *L. brevifolia*.
52. *L. glandulosa*.

- Corolla glabrous or slightly roughened at base of lower lip; leaves broader, never linear, mostly about 3-6 times as long as wide; calyx-lobes various.
- All 5 anthers densely white-tufted at tip; hypanthium somewhat oblique; corolla obliquely inserted into the hypanthium; flowers pendent; seeds smooth, shining; natives of Mexico.
- Corolla cleft nearly to the base on one side; filament-tube 5-7 mm. long.
- Corolla not cleft, the tube entire except for the openings near base; filament-tube 11.0-12.5 mm. long.
- The three larger anthers glabrous or pubescent on the backs, not white-tufted at tip; two smaller anthers white-tufted at tip; hypanthium symmetrical; corolla not inserted obliquely; flowers spreading, rarely at all pendent; seeds rough-cellular-reticulate; natives of southeastern United States.
- Plants more or less short-pubescent throughout; calyx-lobes lanceolate or broader, mostly 2-4 mm. wide; hypanthium pubescent or hirsute, flattened or depressed-hemispheric in bud.
- Plants glabrous or nearly so; calyx-lobes linear-subulate, 1 mm. broad (or sometimes slightly broader at the deltoid base); hypanthium glabrous or essentially so, rounded even in the small buds.
- Calyx-lobes toothed; filament-tube 7-8 mm. long.
- Calyx-lobes entire.
- Filament-tube 8-11 mm. long; native of the southeastern Coastal Plain, near the coast.
- Filament-tube 5-7 mm. long; native of the mountains and piedmont.
- Corolla-tube not fenestrate laterally, entire except for the dorsal fissure.
- Leaves strap-shaped or oblanceolate, nearly all basal, the plants scapose; calyx-lobes toothed; seeds rough-cellular-reticulate; native of the Gulf Coast, southern United States.
- Leaves cauline, or cauline and basal, the plants not scapose; calyx-lobes entire; seeds smooth, shining; natives of the mountains of Mexico and southwestern United States.
- All 5 anthers densely white-tufted at tip.
- Corolla-tube 8-10.5 mm. long; filament-tube 5.0-7.5 mm. long; leaves linear or broader, toothed; capsule about half-inferior.
- Corolla-tube 7.5 mm. (rarely 6.5) long; filament-tube 4.5-5 mm. long; cauline leaves linear-filiform, about 0.5 mm. wide, entire or minutely toothed; ovary and capsule superior or essentially so; Guerrero.
- The 3 larger anthers glabrous or pubescent on the backs, not white-tufted at tip; two smaller anthers white-tufted at tip.
- Capsule much less than half inferior; corolla-tube 11-14 mm. long, narrowly linear and slightly curved, the dorsal fissure extending to a point 2.5-4.5 mm. from the base; Nuevo León and Tamaulipas.
- Capsule at least half inferior; corolla-tube 10 mm. long or less, the dorsal fissure extending to a point 2 mm. or less from the base; southern and western Mexico.
28. *L. Hartwegi*.
29. *L. sinaloae*.
50. *L. puberula*.
- 53b. *L. amoena* var. *glandulifera*.
54. *L. elongata*.
- 53a. *L. amoena* var. *amoena*.
48. *L. floridana*.
18. *L. Ehrenbergii*.
20. *L. Dielsiana*.
17. *L. sublibera* (see also *L. Dielsiana*).

- Filament-tube (4,5) 6.0-12.0 mm. long; corolla-tube widened distally; pedicels in fruit mostly 3-7 mm. long; hypanthium and calyx-lobes usually prickly-pubescent.
- Filament-tube 3.5-5.0 mm. long; corolla-tube narrowly cylindric, not or scarcely widened distally; pedicels in fruit mostly 10-15 mm. long; hypanthium and calyx-lobes usually glabrous.
- Corolla-tube less than 7.0 mm. long (usually 5.0 mm. long or less); filament-tube usually 5.0 mm. long or less. Flower, including hypanthium, 4.0-7.0 mm. long (average about 6.0 mm. or less); anther-tube 0.5-1.0 mm. long; seeds smooth, shining; annuals, native to the West Indies, Central and South America and southern Mexico.
- Pedicels smooth and glabrous, mostly 10-15 mm. long in fruit; plants glabrous or essentially so; capsule about half inferior; native of the Greater Antilles.
- Pedicels scabrous to rough-bristly-pubescent (rarely glabrous in *L. fastigiata*, in which the capsule is almost wholly inferior); plants somewhat pubescent, at least below; capsules various.
- Mature capsule one-third inferior or less. Mature capsule three-fourths inferior or more. Leaves mostly radical; plants 15 cm. high or less; native of the Bahama Islands.
- Plants leafy-stemmed, normally more than 15 cm. high; Yucatán and Trinidad to northern South America.
- Pedicels in fruit 2.0-7.0 mm. long, spreading-ascending, finely granular-roughened or nearly smooth.
- Pedicels in fruit 13.0-15.0 mm. long, strongly divaricate, straight, prickly-pubescent.
- Flower, including hypanthium, 6.5 mm. long or more (usually at least 10 mm. long); anther-tube 1.0 mm. long or more; seeds, duration and range various.
- Corolla-tube usually plainly fenestrate; filaments 3.0 mm. long or less, included in the corolla-tube; all 5 anthers white-tufted at tip (except in *L. umbellifera*); pedicels mostly 10 mm. long or less in fruit, prickly-pubescent, often purplish; seeds smooth or nearly so; natives of Mexico and Central America.
- Inflorescence subumbellate, the 1-6 flowers arising nearly together; leaves, at least the lower, obtuse at tip; blades 1.5 cm. long or less, mostly 2-4 times as long as wide, elliptic; Guatemala and adjacent Chiapas.
- Inflorescence racemose or spicate, elongated, at least in fruit; leaves, except sometimes the lowermost, acute at tip; blades mostly more than 2.5 cm. long, lanceolate or oblong to linear, mostly 4-8(25) times as long as wide.
- Leaves coarsely serrate, the middle and upper ones lanceolate or oblong, mostly 0.6-1.2 cm. wide; plants annual or biennial, with a woody taproot; corolla-tube 5-6 mm. long.
- Leaves crenate or subentire to remotely and shallowly serrate, the middle and upper ones linear to lanceolate, 0.15-0.6 cm. wide; plants perennial, with clustered or fleshy roots; corolla-tube 4.0 mm. long or less (except in *L. poetica*, which has narrowly linear leaves).
- Corolla-tube 4.5-5.0 mm. long; filament-tube 3.0 mm. long; flower 14-17 mm. long, including the hypanthium, which is flat in anthesis or essentially so.
2. *L. grüna*.
3. *L. anatina*.
24. *L. cliffortiana*.
23. *L. xalapensis*.
25. *L. lucayana*.
27. *L. fastigiata*.
26. *L. yucatanana*.
34. *L. umbellifera*.
30. *L. fenestralis*.
31. *L. poetica*.

- Corolla-tube 4.0 mm. long or less; filament-tube 2.0 mm. long or less; flower 8-14 mm. long, including the obliquely short-campanulate or cup-shaped hypanthium.
- Calyx-lobes strongly reflexed, even in the flower; leaves linear-elliptic, attenuate at base and apex; capsule almost wholly inferior, 3 mm. long or less, truncate at base; bracteoles at base of pedicel filiform, evident.
- Calyx-lobes ascending, appressed or sometimes spreading, never strongly reflexed; leaves linear to lanceolate, sessile, the base as broad as the blade or essentially so, often subclasping; capsule one-half to three-fourths inferior, 3.0-5.0 mm. long, rounded or acute at base; bracteoles usually not visible or none.
- Corolla-tube usually not fenestrate; filament-tube 2.5 mm. long or more, usually partially exerted; the 3 larger anthers glabrous or pubescent, not white-tufted at tips; seeds and pedicels various.
- Corolla-tube not fenestrate, entire except for the dorsal fissure, which extends to the base or nearly so (at least to a point 2.5 mm. from base).
- Seeds smooth or faintly lined, highly polished and shining or merely slightly lustrous, never rough cellular-reticulate; natives of Mexico and Central America, with one species in peninsular Florida.
- Flower-bracts all foliaceous, at least the lower ones identical with the foliage leaves; the middle and upper ones sometimes narrower or even linear with the uppermost 1.0-1.5 cm. long; bracteoles of the pedicel none or very small.
- Plants erect or decumbent, the stems 15-50 cm. high; leaves coarsely toothed, mostly lanceolate to ovate, 2.5-8.0 cm. long; inflorescence terminal, bearing few-25 flowers.
- Stems delicate, 20 cm. long or less, creeping and usually rooting at the nodes; flowers 1-4, solitary on erect pedicels in the axils of ordinary leaves.
- Leaves 7 mm. long or less, sharply serrate; pedicels 4 mm. long or less.
- Leaves mostly 1 cm. long or more, crenate or subentire; pedicels usually 30-60 mm. long.
- Flower-bracts linear or subulate, none or only the lowermost foliaceous, all (or all except the lowermost) less than 1 cm. long, much smaller than and sharply contrasted to the foliage leaves; bracteoles of the pedicel mostly present.
- Entire plant somewhat hoary, covered with short whitish hairs; leaves cauline, practically entire, the margins slightly sinuate, the very few callosities hidden by the hairs.
- Plants glabrous or somewhat hairy below, never white-hoary; leaves cauline or partly or
32. *L. jaliscensis*.
33. *L. irasuensis*.
16. *L. longicaulis*.
5. *L. Standleyi*.
4. *L. nana*.
10. *L. illota*.

- wholly basal, with toothed or denticulate blades, the callosities usually plainly visible to the unaided eye.
- Mature capsule one-third inferior or less.
- Flower, including hypanthium, 16-20 mm. long; capsule 7-9 mm. long.
- Flower, including hypanthium, 10 mm. long or less; capsule 6 mm. long or less.
- Pedicels bracteolate at base; filament-tube about 3.0 mm. long; annuals, native of peninsular Florida.
- Pedicels ebracteolate; filament-tube 4.0-4.8 mm. long; perennials, native of southern Mexico.
- Mature capsule half inferior or more.
- Flower 14-16 mm. long, including hypanthium; plants glabrous, 10-15 cm. high from a short upright perennial rootstock which also sends out filiform leafy stolons; native of high mountains of Guatemala.
- Flower 13 mm. long or less, including hypanthium; plants annual or perennial not stoloniferous, usually not entirely glabrous.
- Seeds roughened with faint longitudinal markings, these plainly visible with a magnification of 20 diameters.
- Leaves linear, oblanceolate, or narrowly lanceolate, mostly 0.3 cm. wide or less and 7-12 times as long as wide; plants glabrous or very nearly so.
- Leaves lanceolate to ovate, the larger ones 0.5 cm. wide or more, 1.5-6 times as long as wide, or, if narrower, plants pubescent throughout.
- Leaves basal, the blades with prominent white veins above; capsule 4 mm. long or less.
- Leaves cauline or basal, green; capsule mostly 4.0-6.0 mm. long.
- Seeds smooth, highly polished and shining, without longitudinal striations.
- Plant perennial from a heavy woody base, the numerous stems decumbent; leaves cauline, elliptic, long-attenuate at base; leaves and lower part of stem densely clothed with fine sharp spreading often brownish hairs; native of Nuevo León.
- Plants annual or perhaps sometimes perennial; if perennial, not as above; leaves various; stems glabrous or the lower part sparsely pubescent or scabrous.
- Pedicels in fruit 4-10 (12) mm. long, strongly ascending, the tips little or not at all incurved, and the capsule thus more or less erect.
- Calyx-lobes ciliate near tips on margins; stems and leaves green (exceptionally purplish), glabrous or essentially so, not hispidulous; at least the middle leaves 1 cm. wide or more.
- Calyx-lobes smooth and glabrous; stems purplish below, wiry, usually hispidulous; cauline leaves usually 0.7 cm. wide or less.
- Pedicels in fruit 12 (rarely 10) mm. long or more, spreading, divaricate or the tips strongly incurved, the capsule then facing the stem; calyx-lobes glabrous.
- Stems purplish below, wiry, usually hispidulous; pedicels erect or divaricate, often much elongated, the tips usually not incurved; cauline leaves elliptic, usually 0.7 cm. wide or less; San
19. *L. pulchella* (see also *L. Dielsiana*).
22. *L. homophylla*.
21. *L. diastateoides*.
6. *L. stolonifera*.
9. *L. Purpusii*.
8. *L. subnuda*.
7. *L. Sartorii*.
11. *L. Pringlei*.
13. *L. brachypoda*.
14. *L. divaricata*.

- Luis Potost westward and southward.
14. *L. divaricata*.
- Stems green (exceptionally slightly purplish below), glabrous or essentially so, not hispidulous; pedicels and capsules usually strongly incurved; cauline leaves elliptic to ovate-cordate, at least the middle ones 1.0 cm. wide or more; Tabasco to southern Texas.
12. *L. Berlandieri*.
- Seeds conspicuously roughened, foveate-reticulate; natives of eastern United States.
- Lower lip of corolla pubescent within at base.
- Leaves linear-lanceolate to filiform, the cauline rarely as much as 0.4 cm. wide.
- Pedicels and hypanthium smooth and glabrous; bracteoles of pedicel none; flowering in spring.
44. *L. Boykinii*.
- Pedicels and hypanthium scabrous; bracteoles present; flowering from August to October.
43. *L. Canbyi*.
- Leaves lanceolate or oblong to ovate, the principal ones seldom less than 1 cm. wide.
- Plants nearly glabrous, with a few chafy hairs near the base, on the angles formed by the decurrent leaf-bases; leaves short-ovate, sessile, with a broad sub-clasping base.
42. *L. appendiculata*.
- Plants hirsute or densely short-pubescent, at least at base; leaves somewhat pubescent and narrowed at the base.
- Stem and leaves long-hirsute with rather sparse soft white hairs, these more or less uniform throughout; plants much branched, at least in age; capsule much enlarged in fruit, entirely immersed in the hypanthium at maturity, the latter then 7.5-11 mm. long.
45. *L. inflata*.
- Stem densely short-pubescent below, glabrous above; leaves somewhat short-pubescent, not long-hirsute; plants simple, strict; capsule and hypanthium little enlarged in fruit, the former one-half to two-thirds inferior, the latter 3.5-6.0 mm. long at maturity.
46. *L. spicata*.
- Lower lip of corolla glabrous within at base.
- Plants 20-75 cm. high, erect; leaves lanceolate to linear, the basal spatulate; capsule hemispheric, half inferior, often bristly.
40. *L. Nuttalli*.
- Plants 10-30 cm. high, weak, decumbent; leaves suborbicular, the lower petiolate; capsule somewhat elongate, two-thirds inferior or more, glabrous.
41. *L. Peayana*.
- Corolla-tube fenestrate laterally near base.
- Inflorescence narrowly spicate, the pedicels 5-9 mm. long in fruit, ebracteolate; leaves basal, oblanceolate, usually about 1 cm. wide by about 12 cm. long; native of Florida and southeastern Georgia.
49. *L. paludosa*.

Inflorescence loosely racemose, the pedicels 9-35 mm. long in fruit, or, if shorter, bracteolate at base or the stem with cauline leaves; natives of Mexico and Central America.

Leaves conspicuously and evenly serrate; blades long-acuminate at tip, cuneate at base; capsule 8-10 mm. long, about half inferior; pedicels ebracteolate; calyx-lobes sparingly toothed

15. *L. stenodonta*.

Leaves subtire to irregularly serrate; blades not as above; capsule 6 mm. long or less; pedicels bracteolate; calyx-lobes entire.

Ovary and capsule wholly superior or nearly so; pedicels strongly prickly-pubescent.

36. *L. hypnodes*.

Ovary and capsule one-half to two-thirds inferior; pedicels glabrous or sparsely ciliate, never prickly.

Seeds with longitudinal markings, these easily visible with a magnification of 20 diameters; pedicels spreading-ascending, usually arcuate, the mature capsule incurved; capsule 3.0-6.0 mm. long, usually slightly more than half inferior (sometimes as much as two-thirds inferior), the hypanthium hemispheric to long-campanulate.

7. *L. Sartorii*.

Seeds plainly impressed-reticulate, not longitudinally marked; pedicels stiffly divaricate, the mature capsule not at all incurved; capsule 3.5 mm. long or less, about half inferior, the hypanthium hemispheric.

35. *L. tarso-phora*.

Section 1. *Holopogon* Benth. & Hook. Gen. Pl. 2: 552. 1876. Delicate herbs with small bluish flowers, smooth trigonous seeds, and bracteoles at base of pedicels foliaceous, resembling stipules.

1. *Lobelia aquatica* Cham. *Linnaea* 8: 211. 1833.

Lobelia domingensis A. DC. in DC. Prodr. 7: 359. 1839. (*Bertero* ? in 1825; Geneva, photo!)

Lobelia bracteolata Vatke, *Linnaea* 38: 721. 1874. (*Moritz*, herb. Berlin!) Not *Lobelia bracteolata* A. DC. 1839.

Dortmannia aquatica Kuntze, *Rev. Gen.* 972. 1891.

Plant decumbent, rooting at the lower nodes, the base submerged (?); stem unbranched, weak, slender, 1 mm. in diameter at base, green, smooth and glabrous, 30-50 cm. long; cauline leaves few-13, spreading, membranous, smooth and glabrous, shallowly and regularly crenate-dentate, the teeth callose-tipped; lower leaves often subtire, the margins sinuate with inconspicuous callose teeth, the blades about 1 cm. wide by 2 cm. long, ovate to oblong, the tips cuneate-acute, the bases abruptly rounded, sessile, or subpetiolate; leaves gradually decreasing in size upward, the upper ones relatively narrower, lanceolate or elliptic-lanceolate, sessile, narrowly acute at tip; raceme 8-25 cm. long, loosely 8-15-flowered, scarcely secund, the lowest flowers in the axils of the scarcely reduced upper leaves; pedicels spreading-ascending, filiform, 17-33 mm. long in fruit, smooth, abruptly curved at tip so that the mature capsule is bent away from the inflorescence axis; bracteoles of the pedicel 2, green, at the very base, oblong-linear, 1-2 mm. long; lower flower-bracts sometimes 2 cm. long, leafy, the upper smaller, mostly about 2.5-10 mm. long; flower 7 (?) mm. long, including hypanthium; corolla blue (?), with white markings, the tube about 1.7 mm. long, cleft to base, but not otherwise fenestrate, the lobes of the upper lip about 2 mm. long, those of the lower lip between 1.5 and 2 mm. long; filament-tube 3.0 mm. long, the filaments glabrous, united in the distal third only;

anther-tube 1.0 mm. long, all five anthers shortly white-tufted at tip; style sharply declined just above the summit of the ovary (bent away from the dorsal side of the corolla) and then recurved so that it enters the anther-tube almost from the usual position; hypanthium in anthesis short-campanulate, smooth, becoming ellipsoid or subglobose in fruit, slightly higher than broad, about 3.0 mm. across; capsule about three-fourths inferior; calyx-lobes linear-subulate, smooth, entire, 3.5-4.5 mm. long; seeds shining, smooth, trigonous, ellipsoid, about 0.5 mm. long.

TYPE LOCALITY: Brazil, *Sellow*.

DISTRIBUTION: Hispaniola; Colombia and Venezuela to southeastern Brazil.

ILLUSTRATION: Mart. Fl. Bras. 6^a: pl. 41. f. 1.

Section 2. Hemipogon Benth. & Hook. Gen. Pl. 2: 552. 1876. Herbs with bluish or purplish (sometimes white) flowers and smooth or faintly lined ellipsoid or ovoid seeds; bracteoles of the pedicel, if present, minute and basal.

2. *Lobelia guina* Cav. Ic. 6: S. pl. 511, f. 2. 1800.

Perennial, with heavy clustered roots; stem erect, simple or with few or numerous ascending subordinate branches, 1-3 mm. in diameter at base, green (or purplish below), 20-65 cm. high, pubescent or nearly glabrous; cauline leaves few-20, ascending-appressed, thin or papery, usually somewhat stiff-pubescent at base, on veins beneath, and on margin, shallowly and regularly dentate, the blades (0.2) 0.3-0.7 (1) cm. wide by (2) 4-7 cm. long, the upper lance-linear, attenuate at tip, and, as well as the middle ones, narrowed at base but not petiolate, the lower leaves broader in proportion, usually oblanceolate (those nearest base sometimes spatulate), acute or blunt at tip, narrowed to a subpetiolar base; inflorescence 2-20 cm. long, pedunculate, the stem naked for 5-22 cm. below the lowest bract, the raceme often congested or capitate, the few-35 (65) flowers then approximate (the axis often elongating in age, so that the lower flowers are more distant); pedicels ascending, stiff (spreading in the more congested racemes), 3-6 (10) mm. long in fruit, smooth or minutely prickly, bibracteolate near base; flower-bracts linear or narrowly lanceolate, 5-10 mm. long, usually stiff-ciliate, the lowest somewhat larger (especially in looser racemes), 10-15 (20) mm. long; flower 16-22 mm. long, including hypanthium; corolla purplish-blue, glabrous (or puberulent without), the tube entire except for the dorsal fissure, 5-10 mm. long, somewhat widened distally, the lobes of the lower lip narrowly elliptic or oblong, acute (less often spatulate), about 2 mm. wide by 6-8 mm. long, spreading or reflexed, the two upper lobes lanceolate, 5-8 mm. long, erect; filament-pubescent below, somewhat deflexed, the filaments connate about one-third their length; anther-tube bluish-gray, 2.5-3.5 mm. long, the two smaller anthers white-tufted at tip, the larger glabrous or ciliate on backs; hypanthium in anthesis short-campanulate or cup-shaped, glabrous or pubescent, in fruit hemispheric or short-campanulate, 3.5-4.0 mm. across; capsule half inferior or a little more, 5-7 mm. long; calyx-lobes linear-subulate, ciliate-pubescent at least near tip, 3-6 mm. long; seeds ellipsoid, light brown, smooth and shining, 0.4-0.6 mm. long.

TYPE LOCALITY: Real del Monte, Hidalgo, *Née* (herb. Madrid, Field Mus. Neg. 294471).

Filament-tube 4.5-6.5 mm. long; anther-tube usually white-pubescent; middle cauline leaves usually 3-5 (rarely 8) times as long as wide; Oaxaca and Guerrero.

Filament-tube (6.0) 8.0-9.0 (12.0) mm. long; anther-tube usually glabrous except for the terminal tufts of the two shorter anthers; middle cauline leaves often 10 times as long as broad; region of Mexico City and northward, rarely south to Oaxaca.

2b. *L. guina* var. *pedunculata*.

2a. *L. guina* var. *conferta*.

2a. *Lobelia guina* var. *conferta* Fernald, Proc. Am. Acad. 36: 503. 1901.

Lobelia guina Cav. loc. cit., as to type.

Lobelia rupestris H.B.K. Nov. Gen. & Sp. 3: 312. 1819. (Field Mus. Neg. 38181)

Lobelia pauciflora H.B.K. Nov. Gen. & Sp. 3: 314. 1819. (Field Mus. Neg. 38180)

Lobelia commutata R. & S. Syst. Veg. 5: 73. 1819.

Lobelia simplex Willd., R. & S. Syst. Veg. 5: 73, as syn. 1819.

Lobelia oroulac Mart. & Gal. Bull. Acad. Brux 9^e. 44. 1842. (*Galeotti 1886*, Brux 5)

Dorstenium guianense Kuntze, Rev. Gen. 972. 1891.

- Dortmannia orizabae* Kuntze Rev. Gen. 973. 1891.
Dortmannia pauciflora Kuntze Rev. Gen. 973. 1891.
Lobelia Rouaixii Conzatti, Pobl. Valle Teotihuacán [Sec. Agr. Fom. Direc. Antropol. Mex.] 1: 40, as syn. 1922.
Lobelia grüna var. *Rouaixii* Conzatti, Pobl. Valle Teotihuacán [Sec. Agr. Fom. Direc. Antropol. Mex.] 1: 41. pl. 7. 1922. (Conzatti 3377.)
Lobelia grüna var. *grüna* McVaugh, Am. Midl. Nat. 24: 687. 1940.
Lobelia grüna forma *conferta* McVaugh, Am. Midl. Nat. 24: 687. 1940.

Middle cauline leaves usually 8–12 times as long as broad, the blades dentate; stems short-pubescent, especially near base, or nearly glabrous; filament-tube (6) 8–9 (12) mm. long; anther-tube usually glabrous except for the terminal tufts of the two shorter anthers; "peduncle" mostly 6–13 cm. long.

TYPE LOCALITY: "Durango abundant by a creek, Dos Cajetes, alt. 2620 m.," *Ed. Palmer 810*, Nov. 3–5, 1896 (Gray!).

DISTRIBUTION: Nuevo León and San Luis Potosí to Durango, south to Oaxaca, mostly at elevations of 1800–3000 m.

2b. *Lobelia grüna* var. *peduncularis* McVaugh, Am. Midl. Nat. 24: 687. 1940.

Middle cauline leaves usually 3–5 (rarely 8) times as long as wide; stems with rather dense and uniformly distributed pubescence; filament-tube 4.5–6.5 mm. long; anther-tube usually white-pubescent; peduncle 11–20 cm. long.

TYPE LOCALITY: Sierra de San Felipe, Oaxaca, *Pringle 5688* (Gray!).

DISTRIBUTION: Mountains of Oaxaca and Guerrero, at elevations of 1500–2700 m.

3. *Lobelia anatina* F. E. Wimmer, Repert. Sp. Nov. 19: 385. 1924.

Stems erect, often several from thick perennial roots, simple or with a few subordinate branches, 1–3 mm. in diameter at base, green (or purplish below), 15–70 cm. high, smooth or sparsely pubescent below; cauline leaves few–25, appressed-ascending, thin, glabrous or the lowest ciliate on margins of petiole, the blades shallowly and uniformly callose-dentate or nearly entire, 0.1–0.6 cm. wide by 3.5–8 cm. long, 7.5–15 (20) times as long as wide, the lower broader, the upper leaves linear to lanceolate, attenuate at tip and little narrowed to the base, the lower ones acute or blunt at tip, narrowed at base, often oblanceolate, the lowest sometimes obovate, rounded at tip, petiolate, up to 1.3 cm. wide by 3.5 cm. long; leaves sometimes all linear, or nearly so; inflorescence few–22 cm. long, little or not at all secund, loosely (few-) 10–23-flowered, often pedunculate 5–8 cm., but this not noticeable because of the widely spaced flowers; pedicels ascending, weak, 6–15 (25) mm. long in fruit, glabrous (less often bristly-pubescent), bibracteolate near base; flower usually deflexed at maturity; flower-bracts narrowly linear, usually glabrous, callose-dentate, 9–14 (the lowest to 25) mm. long; flower 15–23 mm. long, including hypanthium; corolla blue, with a white eye, glabrous without, the lower lip roughened within, the tube hairy within, 7–9 mm. long, entire except for the dorsal fissure which extends to a point 1–2 mm. from base, the lobes of the lower lip spreading, obovate, mucronate, up to 3–5 mm. wide by 8–10 mm. long, the two upper lobes erect or reflexed, linear-spatulate, up to 1.0–1.8 mm. wide by 6–9 mm. long; filament-tube (3.5) 4–5 mm. long, scarcely deflexed, included in the narrow corolla-tube, glabrous or hairy below, the filaments connate distally only; anther-tube 2–3 mm. long, bluish-gray, the two smaller anthers white-tufted, the others ciliate on backs or nearly smooth; hypanthium in anthesis campanulate or oblong, usually glabrous (less often bristly-pubescent), in fruit becoming campanulate or ellipsoid, 3–4 mm. across; capsule more than half inferior, 6–9 mm. long; calyx-lobes linear-subulate, glabrous or slightly pubescent, 3–7 mm. long; seeds ellipsoid, light brown, smooth and shining, about 0.6 mm. long.

TYPE LOCALITY: Moist places at the base of the Sierra Madre, Chihuahua, *Pringle 1659* (herb. Vienna, Delessert).

DISTRIBUTION: Arizona and western New Mexico, south along the Sierra Madre to Durango.

4. *Lobelia nana* H. B. K. Nov. Gen. & Sp. 3: 317. pl. 272. 1819.

Lobelia bellis F. E. Wimmer, Repert. Sp. Nov. 22: 193. 1926. (*Liebmann pl. mex. 9204*, Copenhagen!)
Dortmannia nana Kuntze, Rev. Gen. 973. 1891.

Stems slender, less than 1 mm. in diameter, 5-20 cm. long, glabrous, several arising from a stout erect perennial caudex, then creeping and rooting at the nodes; plant sometimes tufted, without creeping stems; leaves 10-20, glabrous or the margins ciliate near base, more or less two-ranked, ovate, spatulate or oblanceolate, acute or obtuse at tip, narrowed at base into a margined petiole, the margin shallowly crenate with callose teeth, the teeth sometimes few or none, the blades usually 2-2.5 times as long as wide, 0.3-1 (1.5) cm. wide, 0.6-1.5 (4) cm. long, including petiolar base; flowers 2-4, solitary in the axils of ordinary leaves, the pedicels stiff, erect, up to nearly 1 mm. in diameter, (7.0) 20-65 (160) mm. long, smooth and glabrous; bracteoles basal, minute, often apparently wanting; flower 10-13.5 mm. long, including hypanthium; corolla glabrous, blue with a white eye, the tube 3-4 mm. long, entire except for the dorsal fissure, the three lower lobes ovate or spatulate, mucronulate, 3.0-3.5 mm. wide, 5-6 mm. long, the two upper lobes narrow, acute, 1-2 mm. wide, 5-6 mm. long; filament-tube 2.0-3.5 (4.5) mm. long, glabrous; anther-tube 1.2-2.0 mm. long, dark bluish-gray, the two smaller anthers slightly white-tufted at tip; hypanthium in anthesis short-campanulate, glabrous, in fruit becoming campanulate, 2.5-4 mm. in diameter; capsule one-third to one-half inferior, 5.0-6.5 mm. long; calyx-lobes lance-deltoid, 2.5-4.5 mm. long, glabrous, entire, acute or blunt at tip; seeds ellipsoid, lustrous, smooth or very minutely lined, 0.4-0.5 mm. long.

TYPE LOCALITY: Hidalgo ("juxta Real del Monte et Moran, alt. 1340 hex.').

DISTRIBUTION: Chihuahua to Vera Cruz and Chiapas; also in the Andes from Colombia to Argentina and Chile; found mostly at elevations of 2500-4000 m.

ILLUSTRATION: H.B.K. Nov. Gen. & Sp. pl. 272.

5. *Lobelia Standleyi* McVaugh, sp. nov.*

Plants entirely glabrous, or the stem, pedicel, hypanthium, and outer surface of the corolla-tube minutely hispidulous; stems creeping and rooting at most of the nodes, less than 1 mm. in diameter, up to 5 cm. long; leaves numerous (often 25 on a stem 4 cm. long), more or less two-ranked, imbricate, often concealing the stem, the blades up to 7 mm. long and wide, the width often slightly exceeding the length except in the terminal leaves, ovate or suborbicular or the upper narrowly ovate, all abruptly narrowed to the essentially sessile base, all blunt at tip or the upper acute, the margins uniformly and sharply serrate with 10-13 deltoid teeth 0.5-1 mm. long and wide, the serration extending almost to base, the venation reticulate, very obscure, even the midvein usually not evident; flowers 1-3, solitary in the upper axils, inverted, on stiff, erect, usually hispidulous pedicels 4 mm. long or less; bracteoles minute, basal, filiform; flower 10-12 mm. long, including hypanthium; corolla pale blue to white, with a thickened greenish-yellow spot at base of lower lip, the tube hairy within, about 3 mm. long (measured to lateral sinuses) or 1.7-2.5 mm. long (measured to dorsal sinus), not fenestrate, the three lower lobes spatulate, mucronulate, 1.7-2.5 mm. wide, 4-5.5 mm. long, often much narrowed at base, the two upper lobes about 1.5 mm. wide, 5-6.5 mm. long; filament-tube 4-5 mm. long, the filaments free more than two-thirds their length, ciliate below; anther-tube 1.7-2 mm. long, light bluish-gray, glabrous except the two shorter anthers which are bristly-spinulose at tips; hypanthium in anthesis campanulate, usually hispidulous, about 2 mm. long by 1.5 mm. wide when pressed; fruits not seen; immature capsule about half inferior, acute at both ends, 6 mm. long; calyx-lobes linear or narrowly triangular, acute, entire, 0.8-1 mm. wide at base, 4-6.5 mm. long; seeds unknown.

TYPE LOCALITY: Region of Chemal, Sierra de los Cuchumatanes, alt. about 3300 m., Huehuetenango, Guatemala, *Standley 81108*, Dec. 28, 1940 (Field!).

DISTRIBUTION: Alpine meadows, Huehuetenango and Totonicapán, Guatemala, at elevations between 3100 and 3300 m.

6. *Lobelia stolonifera* Donn. Smith, Bot. Gaz. 27: 338. 1899.

Stem erect, simple, slender, up to 0.6 mm. in diameter, purplish below, glabrous, 10-15 cm. high, solitary from a short upright perennial rootstock; rootstock sending out filiform stolons few-17 cm. long (according to Smith), the stolons leafy; cauline leaves 1-4, near base of stem, glabrous, subcoriaceous, obscurely callose-denticulate, elliptic or oblanceolate, the upper sessile, the lower tapering to a margined subpetiolar base; blades 0.2-0.5 cm. wide,

* *Lobelia Standleyi*, sp. nov.; herba repens-minuta, foliis ovatis latioribusve, conspicue serratis, sessilibus, usque ad 7 mm. longis; laticulis 4 mm. longis, erectis, bracteolatis; a *Lobelia nana* foliis serratis pedicellis brevioribus differt.

1.0–2.3 cm. long, 3–5 (8) times as long as wide; leaves of the basal rosette 1–5, oblanceolate, rounded at tip, tapering to a cuneate base, with a petiole up to 2 cm. long, a blade up to 0.7 cm. wide, 1.3 cm. long; leaves of the stolons similar; inflorescence 5 cm. long or less, 3–4-flowered, appearing pedunculate, the stem naked below it for 3–7 cm.; pedicels more or less upright, stiff, 4–5 mm. long in fruit, glabrous, each with a pair of small bracteoles at base; flower-bracts subulate, the lowest one elliptic, ciliate, subamplexicaul, larger than the others, 1.0–1.8 mm. wide, 7–10 mm. long; flower 14–16 mm. long, including hypanthium; corolla blue or white, glabrous without, the tube hairy within, 3.5–4 mm. long, entire except for the dorsal fissure, which extends to a point 1.5–1.8 mm. from the base, the lobes of the lower lip obovate, rounded or mucronate at tip, somewhat attenuate at base, about 3 mm. wide, 7–8 mm. long, the upper lobes linear-subulate, apparently recurved, about 1.5 mm. wide at base, 5.0–6.5 mm. long; filament-tube 3.5–4.0 mm. long, the filaments glabrous distally, free at base less than half their length and there ciliate on the margins; anther-tube 1.8–2.0 mm. long, the anthers minutely granular-roughened, all bristly toward the tip, the two shorter ones with several bristles and two of these prolonged and hornlike, nearly 0.5 mm. long; hypanthium in anthesis campanulate or ellipsoid, white-pubescent with sharp straight hairs, in fruit somewhat enlarged, somewhat longer than broad, about 2.5 mm. in diameter; capsule ellipsoid-fusiform, more than half inferior, about 6 mm. long; calyx-lobes narrowly triangular, glabrous, acute, entire, purple, 0.7–1.0 mm. wide at base, 4–5 mm. long; seeds ellipsoid, brown, very minutely longitudinally lined, shining, about 0.5 mm. long.

TYPE LOCALITY: Plains at the summit of the Cordillera at 3000 m., between Todos los Santos and Chiantla, Huehuetenango, Guatemala, *Seler 3017* (US!).

DISTRIBUTION: Alpine meadows, Huehuetenango, Guatemala.

7. *Lobelia Sartorii* Vatke, *Linnaea* 38: 721. 1874.

Lobelia novella B. L. Robinson, *Proc. Am. Acad.* 26: 167. 1891. (*Pringle 3288*, Gray!)

Dortmannia Sartorii Kuntze, *Rev. Gen.* 973. 1891.

Lobelia piscinula F. E. Wimmer, *Repert. Sp. Nov.* 38: 84. 1935. (*Lehmann 1379*, isotype, US!).

Lobelia calcaera F. E. Wimmer, *Repert. Sp. Nov.* 38: 83, in part. 1935.

Stem erect or ascending, sometimes decumbent, simple or with numerous ascending branches from the middle or below, 1–3 mm. in diameter at base, 10–85 cm. high, green, or (usually) purplish below (sometimes the whole plant purplish), usually glabrous above or slightly pubescent at base of branches, short-stiff-pubescent below or infrequently glabrous; leaves cauline, few–15 (40), often crowded in the lower third of the plant and appearing radical, all spreading-ascending and rather stiff when dry, short-stiff-pubescent with whitish hairs which collapse when dry, the pubescence sometimes wanting or essentially so, the margins varying from subentire, with minute callose teeth, to repand-denticulate or serrate, the blades lanceolate or narrowly elliptic, varying to broadly ovate or narrower, almost linear, or oval, the lowest ones broadest; petioles almost none or slender, up to 1–3 cm. long; principal leaves (0.2) 1–3.5 cm. wide by 2–5.5 (7) cm. long; inflorescence few–27 cm. long, often plainly secund, loosely few–27-flowered, appearing pedunculate, the stem naked below the lowest bract for a distance of 2–15 cm.; pedicels spreading-ascending, usually incurved in fruit, slender, 10–33 mm. long in fruit, glabrous or sparsely ciliate, each with a pair of minute bracteoles at base; flower-bracts linear-subulate, 2–6 mm. long or the lowest larger, glabrous or ciliate on the margins, entire or the lowest toothed; flower 8.5–13 mm. long, including hypanthium; corolla blue (?), glabrous without, the tube short-pubescent within and at base of lower lip (this sometimes glabrous), 4.0–5.5 mm. long, entire except for the dorsal fissure or sometimes fenestrate laterally, the lower lip somewhat reflexed, the lobes spreading, elliptic to obovate, 2–2.5 mm. wide, 4–5 mm. long, the two upper lobes linear, erect, 3.5–4 mm. long; filament-tube 3–4 (5.5) mm. long, glabrous distally, the proximal half of the filaments free, pubescent or glabrous; anther-tube 1.0–1.8 mm. long, light bluish-gray, the two smaller anthers white-tufted at tip, the three larger ones ciliate on the backs; hypanthium in anthesis glabrous (rarely short bristly-pubescent), broadly obconic, in fruit becoming broadly turbinate or short-campanulate, 2.5–3.5 mm. in diameter, as broad as high or nearly so; capsule one-half to two-thirds inferior, 3.5–6 mm. long; calyx-lobes linear-subulate or narrowly triangular, glabrous or

rarely pubescent, entire, 2-5 mm. long, usually purple-tipped in anthesis; seeds brown, ellipsoid, somewhat lustrous, about 0.6 mm. long, with faint longitudinal striae, these plainly visible with a magnification of 20 diameters.

TYPE LOCALITY: Mexico (probably Vera Cruz), *Sartorius* (Field Mus. Neg. 9116!).

DISTRIBUTION: Southwestern Tamaulipas and eastern San Luis Potosí to northern Oaxaca, thence to Chiapas and central Guatemala, mostly at elevations of 1500-2500 m.

8. *Lobelia subnuda* Benth. Pl. Hartw. 44. Mr 1840.

Lobelia discolor Klotzsch, in Link, Klotzsch, & Otto, Ic. Pl. Rar. 3. pl. 2. S 1840.* (Based on a cultivated plant.)

Dortmannia subnuda Kuntze, Rev. Gen. 973. 1891.

Annual; stem erect, simple or with 1-2 upright branches, slender (up to 1 mm. diameter at base), 10-30 cm. high, slightly pubescent at base; cauline leaves none or 1-3, bract-like (rarely broader, deltoid, truncate, similar to the basal), up to 0.3 cm. wide by 1.1 cm. long, borne on the lower two-fifths of the plant; radical leaves 1-8, purple below, greenish-purple and prominently whitish-veined above, about (4) 8-15 mm. wide by (4) 10-22 mm. long, on a petiole (2) 5-10 (30) mm. long, the blades coarsely and irregularly incised-toothed, ovate or the smallest suborbicular, truncate or slightly cordate at base, blunt at tip; petiole, main veins beneath, and blade near margin above pubescent; inflorescence a loose raceme, 5-10- (18-) flowered, 6-19 cm. long; pedicels loosely spreading, upcurved, or more or less appressed, 12-50 mm. long in fruit, glabrous, inconspicuously bibracteolate at base; flower-bracts nearly entire, the lowest up to 2.5 mm. wide by 12 mm. long, linear-oblong, the others linear-filiform, 2-4 (10) mm. long; flower 8.5-11 mm. long, including hypanthium; corolla glabrous, pale bluish-purple, the tube 3.0-3.5 mm. long, entire except for the dorsal fissure, which extends to the base, the lower lip puberulent at base within, its lobes ovate, 1.5 mm. wide by 4 mm. long, the lobes of the upper lip linear, 3-3.5 mm. long; filament-tube glabrous, 2.7-3.5 mm. long, the filaments connate about half their length; anther-tube 1.0-1.5 mm. long, dark bluish-gray, the three larger anthers smooth, the two smaller minutely white-tufted at tip; hypanthium in anthesis glabrous, conic; capsule cup-shaped or short-campanulate, 1.5-2.5 mm. in diameter by 2.5-4 mm. long, slightly more than half inferior; calyx-lobes glabrous, entire, lanceolate, subacute, 1.7-2.5 mm. long; seeds ellipsoid, faintly and minutely striate longitudinally, 0.3-0.4 mm. long.

TYPE LOCALITY: Mexico ("in umbrosis loco Banco dicto"), *Hartweg 336* (Kew!).

DISTRIBUTION: Highlands of southern Mexico (Hidalgo).

ILLUSTRATION: Link, Klotzsch, & Otto, Ic. Pl. Rar. pl. 2.

9. *Lobelia Purpusii* Brand. Univ. Calif. Publ. Bot. 4: 190. 1911.

Perennial (?), with fibrous roots from creeping rootstocks about 1 mm. in diameter; stem erect or decumbent, unbranched, slender (up to 1 mm. in diameter at base), green, 10-30 cm. high, glabrous or ciliate at base, terete; leaves cauline or crowded near base of stem, horizontally spreading or somewhat ascending, glabrous, usually 10-40, subentire, with fine callose teeth or the margins notched-denticulate, or crenate with 2-5 distant teeth on each edge, the blades narrowly lanceolate or linear to oblanceolate, 0.2-0.3 cm. wide by 1.4-3.6 cm. long, acute or blunt at tip, gradually narrowed at base; inflorescence 3-15 cm. long, pedunculate 2-5 cm., not secund, loosely 5-12-flowered; pedicels spreading-ascending, filiform, glabrous, 18-50 mm. long, each with a pair of tiny bracteoles at base; mature fruit incurved so as to stand at an angle of 90° to the pedicel; flower-bracts glabrous, linear-filiform, 2-4 (10) mm. long, or the lower leafy, up to 3 mm. wide by 26 mm. long; flower 8-13.5 mm. long, including hypanthium; corolla (blue?) glabrous, the tube about 5 mm. long, cleft dorsally to a point about 1 mm. from base, otherwise entire, the lobes of the lower lip elliptic or obovate, mucronate, up to 1.5 mm. wide by 4.5 mm. long, spreading, the upper lobes linear, erect, up to 4.5 mm. long; filament-tube 3.0-3.5 (4.3) mm. long, glabrous, the filaments connate more than half their length; anther-tube 1.0-1.5 mm. long, bluish-gray, the two smaller anthers slightly tufted, the three larger glabrous or few-ciliate on back; hypanthium in anthesis short-campanulate or conic, glabrous, becoming

* On the last page (62) of the volume, Klotzsch acknowledged the priority by several months of *L. subnuda* over *L. discolor*.

campanulate in fruit, about 2.5 mm. across; capsule three-fifths inferior, 3.5-5 mm. long; calyx-lobes linear-subulate, glabrous, entire, 2-3.5 mm. long; seeds ellipsoid, somewhat apiculate, light-brown, lustrous but very minutely lined, 0.4-0.5 mm. long.

TYPE LOCALITY: Zacuapán, Vera Cruz, *Purpus* 4933 (U. of Calif.!).

DISTRIBUTION: Mountains of northern Vera Cruz and eastern San Luis Potosí.

10. *Lobelia illota* McVaugh, Am. Midl. Nat. 24: 689. 1940.

Perennial(?); whole plant uniformly covered with white, spreading, somewhat crisped hairs which may be 1 mm. long or less, and give the plant a grayish or glaucous appearance; stems weak, straggling or decumbent, 1.5 mm. in diameter or less at base, green, 15-20 cm. long; cauline leaves 7-12, spreading, papery when dry, the margins sinuate, practically entire, the few minute callosities hidden by the hairs of the blade, the blades broadly elliptic, about equally narrowed to base and apex, 1.2-2.6 cm. wide, 2-4.6 cm. long, mostly less than twice as long as wide, the apex blunt or subacute, the base acute or slightly attenuate; petiole slender, 0.3-1.2 cm. long; inflorescence not secund, 7-9 cm. long, loosely 10-12-flowered; pedicels flexuous, rather strongly ascending, filiform, about 10 mm. long in fruit, each with a pair of very minute bracteoles at base; flower-bracts linear, entire, about 1 mm. broad, 4 mm. long; flower about 10 mm. long, including hypanthium; corolla apparently blue or white, somewhat hairy, the tube about 4.5 mm. long, cleft dorsally nearly to base, otherwise entire; filament-tube 4.0-4.5 mm. long, glabrous, the filaments distinct at base about half their length; anther-tube 1.5 mm. long, the two smaller anthers white-tufted at tips, the three larger with stiff bristles on the backs; hypanthium in anthesis hemispheric, in fruit similar, somewhat enlarged, 2.5-3 mm. in diameter; capsule about half inferior; calyx-lobes subulate or very narrowly triangular, acute, entire, 2.5-3 mm. long; seeds ellipsoid, polished, brown, about 0.5 mm. long, with no lines visible at a magnification of 20 diameters.

TYPE LOCALITY: Chiapas ("in montibus argentiferis Zacualpan"), *Rovirosa* 900 (Acad. Phila.).

DISTRIBUTION: Known only from the type locality.

11. *Lobelia Pringlei* S. Wats. Proc. Am. Acad. 25: 157. 1890.

Perennial, from a short, heavy, woody, upright caudex; stems several, decumbent-spreading, simple or branched, 1-2 mm. in diameter at base, green or brownish below, 20-38 cm. long, glabrous above, densely brownish-pubescent below and on young vegetative shoots, with very slender, sharp-pointed, subulate hairs which are not flattened in drying and present a bristly appearance; cauline leaves few-20, thickish, pubescent especially near base and margins, coarsely and irregularly crenate, the blades averaging 1 cm. wide by 1.7 cm. long, up to 1.6 cm. wide by 3 cm. long, elliptic or ovate to spatulate, obtuse or subacute at tip (often obtuse on young shoots), narrowed at base (cuneate) to a margined petiole which is often 1-2.5 cm. long; inflorescence a loose raceme, 6-18 cm. long, on a naked peduncle 4-9 cm. long, loosely few-16-flowered; pedicels slender, ascending, 12-25 mm. long in fruit, glabrous, each with a pair of tiny bracteoles at base, incurved at distal end, so that the mature fruit turns toward the stem; flower-bracts up to 6 mm. long, linear, obtuse, ciliate; flower 10 mm. long, including hypanthium; corolla glabrous, the tube entire except for the dorsal fissure, 3.0-3.5 mm. long, the lower lip pubescent at base within, its lobes about 2-2.5 mm. wide by 4.5 mm. long, elliptic to spatulate, mucronate; filament-tube 2.0-2.5 mm. long, glabrous, the filaments connate one-fourth their length; anther-tube 1.3-1.7 mm. long, bluish-gray, the smaller anthers tufted, the three larger ciliate on backs; hypanthium in anthesis broadly obconic or campanulate, glabrous, becoming campanulate in fruit, 2-3 mm. across; capsule three-fifths to three-fourths inferior, 4.5-5 mm. long; calyx-lobes linear-subulate, entire, 2.5-4 mm. long, glabrous or ciliate; seeds ellipsoid, smooth, shining, light-brown, minutely lined, about 0.4 mm. long.

TYPE LOCALITY: Limestone ledges, Sierra de la Silla, Nuevo León, *Pringle* 2538 (Gray!).

DISTRIBUTION: Mountains of central Nuevo León.

12. *Lobelia Berlandieri* A. DC. in DC. Prodr. 7: 367. 1839.

Dortmannia Berlandieri Kuntze, Rev. Gen. 972. 1891.

Lobelia calcarea F. E. Wimmer, Repert. Sp. Nov. 38: 83, in part. 1935. (*Pringle* 3369, isotype, Gray!)

Annual; stems erect or ascending, 10-50 cm. high, stout or decumbent and prostrate, green (rarely purplish-tinged near base), simple or with few-20 ascending branches from the base of the plant (the plant becoming bushy thereby), the diameter at base 1-3 mm., pubescence wanting or of sparse fine whitish hairs, these mostly near the base, hollow, blunt, cylindrical, collapsing when dry; leaves cauline, few-12, membranous or papery when dry, entirely glabrous or ciliate near base and margins and on the petiole, the blades elliptic or lanceolate to ovate, 1-3.5 cm. wide, 1.8-5 cm. long, mostly 1.5-2 times as long as wide, those of the middle leaves largest, the lower broader and the lowest sometimes crowded near base of stem, forming a basal rosette; margins subentire to coarsely and irregularly toothed, both sorts often on the same plant; apex of blades obtuse or rounded (at least in the lower leaves), the base mostly cuneate, subpetiolar, or the lower leaves with a distinct margined petiole 0.5-2.5 cm. long; inflorescence usually secund, few-25 cm. long, loosely few-35-flowered, appearing pedunculate, the stem usually naked below it for a distance of 12 cm. or less; pedicels slender, mostly 10-20 mm. long in fruit, glabrous or rarely somewhat bristly, usually strongly incurved in fruit, each with a pair of tiny bracteoles at base; flower-bracts linear-subulate, 3-6 (9) mm. long (or the lowest larger, leafy), mostly entire, the margins smooth or ciliate; flower 10-13 mm. long, including hypanthium; corolla pale or bright purplish-blue, with a white eye (occasionally pure white), the lower lip with 2 yellowish-green tubercles at base; corolla glabrous without, the inner surface hairy within the tube and at the base of the lower lip, or glabrous, the tube (3.5) 4-5 mm. long, entire except for the dorsal fissure which extends to a point 1 mm. from base or less, the lobes of the lower lip oblong or obovate, 1.5-3.5 mm. wide, 4-7 mm. long, often shorter than or barely equaling the tube, the two upper lobes linear, erect, 1 mm. wide by 3-5 mm. long; filament-tube 2.5-3.5 mm. long, glabrous distally, the filaments free about half their length and there pubescent; anther-tube 1.0-1.5 mm. long, light bluish-gray, the two shorter anthers white-tufted at tips, the three longer ones sparsely ciliate on the backs; hypanthium in anthesis short-campanulate or obconic, glabrous, in fruit becoming campanulate, plainly longer than broad, 2.5-3 mm. across; capsule ellipsoid, one-half to three-fourths inferior, 3-5 (6) mm. long; calyx-lobes subulate, entire, 1.5-2.5 mm. long, glabrous; seeds ellipsoid, smooth and shining, polished, about 0.5 mm. long.

TYPE LOCALITY: Near Tampico, Tamaulipas, *Berlandier 106* (herb. DC., photo!).

DISTRIBUTION: Southern Texas to Tabasco, mostly east of the Sierra Madre.

13. *Lobelia brachypoda* A. DC.; Small, Fl. SE. U. S. 1147. 1903.

Lobelia cliffortiana var. *brachypoda* A. Gray, Syn. Fl. N. Am. 2: 7. 1878. (Type from "S. W. Texas.")

Annual; stem erect, simple or with 1-20 ascending subordinate branches (the lower branches sometimes decumbent at base), rather coarse (up to 6 mm. in diameter at base), green, few-60 cm. high, entirely smooth and glabrous or with scattered hairs; cauline leaves few-20, spreading-ascending, thin in texture, entirely glabrous or ciliate near the margins and on the petiole, coarsely or finely and irregularly serrate or crenate, the blades 1-2.5 cm. wide by 2.5-5 cm. long, mostly 1.5-2.5 times as long as wide, broad-elliptic or ovate, obtuse or sometimes short-acute at tip, narrowed at the cuneate base to a margined petiole which may be 2.5 cm. long, the upper leaves narrower, more acute, sessile or subpetiolar; inflorescence few-20 cm. long, not secund, few-30-flowered (average less than 20); lower flowers sometimes distant, because of elongation of the axis; inflorescence sometimes pedunculate (2-8 cm.); pedicels ascending, slender, 4-12 mm. long in fruit, glabrous or rarely bristly, each with a pair of tiny bracteoles at base; longer pedicels, in fruit, sometimes incurved; flower-bracts linear, 4-9 mm. long, or the lowest lanceolate, leafy, up to 1.5 mm. wide by 18 mm. long, glabrous or ciliate, usually entire; flower 10-13 mm. long, including hypanthium; corolla blue, with a white eye, smooth, or the lower lip puberulent at base within, the tube 3.5-5.0 mm. long, entire except for the dorsal fissure, which extends to a point less than 1 mm. from the base, the lobes of the lower lip oblong or obovate, up to 3.5 mm. wide by 7 mm. long, mucronate, usually slightly shorter than the tube, spreading, the two upper lobes linear, erect; filament-tube 3 mm. long, glabrous, the filaments connate less than half their length; anther-tube (1.0) 1.5-1.7 mm. long, bluish gray, the two smaller anthers white-tufted at tip, the three larger ciliate

on back; hypanthium in anthesis short-campanulate or obconic, glabrous, becoming campanulate in fruit, 2.5–3.5 mm. across; capsule about half inferior, 4.5–6 mm. long; calyx-lobes linear-subulate, entire, 3–4.5 mm. long, mostly prickly-ciliate on margins; seeds ellipsoid, brown, smooth, shining, about 0.3 mm. long.

TYPE LOCALITY: "Texas and adjacent Mexico."

DISTRIBUTION: Central Texas to Chihuahua, Coahuila, Nuevo León and Tamaulipas, at elevations of 1000 m. or less.

14. *Lobelia divaricata* H. & A. Bot. Beech. Voy. 301. pl. 67. 1838.

Rapuntium pusillum Presl, Prodr. Mon. Lob. 22. 1836. (*Haenke*, Praha!)

Lobelia pusilla A. DC. in DC. Prodr. 7: 379. 1839. Not *Lobelia pusilla* G. Don, 1834.

Dortmannia divaricata Kuntze, Rev. Gen. 972. 1891.

Dortmannia pusilla Kuntze, Rev. Gen. 973. 1891.

Lobelia Schmitzii F. E. Wimmer, Repert. Sp. Nov. 26: 2. pl. 71, f. 2. 1929.

Lobelia Seleriana F. E. Wimmer, Repert. Sp. Nov. 38: 82. 1935. (*Arsène 0995*, US!)

Lobelia trivialis F. E. Wimmer, Repert. Sp. Nov. 38: 83. 1935. (*Purpus 4918*, isotype, Gray!)

Stems weak, simple and erect or branched and decumbent, often rooting at the lower nodes, usually not exceeding 1 mm. in diameter at base, usually reddish-purple at base and green above, 6–27 cm. in length, either smooth and glabrous throughout, sparsely pubescent in the lower axils, or plainly hirtellous below; cauline leaves few–12, often somewhat appressed, thin, glabrous or pubescent beneath at base, entire or sparingly toothed; principal leaves linear to broadly elliptic, reaching a maximum size of 0.7 cm. wide by 3 cm. long, their tips obtusely rounded to acute and their bases acute, subpetiolate, decurrent; lower leaves relatively broader, often suborbicular, their petioles 0.5 cm. long or less; inflorescence secund, 2–18 cm. long, often appearing pedunculate, loosely 1–10-flowered; pedicels filiform, stiff, strongly ascending, 10–25 (70) mm. long in fruit, smooth and glabrous, or rarely finely prickly, each with a pair of tiny bracteoles at base; flower-bracts linear, or the lower ones leaflike and resembling the upper leaves, the middle ones usually 3–8 mm. long; flower 9–13 mm. long, including hypanthium; corolla blue, often with dark veins, glabrous without, the tube sparsely hairy within, 3.5–4.0 mm. long, entire except for the dorsal fissure which extends to a point slightly more than 1 mm. from base, the lower lip with two conspicuous tubercles at base (according to Hooker & Arnott); the lobes shorter than the tube, the upper ones erect, narrow, those of the lower lip elliptic, reflexed; filament-tube 2.5–3.5 mm. long, blue at least distally, the filaments connate one-half to two-thirds their length, ciliate at base; anther-tube 1.0–1.7 mm. long, gray, the two smaller anthers white-tufted at tip, the others minutely ciliate on backs; hypanthium in anthesis narrowly obconic, glabrous, becoming cup-shaped or campanulate in fruit, 2–3 mm. across; capsule 5–6 (7.5) mm. long, one-half to three-fifths inferior; calyx-lobes linear or subulate, glabrous, entire, short-pointed, (2) 3–4.5 mm. long; seeds brown, ellipsoid, smooth, shining, 0.3–0.5 mm. long.

TYPE LOCALITY: "Talisco" (Jalisco, near Tepic, Nayarit), *Beechey* (Kew!).

DISTRIBUTION: Coahuila to Mexico (D. F.), Michoacán, and Nayarit, at elevations up to about 2200 m.

ILLUSTRATION: H. & A. Bot. Beech. Voy. pl. 67.

15. *Lobelia stenodonta* (Fernald) McVaugh, Bull. Torrey Club
67: 144. 1940.

Heteroloma stenodonta Fernald, Proc. Am. Acad. 36: 504. 1901.

Perennial, from a slender rootstock (according to Fernald); stem erect, simple or with a few axillary branches, up to 2.5 mm. in diameter at base, green (tinged with reddish-brown?), 30–50 cm. high, glabrous; cauline leaves 4–8, spreading, thin and membranous, glabrous, their margins conspicuously and rather evenly serrate with narrowly deltoid acute teeth (about 5–6 per cm.), the principal teeth often alternating with shorter ones, the blades 1.5–4.5 cm. broad by 5–15 cm. long, mostly about 3 times as long as wide, ovate or ovate-lanceolate, the tip long-acuminate, the base cuneate, entire; inflorescence 6–18 cm. long, not strongly secund, loosely 7–18-flowered, the lowest flower sometimes in the axil of the uppermost leaf; pedicels ebracteolate, spreading-ascending, filiform, 15–25 mm. long in fruit, smooth or sparingly papillose, or bristly; flower-bracts linear or the lower much broader, the middle and upper ones

usually 10-15 mm. long, glabrous, callose-toothed; flower 11-13 mm. long, including hypanthium; corolla glabrous, pale bluish (according to Fernald), 5-9 mm. long, the tube conspicuously fenestrate, up to 5 mm. long, the lobes of the lower lip reflexed-spreading, about 1 mm. wide by 3-4 mm. long, the upper lobes erect, up to 4 mm. long, narrowly linear-subulate; filament-tube 4.0-4.5 mm. long, slightly exerted from the somewhat declined corolla-tube, the filaments ciliate below and connate about one-third of their length; anther-tube 1.6-2.0 mm. long, the two smaller anthers white-tufted at tip, the three larger minutely pubescent on backs; hypanthium in anthesis campanulate, very slightly oblique, glabrous, becoming ellipsoid in fruit, longer than broad, about 4 mm. in diameter; capsule 8-9 mm. long, about half inferior, with a narrowly conical beak, prominently projecting from the hypanthium; calyx-lobes narrowly deltoid, somewhat widened at base, glabrous, sparingly toothed, 3-5 mm. long, acutely pointed; seeds light yellowish-brown, ellipsoid, 0.6 mm. long, smooth but not glassy-shining.

TYPE LOCALITY: Vicinity of Chicharras, Chiapas, *Nelson 3758* (Gray!).

DISTRIBUTION: Mountains of southern Chiapas.

16. *Lobelia longicaulis* Brand. Univ. Calif. Publ. Bot. 6: 73. 1914.

Lobelia neglecta Vatke, *Linnaea* 38: 720. 1874. (*Ehrenberg 520*, Berlin!) Not *Lobelia neglecta* R. & S. 1819.

Dortmannia neglecta Kuntze, *Rev. Gen.* 973. 1891.

Lobelia urticifolia F. E. Wimmer, *Repert. Sp. Nov.* 22: 195. 1926. (Based on *L. neglecta* Vatke.)

Lobelia poasensis F. E. Wimmer, *Ann. Naturh. Mus. Wien* 46: 239. 1933. (*Cufodontis 605*, isotype, Field!)

Perennial, with short woody caudex and tufted fibrous or somewhat tuberous roots; stems weakly erect, decumbent or prostrate, 15-50 cm. long, often several from the same root, simple, or with few weak subordinate side branches, 1-2 (rarely 4) mm. in diameter at base, green, or purplish below, rather sparsely chaffy-pubescent, the angles somewhat winged; cauline leaves few-20, spreading, thin or even membranous, sparsely chaffy-pubescent especially on the veins, coarsely and irregularly sharp-serrate with 2-5 teeth per cm. the blades mostly about twice as long as wide, 1-3 cm. wide by 2.5-8 cm. long or the lower smaller, ovate to broadly lanceolate or elliptic, acute or short-acuminate at tip, the base cuneate, subpetiolate or with a distinct margined petiole up to 1 cm. long; inflorescence few-35 cm. long, often occupying half the stem or more when in fruit; flowers few-25, the lower or sometimes all in the axils of the upper leaves, the bracts then scarcely reduced; pedicels spreading, straight or somewhat curved upward near tip, 8-30 mm. long in fruit, sparsely chaffy-pubescent (or minutely prickly, especially near distal end) or nearly glabrous; bracteoles none; flower-bracts all leafy, the upper as large as the lower or more often somewhat reduced, lanceolate to linear; flower 8-11 mm. long, including hypanthium; corolla pale lavender (according to Skutch) or nearly white, minutely pubescent at least on the veins without, the lower lip with two green tubercles within at base, the tube 3-4 mm. long, entire except for the dorsal fissure, which extends to a point 0.7-0.3 mm. from base, the lobes of the lower lip elliptic, 1-1.5 mm. wide by 2-3.5 mm. long, the two upper lobes nearly linear, 2-3.2 mm. long; filament-tube (2.5?) 3.5-4.5 mm. long, the filaments pubescent at least below, connate about a third their length or a little more, adnate to the corolla-tube for about 0.7 mm.; anther-tube 1.0-1.6 mm. long, the two smaller anthers minutely white-tufted at tip, the 3 larger ciliate on the back; hypanthium in anthesis campanulate, chaffy- or prickly-pubescent or nearly glabrous, becoming ellipsoid or long-campanulate in fruit, 2.6-3.5 mm. in diameter; capsule 5.5-10 mm. long, ellipsoid, the free part 1.5-3 mm. long, one-third to two-thirds as long as the hypanthium-tube; calyx-lobes linear-subulate, entire, ciliate or nearly glabrous, (1.6) 3-4 mm. long; seeds ellipsoid, smooth, shining, 0.5 mm. long.

TYPE LOCALITY: Finca Covadonga, Chiapas, *Purpus 6697* (U. of Calif.!).

DISTRIBUTION: Mexico (state) and Michoacán to western Panama, mostly at elevations of 2000-3000 m.

Lobelia plebeia F. E. Wimmer, *Repert. Sp. Nov.* 22: 194. 1926 (*Lichmann fl. mex. 7772*, Copenhagen) is scarcely distinct, differing only in the linear and elongated flower-bracts, and in the apparently annual duration of the plants. The range is Mexico (state) to Oaxaca and Chiapas.

17. *Lobelia sublibera* S. Wats. Proc. Am. Acad. 25: 157. 1890.

Perennial; stem erect or ascending, sometimes branched above, 25–64 cm. high, 1–3 mm. in diameter at the base, usually slightly purplish near base, uniformly but rather sparsely short-stiff-hirsute, especially near base, or sometimes throughout the whole plant; roots fibrous; cauline leaves 3–8, lanceolate or elliptic, mostly 4–8 times as long as wide, acute at both ends, membranous or thickish, 0.6–0.9 cm. wide by 4.5–9 cm. long, the lowest oblanceolate, up to 2.5 cm. wide by 10 cm. long, the blades glabrous beneath and sparsely pubescent above, especially near margin, sometimes purple below, the basal leaves when present broadly elliptic, rounded at apex, narrowed to a short petiole, 1.5–2.5 cm. wide by 3.5–10 cm. long; inflorescence 3–18 cm. long, 3–13-flowered, more or less secund, on a peduncle (7.5) 10–20 (23) cm. long; pedicels angled or nearly terete, usually strongly ascending, pubescent like the stem, or nearly glabrous, (5) 11–27 mm. long in fruit, with two yellowish-brown bracteoles near base; flower-bracts linear, ciliate, 4–7 mm. long, entire or nearly so; flower, including hypanthium, 21–29 mm. long, slightly granular-pubescent without or strongly pubescent; corolla-tube 11–14 mm. long, narrow and almost linear, slightly curved, entire except for the dorsal fissure which extends to a point 2.5–4.5 mm. from the base; lobes of the lower lip broad-ovate, mucronate, up to 7–9 mm. wide by 8.5–11 mm. long, those of the upper lip 1.5–3.5 mm. wide by 8–11 mm. long; filament-tube 9–11.5 mm. long, glabrous, slightly reflexed and included in the curved corolla-tube, the filaments free from corolla-tube, connate more than half their length, ciliate below; anther-tube light bluish-gray, 2.5–3.0 mm. long, the two smaller anthers bright-white-tufted at tip and ciliate on back, the three larger ones rather densely ciliate on back, near apex; hypanthium in anthesis flat or very shallowly cup-shaped, ciliate; capsule ovate-ellipsoid, acute at both ends, 3.5–4 mm. in diameter by 8 mm. long, one-third to two-fifths inferior; calyx-lobes linear-attenuate, 4–8 mm. long, ciliate, entire; seeds smooth, shining, broadly ellipsoid, about 0.5 mm. long.

TYPE LOCALITY: Cool shaded slopes of the Sierra Madre near Monterey, Nuevo León, Pringle 1889 (Grayl).

DISTRIBUTION: Mountains of Nuevo León and western Tamaulipas.

18. *Lobelia Ehrenbergii* Vatke, Linnaea 38: 719. 1874.

Stem erect, usually unbranched, 2–3 mm. in diameter at base, green or purplish below, 25–55 cm. high, somewhat pubescent below the inflorescence, at least in lines and at the very base; cauline leaves few–15, spreading-ascending, membranous or papery when dry, sparsely pubescent on upper surface near base and margins, the blades subentire or sinuate-dentate, the teeth fine to coarse; inflorescence few–20 cm. long, strongly secund, loosely few–12-flowered, appearing pedunculate, the stem naked for 10–18 cm. below it; pedicels spreading-ascending, slender, 10–25 (60) mm. long in fruit, glabrous; bracteoles minute, at the very base, often apparently wanting; flower-bracts linear to subulate, 5–15 mm. long (or the lower larger), subentire, ciliate-margined or glabrous; flower 20–28 mm. long, including hypanthium; corolla glabrous without, blue, the tube linear, entire except for the dorsal fissure, 8–10.5 mm. long, the lobes of the lower lip elliptic, acute at tip, 2–4 (7) mm. wide, 8.5–17 mm. long, the two upper lobes narrowly oblanceolate, erect or recurved, 1–3 mm. wide, 7–10 mm. long; filament-tube (5) 6–7.5 mm. long, glabrous distally, the filaments distinct about half their length and there white-hairy; anther-tube 2.0–3.0 mm. long, all the anthers densely white-bearded near tip; hypanthium in anthesis narrowly campanulate, 2–3 mm. long, glabrous or nearly so; capsule ellipsoid, about half inferior, 4–5.5 mm. in diameter, 9–11 mm. long; calyx-lobes linear-subulate, entire, 3–6 mm. long, glabrous or ciliate; seeds ellipsoid, smooth, shining, sometimes with minute longitudinal markings, 0.5–0.8 mm. long.

TYPE LOCALITY: Mine of La Encarnación, Hidalgo ("Mexico, prope los Encarnacios"), Ehrenberg 581 (Berlin).

Upper leaves 2–6 mm. wide, the lower broader, 1.0–2.5 cm. wide; northeastern Mexico.

Upper leaves 2 mm. wide or less; lower leaves 3 mm. wide or less; Chihuahua and Durango.

18a. *L. Ehrenbergii* var. *Ehrenbergii*.

18b. *L. Ehrenbergii* var. *gracilens*.

18a. *Lobelia Ehrenbergii* var. *Ehrenbergii* McVaugh,
Am. Midl. Nat. 24: 695. 1940.

Lobelia Ehrenbergii Vatke, loc. cit., as to type.
Dortmannia Ehrenbergii Kuntze, Rev. Gen. 972. 1891.

Upper leaves linear, 0.2–0.6 cm. wide, 5–11 cm. long, tapering at both ends; lower leaves elliptic, the lowermost oblanceolate to obovate or spatulate, 1–2.5 cm. wide, 2–7 cm. long, on margined petioles 1.5–4 cm. long.

DISTRIBUTION: Mountainous regions, northern Hidalgo to Nuevo León and southwestern Tamaulipas.

18b. *Lobelia Ehrenbergii* var. *gracilens* (A. Gray) McVaugh,
Am. Midl. Nat. 24: 695. 1940.

Lobelia gracilens A. Gray, Proc. Am. Acad. 21: 393. 1886.

Upper leaves narrowly linear, 0.1–0.2 cm. wide, 3–9 cm. long, long-attenuate to tip; lower leaves often oblanceolate, up to 0.35 cm. wide by 3.5 cm. long.

TYPE LOCALITY: "Summit of the mountains above Batopilas, Chihuahua, at about 8850 feet," Ed. Palmer 360 in 1885 (Gray!).

DISTRIBUTION: Mountains of western Chihuahua and adjacent Durango.

19. *Lobelia pulchella* Vatke, Linnaea 38: 720. 1874.

Dortmannia pulchella Kuntze, Rev. Gen. 973. 1891.
Lobelia bryophila F. E. Wimmer, Repert. Sp. Nov. 19: 385. 1924. (*Pringle 6002*, isotype, Gray!)
Lobelia setulosa F. E. Wimmer, Repert. Sp. Nov. 19: 386. 1924. (*Galeotti*, herb. Delessert, photo!)

Stem erect, purple below, often from a decumbent base, glabrous or pubescent at base, 15–39 cm. long, slender, up to 2 mm. diameter at base, from a creeping or erect rootstock or the rootstock short, with fibrous roots; leaves 3–7, often clustered at the decumbent base of the stem, so that the plant appears scapose, the lowest broad-ovate, obtuse, up to 2 cm. broad by 2.5 cm. long, narrowed into margined petioles, the upper acute, often narrower, up to 1.2–2 cm. wide by 5.5–7 cm. long, petiole 1.0–1.5 cm., the margin sharply and irregularly toothed, or crenate; the blades glabrous or slightly short-strigose-pubescent on veins beneath or near margin above; inflorescence a loose raceme, 2–10-flowered, 5–26 cm. long, pedunculate 10–17 cm., the lowest flowers sometimes very distant (10–15 cm.); pedicels spreading or more or less upright, rough or nearly glabrous, purplish-red, the lowest 20–35 mm. long; bracteoles none; flower-bracts linear, toothed, the lowest up to 1 mm. wide by 15 mm. long; flower 16–18 mm. long, including hypanthium; corolla glabrous, violet, the tube 5–6 mm. long, entire except for the dorsal fissure, the lobes of the lower lip ovate, mucronulate, 5–6 mm. broad by 9 mm. long, spreading-reflexed, those of the upper lip linear or oblanceolate, 1 mm. wide by 7 mm. long, somewhat reflexed; filament-tube glabrous, 4–5 mm. long, the filaments free about four-fifths their length; anther-tube 1.5 mm. long, light bluish-gray, the three larger anthers ciliate on the backs, the two small anthers sparsely tufted at tip; hypanthium in anthesis smooth or slightly roughened, conic; capsule ellipsoid, more or less acute at both ends, 3–5 mm. in diameter by 7 mm. long, less than one-fourth inferior; calyx-lobes linear-acute, 3–6 mm. long, glabrous, entire except for (usually) one tooth on each side near the base; seeds smooth, shining.

TYPE LOCALITY: Mexico, *Ehrenberg* (Berlin!).

DISTRIBUTION: Oaxaca and Guerrero at high altitudes.

20. *Lobelia Dielsiana* F. E. Wimmer, Repert. Sp. Nov.
22: 194. 1926.

Stem erect, unbranched, up to 2 mm. in diameter at base, 30–40 cm. high or more, glabrous, slightly winged on the angles; cauline leaves few—25, more or less appressed, linear-filiform, averaging 0.5 mm. wide, 20–35 mm. long, glabrous except for a few sharp hairs on the upper surface, entire or with minute glandular teeth; radical leaves 3–7, ovate or elliptic, obtuse, up to 1 cm. wide and 3 cm. long, narrowed into margined petioles, the margins sharply and irregularly serrate; inflorescence a loose raceme, 12–20 cm. long, about 10–35-flowered; pedicels slender, flexuous, loosely spreading, 8–15 (25) mm. long in fruit, smooth and glabrous, slightly

winged on the two edges; bracteoles none; flower-bracts linear-filiform, indistinguishable from the foliage leaves and grading into them; ovary in flower essentially superior, about 4 mm. long; flower 16–20 mm. long, including hypanthium; corolla blue, glabrous without, the base of lower lip with two prominent tubercles and dense pubescence within, the tube (6.5) 7–7.5 mm. long, entire except for the dorsal fissure, which extends to a point 2–2.5 mm. from the base, the lobes of lower lip narrowly elliptic, 2.2 mm. wide by 6 mm. long, hairy on upper (inner) surface, the two upper lobes strongly falcate-recurved, about 1.5 mm. wide by 7.5 mm. long; filament-tube 4.5–5 mm. long, the filaments ciliate below, united about half their length, adherent to the corolla-tube for about 2 mm.; anther-tube 2.1 mm. long, the two smaller anthers white tufted at tip, the three larger copiously pilose; hypanthium in anthesis saucer-shaped, very short (about 0.7 mm.), glabrous, about 2 mm. across, in fruit obconic, 1.5–2 mm. high; capsule ellipsoid, about 2.5 mm. in diameter, 7 mm. long, about three-fourths superior; calyx-lobes filiform-subulate, about 8 mm. long, entire, ciliate near tip or glabrous, often purple; seeds ellipsoid, pale brown, smooth but not polished, about 0.8 mm. long.

TYPE LOCALITY: "Sierra Madre, sol granitique, 1700 m." (Guerrero), *Langlassé 852* (isotype, US!).

DISTRIBUTION: Pine forests, mountains of Guerrero, at altitudes of 2000 m. or less.

21. *Lobelia diastateoides* McVaugh, Am. Midl. Nat.

24: 695. 1940.

Stems simple, erect or decumbent, 1.5 mm. in diameter or less, purplish at base, 20–40 cm. high, glabrous above, somewhat pubescent below with sharp stiff whitish hairs; leaves cauline, more or less crowded on the lower half of the plant, spreading, stiff when dry, the upper ones lanceolate or narrowly elliptic, acute, sessile, narrowed at base, the lower ones broader, rhombic-ovate, acute at base, acute or obtuse at tip, narrowed to a subpetiolar base about 5 mm. long; margins crenate or shallowly sharp-serrate with 3–6 teeth per cm., the blades pubescent above, glabrous beneath or pubescent, especially on the veins, those of middle and lower leaves (except the very lowest) 0.6–1.1 cm. wide, 1.4–3 cm. long; inflorescence usually plainly secund, 5–12 cm. long, few-15-flowered, appearing pedunculate; pedicels slender, 12–25 mm. long in fruit, ascending, arcuate, the distal end upcurved, glabrous or sparsely pubescent at very base, ebracteolate; flower-bracts linear, somewhat appressed, glabrous or sparsely pubescent, entire or rarely with a few small teeth, up to 1 mm. wide by 15 mm. long; flower 9–10 mm. long, including hypanthium; corolla glabrous, "light blue, two top segments deeper or sometimes violet" (according to Camp), the tube 4–5 mm. long, cleft dorsally to a point 1.5–2.2 mm. from base, the two upper lobes narrowly elliptic, erect (?), about 0.5 mm. wide, 4 mm. long, the three lower lobes oblong, about 1.5 mm. wide, 3.5 mm. long; filament-tube 4.0–4.8 mm. long, glabrous, the filaments connate about a third of their length; anther-tube 1.5–1.8 mm. long, the three larger anthers sparsely pubescent; hypanthium in anthesis glabrous, shallowly cup-shaped, broader than high, the base flattened, in fruit becoming acute at base, about as high as broad; capsule ellipsoid-fusiform, 1.5–2.5 mm. in diameter, 4.5–5.5 mm. long, superior or essentially so; calyx-lobes subulate, attenuate, entire, glabrous or very sparsely ciliate on margin, 0.3 mm. wide or less at base, 2.5–3.5 mm. long; seeds ellipsoid, lustrous, about 0.6 mm. in length.

TYPE LOCALITY: Mountain slopes near Tlaxiaco, Oaxaca, *Camp 2205* (NY!).

DISTRIBUTION: Mountains of Chiapas and Oaxaca.

22. *Lobelia homophylla* F. E. Wimmer, Repert. Sp. Nov.

22: 194. 1926.

Lobelia cliffortiana var. *xalapensis* A. Gray, Syn. Fl. 2¹: 7. 1878. Not *Lobelia xalapensis* H.B.K. 1819.

Stem erect, simple or with ascending subordinate branches, 5 mm. in diameter or less at base, few–50 (75) cm. high, green, or rarely somewhat purplish, glabrous or with a few hairs below; leaves few–20, cauline but sometimes clustered near base, membranous when dry, glabrous or sparsely hairy near base and on veins above, the blades up to 4.5 cm. wide, 6 cm. long, slightly longer than broad or not so, ovate, obtuse at tip, rounded or cordate at base

and then attenuate into a narrowly margined petiole 1-4 cm. long, the margins coarsely and irregularly toothed, the teeth usually blunt or broad-pointed; inflorescence few-40 cm. long, not secund, few-50-flowered, often corymbose when young, appearing pedunculate, the stem naked 3-9 cm. below the lowest bract; lower flowers often distant; pedicels slender, spreading or rather strongly ascending, mostly 10-15 mm. long in fruit, glabrous, bracteolate at base; flower-bracts subulate, entire, glabrous or ciliate on margins, 3-5 mm. long or the lowermost larger; flower 6.5-10 mm. long, including hypanthium; corolla blue, glabrous without, the tube sparsely hairy within, 4.0-4.8 mm. long, entire except for the dorsal fissure, which extends to a point less than 1 mm. from base, the three lower lobes elliptic or ovate, fused into a distinct lip, the two upper lobes narrow, linear or nearly so, erect; filament-tube 3.0-3.5 mm. long, the filaments glabrous distally, free half their length and there slightly hairy; anther-tube 1.0-1.3 mm. long, bluish gray, the three larger anthers bristly near tips or glabrous; hypanthium in anthesis flat or shallowly cup-shaped, enlarging and shallowly cup-shaped in fruit, glabrous; capsule 2.5-4 mm. in diameter, 4-6 mm. long, ellipsoid, one-fourth to one-third inferior; calyx-lobes linear-subulate, entire, 2-3.5 mm. long, glabrous or ciliate on the margins; seeds ellipsoid, brown, highly polished, smooth, about 0.4 mm. long.

TYPE LOCALITY: St. Augustine, Florida, *Curtiss 6363* (isotype, US!).
DISTRIBUTION: Peninsular Florida, north about to St. Johns County.

23. *Lobelia xalapensis* H. B. K. Nov. Gen. & Sp. 3: 315. 1819.

Lobelia monticola H.B.K. Nov. Gen. & Sp. 3: 316. 1819. (Field Mus. Neg. 9111!)
Lobelia palmaris Willd.; R. & S. Syst. Veg. 5: 56. 1819. (Field Mus. Neg. 9111!)
Lobelia mollis Graham, Edinb. New Phil. Jour. 8: 185. 1829. (Type from Dominica.)
Rapuntium affine Presl, Prodr. Mon. Lob. 25. 1836. (Nomen nudum.)
Rapuntium xalapense Presl, Prodr. Mon. Lob. 25. 1836.
Rapuntium monticulum Presl, Prodr. Mon. Lob. 25. 1836.
Rapuntium molle Presl, Prodr. Mon. Lob. 30. 1836.
Lobelia ocimoides Kunze, Linnaea 24: 178. 1851. (Based on a cultivated plant.)
Dortmannia mollis Kuntze, Rev. Gen. 972. 1891.
Dortmannia monticola Kuntze, Rev. Gen. 972. 1891.
Dortmannia ocimodes Kuntze, Rev. Gen. 973. 1891.
Dortmannia xalapensis Kuntze, Rev. Gen. 973. 1891.

Stem erect, simple or with ascending subordinate branches, 5 mm. in diameter or less at base, few-60 cm. high, green or often purplish below, usually sparsely pubescent at least below; leaves cauline, few-20, ciliate or strigose at least near base on the upper surface, and on the margins of the petioles, the blades membranous when dry, ovate, up to 4.5 cm. wide, 5.5 cm. long, slightly longer than broad (those of the middle leaves usually the largest), mostly acute at tip but the extreme apex blunt, rounded or cordate at base and then attenuate into a narrowly margined petiole 0.5-3 cm. in length, their margins sinuate, coarsely toothed with somewhat rounded teeth, the e somewhat irregular, interspersed with minute callosities; inflorescence few-30 cm. long, not secund, few-40-flowered, often corymbose when young, appearing pedunculate, the stem naked 3-10 cm. below the lowest bract, the lower flowers often distant; pedicels slender, spreading-ascending, mostly 10-15 mm. long in fruit, minutely prickly-puberulent, bracteolate at base, the tip usually incurved at maturity; flower-bracts linear or subulate, entire or nearly so, bristly on margins, 3-5 mm. long or the lowermost larger; flower 4-6 (7) mm. long, including hypanthium; corolla blue or purplish, varying to white or reddish, glabrous without, the tube sparingly hairy within, about 2.5 mm. long, entire except for the dorsal fissure, which extends to a point less than 1 mm. from base, the lower lip 1.5-2 mm. long, the lobes rounded, the two upper lobes erect, about 1.5 mm. long; filament-tube 2.0-2.5 mm. long, the filaments connate about one-third their length, glabrous or nearly so; anther-tube 0.5-1.0 mm. long, gray, the larger anthers bristly near tips or glabrous; hypanthium in anthesis flat or shallowly cup-shaped, prickly or bristly like the pedicel, in fruit becoming cup-shaped or depressed hemispheric, often glabrate; capsule one-third inferior or less, ellipsoid, mostly 2-3 mm. in diameter by 4-5.5 mm. long; calyx-lobes linear-subulate, entire, 2-4 mm. long, glabrous or ciliate on the margins; seeds ellipsoid, brown, highly polished, smooth, 0.5 mm. long or less.

TYPE LOCALITY: Near Jalapa, Vera Cruz.

DISTRIBUTION: Vera Cruz to Oaxaca and thence throughout Central and South America to northern Argentina; Lesser Antilles; Galápagos Islands.

24. *Lobelia cliffortiana* L. Sp. Pl. 931. 1753.

Rapuntium cliffortianum Mill. Gard. Dict. ed. 8. *Rapuntium*, no. 3. 1768.
Rapuntium cordifolium Moench, Meth. Suppl. 277. 1802. (Based on *Lobelia cliffortiana* L.)
Lobelia chenopodiifolia Wall.; G. Don, Gen. Hist. 3: 709. 1834. (Type from the East Indies?)
Rapuntium chenopodiifolium Presl, Prodr. Mon. Lob. 31. 1836.
Lobelia filiformis Sieber; A. DC. in DC. Prodr. 7: 372, as syn. 1839.
Lobelia triangulata Wall.; A. DC. in DC. Prodr. 7: 372, as syn. 1839.
Lobelia incisa Wall.; Hook. f. & Thomson, Jour. Linn. Soc. 2: 29, as syn. 1857.
Dortmannia cliffortiana Kuntze, Rev. Gen. 380. 1891.
Lobelia bisserata Sessé & Moc. Fl. Mex. ed. 2. 198. 1894. (Madrid!)

Annual; stem erect or decumbent, simple or with several main branches which are usually strongly ascending, 1-5 mm. in diameter at base, 5-75 cm. high, green or more rarely purplish below, smooth or with scattered hairs, terete or somewhat angled; leaves cauline, few-20 (more in branched plants), membranous and spreading when dry, smooth or short-strigose-pubescent, especially on the upper side, near the margin, on the margins of the petiole and sometimes on the veins beneath, the margin coarsely and irregularly serrate or crenate, the teeth sharp or obtuse and mucronate, the blades 1-4.5 cm. wide by 1.2-6 cm. long (averaging about 2.3 by 3.3 cm., and usually a little longer than wide), ovate, or the upper lanceolate or elliptic, the tip obtuse or rounded, or acute in the upper leaves, the base cuneate to truncate or subcordate, narrowed to a margined petiole 0.5-3 cm. long, the upper and lower leaves usually smaller than the middle ones; inflorescence few-40 cm. long, not secund, few-50-flowered, often corymbose when young, usually appearing pedunculate, with the lowest flower 3-9 cm. above the uppermost leaf; lower flowers often distant; pedicels slender, 6-23 mm. long in fruit (average 11-15 mm.), spreading-ascending at a 45° angle, often with the capsule incurved at maturity, smooth, each with a pair of bracteoles at the base; flower-bracts linear-filiform, 3-5 mm. long (the lowest often larger, up to 2 mm. wide by 10 mm. long), smooth or ciliate, entire; flower 4.5-7 mm. long, including hypanthium; corolla blue, purplish, white or sometimes reddish, glabrous without, the tube sparsely hairy within, about 2.5 mm. long, entire except for the dorsal fissure, which extends to a point less than 1 mm. from base, the lobes spreading, shorter than the tube; filament-tube 2.0-3.0 mm. long, about equaling the corolla-tube, smooth, the filaments connate near apex; anther-tube 0.5-1.3 mm. long (usually about 1.0 mm.), bluish-gray, the two smaller anthers with a small white tuft at tip, the three larger sparsely bristly near tip, or glabrous; hypanthium in anthesis conic, glabrous, becoming campanulate or broadly conic in fruit, 2.5-4 mm. broad; capsule 4-6 mm. long, ellipsoid, one-half to about two-thirds inferior; calyx-lobes linear-subulate, entire, 2-3.5 mm. long, smooth or ciliate at tip; seeds smooth, shining, ellipsoid, about 0.5 mm. long.

TYPE LOCALITY: "Habitat in Virginia. Canada."

DISTRIBUTION: Native of Cuba, Hispaniola, Jamaica, and Puerto Rico; occurs as a weed in Trinidad, where apparently introduced; introduced into the Old World tropics early in the 19th century.

ILLUSTRATION: L. Hort. Cliff. pl. 26.

25. *Lobelia lucayana* Britton & Millsp. Bahama Fl. 428. 1920.

Annual; stem erect, simple, scapose, 5-12.5 cm. high, about 0.5 mm. in diameter at base, sometimes purplish below, smooth or slightly pubescent, especially at base; roots fibrous; leaves apparently all radical, 2-6, clustered near base at several approximate nodes (side branches sometimes arise here), the blades 3-10 mm. wide by 9-24 mm. long, ovate or spatulate, obtuse, narrowed into margined petioles, the margin and petiole more or less ciliate, the margin coarsely few-toothed; bracts on stem below inflorescence 1-2, leafy, but smaller, narrower and more acute than the radical leaves; inflorescence a loose raceme, 2-8-flowered, 1-6.5 cm. long; pedicels roughened, 5-9 mm. long, spreading-ascending, with two bracteoles at base; flower-bracts slightly roughened, tiny, linear, the lowest 3 mm. long, nearly entire; flower about 6 mm. long; corolla glabrous, about 3.5 mm. long, the lobes about 1 mm. long; filament-tube 1.5 mm. long, glabrous; anther-tube yellowish, less than 1 mm. long, the two smaller anthers slightly tufted at tip; hypanthium in anthesis conic, glabrous, at maturity about 2 mm. in diameter by 3 mm. long, acute at base; capsule about 4 mm. long, at least three-fourths inferior; calyx-lobes narrow, acute, glabrous, entire, about 1 mm. long; seeds minute, shining.

TYPE LOCALITY: North Caicos Island, near Kew, Wilson 7713 (NY!).

DISTRIBUTION: Bahama Islands.

26. *Lobelia yucatanana* F. E. Wimmer, Repert. Sp. Nov.
38: 83. 1935.

Stems more or less erect, simple or with subordinate filiform axillary branches, 18-32 cm. high, 1 mm. in diameter at base, green, glabrous above, short-hirsute-pubescent (sparsely so) below; roots fibrous; leaves 5-7, delicate in texture, ciliate on edges and strigose above, the largest near base, the near-radical leaves ovate, obtuse, up to 2.3 cm. wide by 4 cm. long, their deltoid bases narrowed into ciliate-margined petioles up to 2 cm. long, the upper leaves ovate or elliptic, obtuse, up to 2.1 cm. wide by 3 cm. long with margined petioles up to 1.6 cm. long; margins coarsely crenulate; inflorescence 6-11-flowered, 10-17 cm. long, often zigzag, not distinctly pedunculate; lower flowers distant, 4-5 cm. apart; pedicels 13-15 mm. long in fruit, filiform, spreading stiffly, prickly-pubescent, with tiny bracteoles at base; capsule not incurved; flower-bracts linear, about 3 mm. long, or the lowest 2 mm. wide by 10 mm. long, obtuse, toothed; all bracts glabrous, or the lowest strigose above; flower (at least) 4.0 mm. long, "white"; filament-tube up to 1.8 mm. long; anther-tube about 0.5 mm. long, the three larger anthers ciliate on the backs; hypanthium glabrous, narrowly conic in anthesis, often acuminate at base; calyx-lobes narrow, entire, glabrous, 1.3-1.5 mm. long; mature hypanthium 1.5-2 mm. in diameter by 4-5 mm. long, ellipsoid to oblong; capsule about three-fourths to four-fifths inferior, acute at base; seeds smooth, shining, 0.5 mm. long or less.

TYPE LOCALITY: Pocoboch, Yucatán, *Gaumer 1327* (isotype, Field!).

DISTRIBUTION: Yucatán and El Petén, Guatemala.

27. *Lobelia fastigiata* H. B. K. Nov. Gen. & Sp. 3: 313. 1819.

Lobelia tenuifolia Willd.; R. & S. Syst. 5: 56. 1819. ("in Amer. merid.," *Humboldt & Bonpland.*)

Rapuntium fastigiatum Presl, Prodr. Mon. Lob. 15. 1836.

Lobelia trinitensis Griseb. Fl. Brit. W. Ind. 385. 1861. (Type from Trinidad.)

Lobelia Gardneriana Kanitz in Mart. Fl. Bras. 6: 138. 1878. (*Gardner 2655*, isotype, NY!)

Dortmannia trinitensis Kuntze, Rev. Gen. 380. 1891.

Dortmannia fastigiata Kuntze, Rev. Gen. 972. 1891.

Dortmannia Gardneriana Kuntze, Rev. Gen. 972. 1891.

Annual; stem erect, simple or with few-several ascending branches, slender (1-2 mm. in diameter at base), green or slightly purplish-tinged below, 15-40 cm. high, practically glabrous; leaves cauline, few-15, spreading or ascending, thin, glabrous (or with a few hairs near base on midrib of upper surface), the margins sinuate-serrate, with 3-10 remote teeth on each side, the blades 0.5-1.5 cm. wide by 2-3.5 cm. long, narrowly lanceolate to ovate-lanceolate, the apex acuminate or occasionally obtuse, the base cuneate, the middle leaves largest, 0.4-0.5 cm. wide by 0.5-1 cm. long, usually 3-6 times as long as wide, the lower leaves sometimes obtuse, ovate, subpetiolate; inflorescence few-17 cm. long, not secund, loosely few-20-flowered; pedicels in fruit spreading-ascending, slender, 2-6 mm. long, very finely granular-roughened or bristly, or nearly glabrous, each with a pair of bracteoles (which may reach a length of nearly 1 mm.) at the base; flower-bracts leafy, sometimes as large as the foliage leaves and merging imperceptibly into these (then up to 0.8 cm. wide by 3.5 cm. long), their average size about 0.2 cm. wide by 1.5 cm. long, their margin usually with several callose teeth on each side; flower 5-6 mm. long, including hypanthium; corolla glabrous, the tube 2 mm. long, the dorsal fissure extending nearly to base, the lobes about 1.5-2.0 mm. long; filament-tube about 2.0 mm. long, the filaments connate distally; anther-tube 0.5-1.0 mm. long, brownish-red in dried material, the three larger anthers nearly glabrous, the two smaller white-tufted at tip; hypanthium in anthesis long-campanulate, glabrous, in fruit becoming ellipsoid, with rounded or cuneate base, 3 mm. across by 4-5 mm. long; capsule nearly inferior, 5-6 mm. long; calyx-lobes linear-subulate, entire, 2-3 mm. long, glabrous or very slightly granular; seeds ellipsoid, smooth, shining, about 0.5 mm. long.

TYPE LOCALITY: Colombia or Ecuador ("prope urbem Popayan et Chillo Quitensium, alt. 900-1300 hex.," Field Mus. Neg. 9106!).

DISTRIBUTION: Widely distributed in South America, south to Paraguay and southern Brazil; eastern Panama; Trinidad.

28. *Lobelia Hartwegii* A. DC. in Benth. Pl. Hartw. 16. 1839.

Lobelia velutina Mart. & Gal. Bull. Acad. Brux. 9: 41. 1842. (*Galeotti 1969*, BRUX.)
Dortmannia Hartwegii Kuntze, Rev. Gen. 972. 1891.

Stem erect, simple, 40-90 cm. high, up to 3.5 mm. in diameter at base, purplish below, mostly conspicuously short-pubescent, especially below, arising from tuberous roots up to 6 mm. in diameter by 6 cm. long; leaves more or less appressed or spreading, linear-lanceolate to ovate or linear-oblong, mostly 3-6 (10) times as long as wide, pubescent both sides or nearly glabrous, acute at tip or the lower obtuse; base of blades cuneate, subpetiolate to subclasping, the lower leaves sometimes purplish beneath, 1.2-3 cm. wide by 2.5-6 cm. long, the upper leaves 0.6-2.2 cm. wide by 5-8 cm. long; margins sharply and irregularly or merely callose-toothed; inflorescence a spike, usually strongly secund, few-38-flowered, few-30 cm. long, on a leafless peduncle 8-24 cm. long; pedicels terete, 3-6 mm. long, densely pubescent; bracteoles linear, 1 mm. long, near base of pedicel, or apparently wanting; flower-bracts linear-lanceolate or subulate, pubescent, acuminate, toothed, the lowest up to 1 mm. wide and 13 mm. long (average 3-8 mm. long); flower pendent by bend at base of hypanthium, 17-19 mm. long, including hypanthium; corolla blue (?), pubescent without, the tube fenestrate, 9-11 mm. long, the three lower lobes ovate, 3 mm. wide by 6 mm. long, rather sharply deflexed, the two upper lobes 1 mm. wide by 4-5 mm. long, more or less upright; filament-tube 5-7 mm. long, not reflexed, glabrous, the filaments free about one-third their length; anther-tube dark bluish, 2.5-3.0 mm. long, all the anthers bright-white-tufted at tip; hypanthium in anthesis short campanulate, pubescent, in fruit (*Hinton 2951*) hemispherical, 4 mm. wide; capsule inferior; calyx-lobes linear, acute, pubescent, callose-toothed, 3-5 mm. long; seeds smooth, shining.

TYPE LOCALITY: Bolaños (state?), between Mexico and Zacatecas (*Hartweg 102*, Kew!).
 DISTRIBUTION: Oaxaca to Mexico (state), at elevations of 1500-2500 m.

29. *Lobelia sinaloae* Sprague, Kew Bull. 1929: 7. 1929.

Lobelia tubiflora F. E. Wimmer; J. G. Ortega, Bol. Pro-Cult. Reg. 1: n. 7-8 (Cat. Sist. Pl. Sinaloa, 31). 1930. (Nomen nudum.)

Perennial; stem erect, simple or with ascending subordinate lateral branches, coarse (up to 4 mm. in diameter at base), purplish at least below, up to 75 cm. high, pubescent throughout or somewhat woody and glabrate below; cauline leaves few-20, papery but firm when dry, short prickly-pubescent at least near base and on the veins of the lower surface, green above, light gray-green or silvery beneath when dry, the margin serrate with slender sharp teeth, or in the largest leaves doubly serrate, the principal teeth about 1 cm. apart, the intermediate teeth about 5 per cm., the blades narrowly elliptic, occasionally varying to lanceolate, 1-2.5 cm. wide, 5-10 cm. long, usually 4-6 times as long as wide, the upper leaves abruptly narrowed to a sessile base, the lower leaves with broadly winged subpetiolar base, the tips of the blades acute or short-acuminate; inflorescence a spike, usually plainly secund, 8-25 cm. long, few-25-flowered, the stem naked below the lowest flower for a distance of 5-13 cm.; pedicels stiffly upright, filiform, 5-11 mm. long in fruit, minutely pubescent, ebracteolate or with a pair of filiform bracteoles 1 mm. long at base; flower-bracts linear or nearly so, serrate, acuminate, up to 3 mm. wide by 20 mm. long; flower pendent, 30-35 mm. long, including hypanthium; corolla violet (according to Sprague), glabrate, or the tube pubescent without, the tube linear, 16-18.5 mm. long, 2-3 mm. in diameter ("3 mm. diametro mediano, 2 mm. diametro transverso" according to Sprague), laterally fenestrate near base and usually dorsally also, but without dorsal fissure at apex, the distal two-thirds entire; tube inserted obliquely in the hypanthium-tube, the lobes of the lower lip broadly elliptic or obovate, apiculate, 5-7 mm. wide, 6-13 mm. long, the two upper lobes spatulate, 3-4 mm. wide, 6-9 mm. long; filament-tube 11-12.5 mm. long, included in the corolla-tube, glabrous distally, the filaments free for about half their length or less, the free part pilose; anther-tube about 3.5 mm. long, the two shorter anthers 2.5-3.0 mm. long, the anthers all densely white-tufted at tip, otherwise glabrous; hypanthium in anthesis cup-shaped or nearly hemispheric, oblique, flattened at base, pubescent, enlarging in fruit, becoming slightly broader than high, about 3.5 mm. across; capsule less than half inferior, about 5 mm. long, the free part conic; calyx-lobes linear-subulate, minutely pubescent

and usually prickly on the margins, serrate, 1-1.5 mm. broad at base, 7-9 mm. long; seeds ellipsoid, smooth, shining, blunt, about 0.7 mm. long.

TYPE LOCALITY: Cultivated at Hyde Park, England; seeds originally from Mina La Tuna, Tarahumar, San José de Gracia, Sinaloa (Kew!).

DISTRIBUTION: Mountains of Sinaloa.

30. *Lobelia fenestralis* Cav. Ic. 6: 8. pl. 512. f. 1. 1800.

Lobelia crispata Graham, Edinb. New Phil. Jour. 1: 173. 1826. (Edinb.!).

Lobelia spicata Moc.; A. DC. in DC. Prodr. 7: 361, as syn. 1839. Not *Lobelia spicata* Lam. 1791.

Rapuntium fenestrale Presl, Prodr. Mon. Lob. 13. 1836.

Lobelia stricta Mart. & Gal. Bull. Acad. Brux. 9^e: 43. 1842. (*Galotti 1930*, Brux.!) Not *Lobelia stricta* Sw. 1788.

Lobelia pectinata Engelm. in Wislitz. Tour Northern Mex. 108. 1848. (*Wislizenus 192*, Mo. Bot. Gard.!).

Lobelia spicata Sessé & Moc. Pl. Nov. Hisp. ed. 1. 151. 1890. Not *Lobelia spicata* Lam. 1791.

Dortmannia fenestralis Kuntze, Rev. Gen. 972. 1891.

Annual or biennial, from a heavy taproot; stem erect, unbranched (occasionally with ascending branches or with several stems from the same root), rather coarse (1-6 mm. in diameter at base), green (sometimes purplish below), 20-140 cm. high (mostly about 50 cm.), glabrous or sparsely chaffy-pubescent or prickly on the angles; cauline leaves few-50, ascending or appressed (less often loosely spreading), thin, glabrous, or prickly on the margins and the lower surface, coarsely and sharply serrate, the blades 0.6-1.2 cm. wide by 2.5-7 cm. long, mostly 4-8 times as long as wide, lanceolate, oblong or oblanceolate, acute at tip (or the upper attenuate and the lowest oblanceolate, obtuse at tip), sessile at the broad or even slightly auriculate-clasping base; inflorescence spike-like, few-78 cm. long (averaging about 25 cm.), not at all or more or less secund, densely (more rarely loosely) few-220-flowered (averaging over 50-flowered); pedicels more or less upright, 1.5-4.5 mm. long, rarely 6.5 mm., often concealed by the flower-bracts, smooth or prickly, ebracteolate; flower-bracts lanceolate, attenuate, leafy, mostly 0.5-1.0 cm. wide by 1.8-3.5 (5.5) cm. long; stem usually leafy to the base of the inflorescence, so that the bracts are in effect reduced leaves only slightly smaller than the adjacent foliage leaves; flower 12-14 mm. long, including hypanthium; corolla blue, with a white eye, minutely prickly without around base of tube, otherwise glabrous, the tube oblique to the axis of the hypanthium, long-fenestrate, 5-6 mm. long, the lobes of the lower lip elliptic or ovate, spreading-reflexed, mucronulate, 2-3 mm. wide by 5.5-7 mm. long, the two upper lobes oblong or linear, erect, 3-5 mm. long; filament-tube 1.5-2.3 mm. long, much shorter than the corolla-tube, prickly at least below, the filaments connate distally; anther-tube 1.5-2.0 mm. long, dark bluish-gray or blackish, plainly visible through the lateral fissures in the corolla-tube, all five anthers white-tufted at tip or the three larger merely ciliate on the backs; hypanthium in anthesis narrowly campanulate, smooth or prickly, in fruit campanulate or ellipsoid, 2.5-3.5 mm. broad; capsule three-fifths inferior or more, 3-6 (8) mm. long; calyx-lobes lanceolate to linear-subulate, prickly or smooth, often toothed, 2.5-6.5 mm. long; seeds ellipsoid, light brown, smooth and lustrous, about 0.3 mm. long.

TYPE LOCALITY: San Bartolomé, three leagues from the city of Mexico, *Née* (Madrid, Field Mus. Neg. 29446).

DISTRIBUTION: Western Texas to southeastern Arizona, south throughout the highlands of Mexico to Oaxaca. Not reported from Coahuila, Nuevo León, or Tamaulipas.

ILLUSTRATION: Bot. Reg. 24: pl. 47.

31. *Lobelia poetica* F. E. Wimmer, Repert. Sp. Nov. 22: 195. 1926.

Perennial, from 1 or 2 tuberous roots; stem erect, simple, 2 mm. in diameter at base, somewhat purplish below, 25-50 cm. high, glabrous; cauline leaves about 10, ascending, apparently leathery (in dried specimens), glabrous beneath, pubescent above, minutely callose-denticulate, the blades linear, the tips long-attenuate, the bases scarcely narrowed, 0.1-0.2 cm. wide by 2.5-7 cm. long (the lower shorter); inflorescence 6-10 cm. long, few-10 flowered, apparently pedunculate, the peduncle 9-16 cm. long; pedicels strongly ascending, in flower 6-9 mm. long, purplish, short-prickly-pubescent; bracteoles not seen; flower bracts narrowly linear, up to 10 mm. long (or the lowest to 17 mm.), glabrous beneath, pubescent above, with callose teeth on

the margins; flower 14–17 mm. long; corolla blue, glabrous without, slightly ciliate within at bases of lobes of lower lip, the tube 4.5–5.0 mm. long, fenestrate, the lobes of the lower lip elliptic to obovate, 4–6 mm. wide by 5–8 mm. long, the two upper lobes with spatulate tips, 6–7 mm. long, 3 mm. wide near tip; filament-tube 2.8–3.0 mm. long, the filaments ciliate, connate about one-third their length; anther-tube 2.0–2.5 mm. long, all 5 anthers white-tufted at tip; hypanthium in anthesis flat, the tube almost none; mature hypanthium and capsule not seen; calyx-lobes linear-subulate, glabrous without, somewhat ciliate within, callose-denticulate, strongly reflexed even in the young flower, 3.5–5.5 mm. long, purplish; seeds not seen.

TYPE LOCALITY: "Between Santa Gertrudis and Santa Teresa, Sierra Madre, Tepic," *Rose 2100* (US).

DISTRIBUTION: Known only from the type locality.

32. *Lobelia jaliscensis* McVaugh, *Am. Midl. Nat.* 24: 697. 1940.

Stem erect, simple, up to 1.5 mm. in diameter at base, 30–55 cm. high, purplish at base, slightly prickly below and increasingly so above; leaves cauline, few–20, thick, minutely rough-pubescent above, attenuate at both base and apex, 3–3.5 mm. wide by 6–10 cm. long, yellow-green above, apparently slightly glaucous beneath, the margins thickened and often revolute, remotely callose-denticulate; roots fleshy, tuberous, elongated; inflorescence secund, few–15 cm. long, 10–25-flowered, appearing pedunculate, the stem naked for 4–6 cm. below it; pedicels strongly ascending, 3–4 mm. long in fruit, bristly-pubescent, flattened, each with a pair of short green filiform bracteoles near base; bracts prickly-ciliate, 7 mm. long or less; flower 10–13 mm. long, including hypanthium; corolla blue, pubescent without, the tube 3.5 mm. long, fenestrate, the lobes of the lower lip broadly rounded, up to 3.5 mm. wide by 5.5 mm. long, the two upper lobes with a broad base, the terminal part nearly linear, 1 mm. wide by 4 mm. long; filament-tube 2 mm. long, the filaments ciliate, connate about one-third their length; anther-tube about 1.5 mm. long, all 5 anthers white-tufted at tip; hypanthium in anthesis obliquely hemispheric, rough-pubescent, in fruit hemispheric, somewhat flattened at base, about 4 mm. broad by 3 mm. high; capsule almost wholly inferior; calyx-lobes linear or narrowly triangular, prickly-pubescent, strongly reflexed even in the young flower, callose-toothed, 3 mm. long; seeds ellipsoid, very faintly lined, shining, about 0.4 mm. in length.

TYPE LOCALITY: Open pine forest on steep hillside, San Sebastian, northeast of Hacienda del Cura, in the Sierra Madre, at an elevation of 1425 m., Jalisco, *Mexia 1371* (U. S. Nat. Arb.).

DISTRIBUTION: Known only from the type locality.

33. *Lobelia irasuensis* Planch. & Oerst. *Vidensk. Meddel.*

1857: 153. 1857.

Perennial, from clustered fibrous or tuberous roots; stem simple, erect or decumbent, slender (not over 2 mm. in diameter at base), usually purplish below and sometimes above, 8–35 (56) cm. high, smooth or sparsely pubescent below; cauline leaves few–20, spreading-ascending, often somewhat clustered near base, somewhat leathery in texture (in dried specimens), glabrous, or pubescent above and ciliate on margins, the blades shallowly and distantly crenate or serrate, the lower surface often purplish, 0.15–0.6 cm. wide by 1–5 (10) cm. long, usually 10–15 times as long as broad or the lower broader, 0.8 cm. wide, 4 cm. long; blades linear to lanceolate or the lowest oblanceolate, the tip attenuate or abruptly pointed, the base broad, sessile, often subclasping; radical leaves, if present, ovate, petiolate; inflorescence 2–15 cm. long, loosely few–30-flowered, often somewhat secund, appearing pedunculate, the "peduncle" 2–7 cm. long; pedicels strongly ascending or erect, slender, 4–6 (9) mm. long in fruit, short-bristly-pubescent; bracteoles minute, at base of pedicel, or wanting; flower-bracts linear or the lowest lanceolate, glabrous or nearly so, obscurely toothed, 3–7 mm. long (or the lowest up to 1.3 cm. long); flower 8–14 mm. long, including hypanthium; corolla glabrous or essentially so, the lobes of the lower lip elliptic, 1.5–2.5 mm. wide by 4–6 mm. long, the two upper lobes triangular, with a broad base, 3–6 mm. long; filament-tube 1.0–2.0 mm. long, the filaments ciliate and distinct most of their length; all five anthers minutely white-tufted at tip; hypanthium in anthesis cup-shaped or short-campanulate, somewhat oblique, somewhat pubescent,

becoming ellipsoid in fruit, slightly longer than broad, 2.0-3.5 mm. in diameter; capsule one-half to three-fourths inferior, 3-5 mm. long; calyx-lobes linear or narrowly triangular, 2-5 mm. long, mostly glabrous without and hispidulous within, usually obscurely callose-toothed on each side.

TYPE LOCALITY: Oak zone, at an elevation of 8000 feet, Volcán de Irazú, Costa Rica, *Oersted pl. centroam.* 9246 (Copenhagen!).

Anther-tube 1.0-1.3 mm. long; seeds dull or slightly lustrous, with faint longitudinal lines.

Corolla blue, the tube usually fenestrate; flower, including hypanthium, 8-10.5 mm. long; Costa Rica and Panama.

Corolla light blue or white, conspicuously dark-blue-veined; tube not fenestrate; flower, including hypanthium, 12-13 mm. long; State of Mexico.

Anther-tube 1.5-2.0 mm. long; seeds highly polished, with no lines visible at a magnification of 20 diameters; corolla light, with dark blue veins, the tube fenestrate; Durango and Sinaloa.

33a. *L. irasuensis* var. *irasuensis*.

33b. *L. irasuensis* var. *picta*.

33c. *L. irasuensis* var. *fucata*.

33a. *Lobelia irasuensis* var. *irasuensis* McVaugh, Am. Midl. Nat. 24: 697. 1940.

Lobelia irasuensis Planch. & Oerst. loc. cit., as to type.

Lobelia Warszewiczii Vatke, *Linnaea* 38: 718. 1874. (*Warszewicz* 20, Berlin!)

Dortmannia Warszewiczii Kuntze, *Rev. Gen.* 973. 1891.

Corolla blue, deep blue, or purplish, the tube 2.8-3.0 mm. long, usually fenestrate at least in age; flower, including hypanthium, 8-10.5 mm. long; anther-tube 1.0-1.3 mm. long; seeds dull or slightly lustrous, with faint longitudinal markings, about 0.5 mm. long.

DISTRIBUTION: High mountains of Costa Rica and western Panama, mostly above 3000 m. elevation.

33b. *Lobelia irasuensis* var. *picta* (Rob. & Seaton) McVaugh, Am. Midl. Nat. 24: 697. 1940.

Lobelia picta Rob. & Seaton, *Proc. Am. Acad.* 28: 112. 1893.

Corolla purplish, varying to light blue or white, conspicuously dark-veined, the tube about 3 mm. long, entire except for the dorsal fissure; flower, including hypanthium, 12-13 mm. long; anther-tube 1.3-1.5 mm. long; seeds dull or slightly lustrous, with faint longitudinal markings, about 0.5 mm. long.

TYPE LOCALITY: Cold springy meadows, Sierra de las Cruces, Mexico (state), *Pringle* 4305 (Gray!).

DISTRIBUTION: Mountains of Mexico (state), at elevations of 3000-3350 m.

33c. *Lobelia irasuensis* var. *fucata* McVaugh, Am. Midl. Nat. 24: 697. 1940.

Corolla blue or purplish, dark-veined, the tube 3-4 mm. long, fenestrate; flower, including hypanthium, 11-14 mm. long; anther-tube 1.5-2.0 mm. long; seeds smooth, shining, about 0.5 mm. long.

TYPE LOCALITY: Dos Cajetes, west of the city of Durango, Durango, *Ed. Palmer* 817, Nov. 3-5, 1896 (Gray!).

DISTRIBUTION: Durango and Sinaloa, in the Sierra Madre.

34. *Lobelia umbellifera* McVaugh, *Bull. Torrey Club* 67: 144. 1940.

Lobelia fasciculata Donn. *Smith, Bot. Gaz.* 27: 338. 1899. Not *Lobelia fasciculata* Kuntze, 1891.

Perennial from fusiform, woody-tuberous roots, these up to 0.7 cm. thick and 7 cm. long; plant delicate, the stems up to 1 mm. in diameter at base, 10-15 cm. long, nearly smooth, glabrous, somewhat roughened below (as seen under a lens), green above and usually purplish

below, erect or decumbent, often with 1-5 erect or ascending branches; leaves cauline, 10-25 on each stem, closely grouped in a distance of 5-8 cm. on the lower part of the stem, spreading nearly horizontally or even somewhat reflexed, firm, smooth beneath, sparsely strigose above, especially near base and margin, the margin coarsely crenate, with 2-5 teeth on each side, the blades 2-3.5 (6) mm. wide by 8-13 (20) mm. long, 2-4 times as long as wide, the lowest leaves often obovate, obtusely rounded at tip and cuneate at base, the middle and upper leaves relatively narrower, elliptic, usually acute at base and apex, nearly all leaves somewhat decurrent, subsessile; inflorescence a terminal subumbellate cluster, the 1-6 flowers arising nearly together at the summit of a naked peduncle 2-5 cm. long (the inflorescence axis itself is occasionally as much as 2.5 cm. in length); pedicels filiform, 5-12 mm. long in fruit, short-prickly-pubescent, apparently ebracteolate, green or purplish; flower-bracts clustered at the bases of the pedicels, nearly linear, up to 1 mm. wide by 7 mm. long, smooth, acute at tip, the cluster of bracts simulating an involucre; flower 11-12 mm. long, including hypanthium; corolla blue (?), glabrous or nearly so, the tube about 3 mm. long, fenestrate laterally and cleft dorsally almost to the very base, its long axis somewhat oblique to that of the hypanthium, the lobes of the lower lip reflexed, spreading, spatulate, mucronate, 3-4 mm. wide by 6-7.5 mm. long, the two upper lobes narrowly spatulate, erect, about 2 mm. wide by 5 mm. long; filament-tube 1.7-2.0 mm. long, the filaments connate less than one-third their length; anther-tube about 1.3 mm. long, included in the corolla-tube, the two smaller anthers tufted at tip with a dense cluster of long white cottony hairs, the three larger anthers short-tufted or merely roughened at tip; hypanthium in anthesis short-campanulate or cup-shaped, glabrous, or strigose at base, somewhat oblique, in fruit more or less inflated, 3-7 mm. wide and high, usually purplish (in dried material dark bluish-black); calyx-lobes lanceolate, green, glabrous, somewhat foliaceous, callose-denticulate, acute but with a rather blunt point, up to 1 mm. wide and 4.5 mm. long; seeds ellipsoid, brown, lustrous, about 0.7 mm. long.

TYPE LOCALITY: Plains at the summit of the cordillera at 3000 m., between Todos los Santos and Chiantla, Huehuetenango, Guatemala, *Seler 3022* (isotype, Gray!).

DISTRIBUTION: Mountains of Guatemala and adjacent Chiapas, mostly at elevations of 3000 m. and above.

35. *Lobelia tarsophora* Seaton; Greenman, Proc. Am. Acad.

33: 489. 1898.

Annual; stem erect, simple or with slender axillary branches, slender (1-2 mm. in diameter at base), green, 27-38 cm. high, glabrous except for scattered hairs around the petiole bases or pubescent below; cauline leaves 3-4, spreading, thin, nearly glabrous, somewhat ciliate on petiole and near margins or sparsely strigose above and on veins beneath, subterete in outline but evenly sinuate-dentate, the shallow teeth callose tipped or represented only by the fine callosities, the blades 2-4.5 cm. wide by 6-6.5 cm. long, 1.5-2 times as long as wide, lanceolate to ovate, with an acute (less often obtuse) tip, the base rounded (or cuneate in the upper leaves); petiole distinct from blade, 1-5 cm. long; inflorescence 7-19 cm. long, not secund, loosely 8-21-flowered; pedicels in fruit spreading at right angles to the rachis, slender, 8-15 mm. long, glabrous, with a pair of tiny inconspicuous bracteoles at base; flower-bracts linear, 1.5-3 mm. long, ciliate; flower about 10 mm. long, including hypanthium; corolla purplish, glabrous, the tube about 4.5 mm. long, fenestrate in addition to the dorsal fissure, which extends to base, the three lower lobes spatulate, 2 mm. broad by 3 mm. long; filament-tube 3.0-4.0 mm. long, the filaments connate less than half their length, pubescent at base; anther-tube 1.0-1.3 mm. long, bluish-gray, the smaller anthers white-tufted at tip, the three larger lightly ciliate on backs; hypanthium in anthesis broadly-obconic or nearly flat, glabrous, becoming hemispheric in fruit, 3 mm. across; capsule one-fourth to one-half inferior, hardly more than 3.5 mm. long; calyx-lobes narrowly lanceolate or subulate, sometimes with a deltoid base, glabrous, 2-2.5 mm. long; seeds oblong, with blunt ends, brown, lustrous, markedly foveate-reticulate, 0.5-0.6 mm. long.

TYPE LOCALITY: River banks, Córdoba, Vera Cruz, *Seaton 417* (Gray!).

DISTRIBUTION: Mountains of Vera Cruz and Hidalgo.

36. *Lobelia hypnodes* F. E. Wimmer; McVaugh, Am. Midl.

Nat. 24: 698. 1940.

Annual (?); stem erect, with a few small lateral branches below the inflorescence, about 2.5 mm. in diameter at base, green, up to 60 cm. high, glabrous or sparsely ciliate about the axils of leaves; cauline leaves about 10-12, spreading, membranous, glabrous except for scattered hairs near the base and margins, on the upper side; blades up to 3.5 cm. wide by 6.5 cm. long, ovate, rounded or cordate at base, short-acuminate at tip, the margins subentire with callose teeth or sinuate-dentate, the teeth callose-tipped; petiole distinct from blade, scarcely margined, 1.5-2.5 cm. long, ciliate on upper side; inflorescence somewhat secund, 14-23 cm. long, 25-31-flowered, appearing short-pedunculate (3-6 cm.); pedicels spreading or standing at a 45° angle to the stem, filiform, 9-12 mm. long in fruit, short-prickly-pubescent, each with a pair of bracteoles near the base, the tip of the pedicel abruptly bent so that the mature capsule is incurved toward stem; flower-bracts linear-subulate, usually ciliate, 3-5 mm. long, decurrent; flower about 10.5 mm. long, including hypanthium; corolla glabrous, nearly white (?), the tube fenestrate laterally and cleft dorsally almost to the very base, ciliate within, about 5 mm. long, the lobes of the lower lip narrowly elliptic, mucronate, about 4 mm. long; lower lip minutely pubescent at base within, the two upper lobes linear-subulate, about 1.5 mm. wide by 4.0 mm. long; filament-tube 4.5 mm. long, the filaments united about half their length; anther-tube 1.5 mm. long, the two smaller anthers white-tufted at tip, the others stiff-bristly on backs; hypanthium in anthesis with the tube scarcely visible, flat, at the base of the ovary, the calyx-lobes erect; capsule wholly superior, at maturity ellipsoid, about 3 mm. across by 4 mm. long, surrounded by the ruptured but persistent corolla; calyx-lobes narrowly deltoid, smooth, 2.5-3 mm. long, attached at base to the flat, disk-like hypanthium-tube; seeds roughened and cellular-reticulate, dark brown, about 0.5 mm. long, ellipsoid-oblong, truncate at one end.

TYPE LOCALITY: Vicinity of Tantoyuca, Vera Cruz, Cárdenas 482 (Field!).

DISTRIBUTION: Vicinity of Tantoyuca, Vera Cruz.

NOTE: This species and the preceding one are doubtfully members of the section *Hemipogon*, having seeds nearly like the species of the section *Dortmanna*, but in other respects appearing closer to *Hemipogon*.

Section 3. Palmerella (A. Gray) McVaugh, Am. Midl. Nat. 24: 682. 1940. *Palmerella* A. Gray, Proc. Am. Acad. 11: 80. 1876, as genus. Herbs, with bluish or purplish flowers; flower inverted in anthesis; seeds ellipsoid-lenticular, smooth and shining; bracteoles of the pedicel none; corolla-tube not cleft dorsally at the apex but sometimes splitting near the base at maturity. A single species in North America, *Lobelia Dunnii* Greene.

37. *Lobelia Dunnii* Greene, Pittonia 1: 297. 1889.

Perennial herbs with sessile leaves; stem decumbent or erect, simple or with ascending-subordinate lateral branches, rather coarse (maximum size about 4 mm. in diameter at base), light green (often straw-colored below in dried specimens), 20-85 cm. high, smooth and glabrous below the inflorescence or sometimes throughout; cauline leaves 20-35, spreading, membranous; inflorescence often sub-capitate, 2-7 (12) cm. long, densely few-23-flowered; pedicels strongly ascending or the lower spreading, rather stout (up to 0.6 mm. in diameter in fruit); corolla-limb blue, the tube whitish (according to Jepson); both tube and limb pubescent, the former *cloudy* so within and less densely so without, the tube linear or nearly so, at first entire, in age splitting incompletely on the dorsal side, the split extending from near the base about half the length of the tube and exposing the dorsal filament, the lobes abruptly spreading from the summit of the tube, the two upper ones linear, acute, about 1 mm. wide by 5-7 mm. long, the lobes of the lower lip fused at base, elliptic, 2-3 mm. wide by 6-8 (10) mm. long; filaments pubescent, connate distally but free nearly their whole length and loosely adherent to the corolla-tube; anther-tube bluish-gray, the two shorter anthers white-tufted at tip and sometimes with short straight hornlike processes in addition; hypanthium in anthesis campanulate, mostly acute at base, campanulate to ellipsoid in fruit, 2.5-3 mm. in diameter; capsule inferior or nearly so, 6-7 (12) mm. long; calyx-lobes linear-subulate, with a short-deltoid base, entire; seeds ellipsoid-lenticular, smooth and shining, light-brown, about 0.5 mm. in length.

TYPE LOCALITY: Baja California ("Great Canyon of the Tantillas Mountains"), *Ed. Palmer*, Sept. 9-10, 1875 (Gray).

Middle and upper leaves elliptic or lanceolate, 7-20 mm. wide; lower leaves obovate to oblanceolate, 9-30 mm. wide; plants glabrous or pubescent at least in the inflorescence or, if glabrous, at least the corolla-tube pubescent.

Middle and upper leaves linear or narrowly elliptic, 2.5-9 mm. wide; lower leaves oblanceolate, 5-12 mm. wide; plants entirely glabrous or sparsely bristly in the inflorescence.

37b. *L. Dunnii* var. *serrata*.

37a. *L. Dunnii* var. *Dunnii*.

37a. ***Lobelia Dunnii* var. *Dunnii* McVaugh, Bull. Torrey Club 67: 794. 1940.**

Palmerella debilis A. Gray, Proc. Am. Acad. 11: 80. 1876. Not *Lobelia debilis* L.f. 1781.

Lobelia Dunnii Greene, loc. cit., as to type. (Based on *Palmerella debilis* A. Gray.)

Laurentia debilis McVaugh, Bull. Torrey Club 67: 144. 1940.

Pubescence none, or sparse and confined to the inflorescence (corolla always pubescent); cauline leaves narrower than in var. *serrata*, the middle and upper ones linear or narrowly elliptic, 0.25-0.9 cm. wide by 4.5-11 cm. long, mostly 10-20 times as long as wide, the lower leaves oblanceolate, 0.5-1.2 cm. wide by 2.5 cm. long, mostly 3-6 times as long as wide, the serration often inconspicuous except on the lowest leaves, the middle and upper ones with essentially entire margins lined with minute callose teeth; pedicels 4-9 mm. long, smooth and glabrous (rarely somewhat prickly); bracts as in var. *serrata* but narrower, in proportion to the leaves; flower 22-30 mm. long, including hypanthium; corolla-tube 12-18 mm. long; filaments 12-17 mm. long; anther-tube 2.0-2.5 mm. long, glabrous or with a few hairs; hypanthium usually glabrous; calyx-lobes glabrous or nearly so, 5-8 mm. long.

DISTRIBUTION: Mountains of northern Baja California.

37b. ***Lobelia Dunnii* var. *serrata* (A. Gray) McVaugh, Bull. Torrey Club 67: 795. 1940.**

Palmerella debilis var. *serrata* A. Gray, Bot. Calif. 1: 620. 1876.

Lobelia Rothrockii Greene, Pittonia 1: 297. 1889. (Based on *Palmerella debilis* var. *serrata* A. Gray.)

Laurentia debilis var. *serrata* McVaugh, Bull. Torrey Club 67: 144. 1940.

At least the middle and lower leaves smooth and glabrous, the upper ones glabrous to short-prickly-pubescent, the middle and upper leaves elliptic or lanceolate, acute at both ends, sessile, 0.7-1.5 (2) cm. wide by 3.5-9.5 cm. long, mostly 5-10 times as long as wide, the lower leaves shorter and broader, obovate to oblanceolate, acute at tip, narrowed at base into a broadly margined petiole, (0.9) 1.5-2.5 (3) cm. wide, 3.5-6 (9) cm. long, usually 2-4 times as long as wide; all the leaves serrate, the lower coarsely so with sharp teeth, the upper shallowly so, with callose narrow teeth; pedicels (2) 4-8 (13) mm. long in fruit, short-bristly-pubescent to glabrous; flower bracts linear, 2 cm. long or less, or the lower lanceolate or elliptic, resembling the upper leaves, up to 0.7 cm. wide by 5 cm. long, but mostly about half this size; flower 20-25 mm. long, including hypanthium; corolla-tube 9-12 (14) mm. long; filaments 9.5-12.5 (14) mm. long; anther-tube 2.3-3.0 mm. long, pilose with long white hairs; hypanthium bristly-pubescent to glabrous; calyx-lobes bristly-pubescent to glabrous, 6-14 mm. long.

TYPE LOCALITY: Valley of Ojai Creek, Ventura County, California, *Rothrock 173* (Gray!).

DISTRIBUTION: Southern Coast Ranges of California from Monterey County to northern San Diego County and inland to the San Bernardino Mountains.

ILLUSTRATION: Bot. Wheeler's Survey, *pl. 16*.

Section 4. ***Dortmannia* [Rudbeck f.] Endl. Gen. 511. 1838. *Eulobelia* Benth. & Hook. Gen. Pl. 2: 552. 1876.** Herbs (one species shrubby) with flowers bluish, purplish or red; calyx-lobes often appendaged (auricled) at base; seeds ellipsoid or ovoid, markedly roughened, the surface deeply foveate-reticulate.

38. ***Lobelia Dortmannia* L. Sp. Pl. 929. 1753.**

Lobelia lacustris Salisb. Prodr. 128. 1796. (Based on *Lobelia Dortmannia* L.)

Dortmannia lacustris G. Don, Gen. Hist. 3: 715. 1834.

Kopuntium Dortmannia Presl, Prodr. Mon. Lob. 18. 1836.

Aquatic; glabrous throughout; stem fistulose, upright, unbranched (rarely with 1-2 branches), 5-100 cm. high (averaging 30-35 cm.), usually immersed about two-thirds of its height (all except the inflorescence), green above water, and green to stramineous below, leafless, bearing 7 or fewer linear fleshy bracts 1-7 mm. long; leaves 2-27 (averaging 15-20), basal plant rarely developing 1-3 cauline leaves 2-4 cm. long), linear, entire, obtuse or short-acute, fleshy, 2-5 (8) cm. long by 1-4 mm. wide when pressed; inflorescence 10-20 (45) cm. long, often more or less secund, very loosely 1-11-flowered (averaging 5-6); pedicels ebracteolate, in fruit 4-13 mm. long, curving in fruit so that the flower is often horizontal while the fruit is pendent; flower-bracts obtuse, fleshy, entire, 2-3 mm. long, with a broad base; flower 12-22 mm. long, including hypanthium; corolla pale violet-blue to white, pubescent at the base of the lower lip, otherwise glabrous, the tube 6-7 mm. long, entire except for the dorsal fissure, which may extend only to a point 1-2 mm. from the base, the lobes of the lower lip long-ovate, nearly equaling the tube, not sharply reflexed, the two upper lobes linear, curved upward; filament-tube 4-6 mm. long (averaging about 4.5), the filaments pubescent below, connate most of their length; anther-tube 1.3-1.7 mm. long, dark gray or black, the two smaller anthers heavily tufted, the three larger densely bearded, especially near the tip; hypanthium in anthesis conic, becoming long-cylindric, barrel-shaped or obconic in fruit, usually with a long-attenuate base, 4-5 mm. wide by 6-12 mm. long. Capsule three-fourths inferior or more; calyx-lobes entire, short-lanceolate or deltoid, blunt, 1.5-2.5 mm. long; auricles none; seeds dark brown, with a prominent square base at one end, 0.6-0.8 mm. long.

TYPE LOCALITY: Europe (herb. Linn., photo!).

DISTRIBUTION: Newfoundland and central Ontario to northeastern Pennsylvania, west to northern Minnesota; Oregon to British Columbia; northwestern Europe.

ILLUSTRATION: Britt. & Brown, Ill. Fl. 3: f. 4028.

39. *Lobelia Kalmii* L. Sp. Pl. 930. 1753.

Rapuntium Kalmii Presl, Prodr. Mon. Lob. 23. 1836.

Lobelia falcata Raf. New Fl. 2: 18. 1837. (Type from the Great Lakes region.)

Dortmannia Kalmii Kuntze, Rev. Gen. 380. 1891.

Lobelia Kalmii var. *strictiflora* Rydb. Mem. N. Y. Bot. Gard. 1: 378. 1900. (*Scribner 130*, isotype, Acad. Phila.)

Lobelia strictiflora Lunell, Bull. Leeds Herb. 2: 8. 1908.

Petromarula strictiflora Nieuwl. & Lunell, Am. Midl. Nat. 5: 13. 1917.

Lobelia Kalmii var. *capillaris* Farwell, Am. Midl. Nat. 10: 217. 1927.

Lobelia Kalmii var. *Edithae* F. E. Wimmer, Repert. Sp. Nov. 38: 85. 1935. (*Farr 782*, NY!)

Extremely variable in vegetative characters; stems tall, slender, 0.5-1.5 (3) mm. in diameter at base, nearly unbranched, 15-35 (60) cm. high, green, or reddish below, smooth or slightly pubescent near the base, varying to a diffusely branched form which is often stouter and shorter, and sometimes to a tufted form with stems 2-3 cm. high, forming a rosette-like mat; cauline leaves 4-15, smooth, thin, subentire or shallowly dentate, with callose teeth, their blades narrowly linear or lance-linear (in the unbranched form), 0.05-0.2 cm. wide by 0.7-4 cm. long, the leaves of the branched or coarser plant broader, larger, 0.08-0.8 cm. wide by 0.7-7 cm. long, oblanceolate or broader, even to narrow-ovate, usually obtuse, the lower sometimes narrowed into short petioles; basal leaves if present few, spatulate or obovate, obtuse, petiolate, somewhat pubescent, often purplish, about 0.5 cm. wide by 1.5 cm. long (maximum size 0.8 by 3.5 cm.); rootstock slender, sometimes elongate; inflorescence sometimes plainly secund, mostly half the length of the whole plant or less, bearing 1-15 flowers upon long slender roughened pedicels 8-18 mm. long in fruit; pedicels flexuous or stiffly appressed, each with a pair of conspicuous sub-opposite bracteoles near the middle; flower-bracts linear, smooth, about equaling the pedicel or longer (in the more luxuriant, branched plants); flower (7) 10-13 (16) mm. long, including hypanthium; corolla blue, with a conspicuous white eye, or sometimes all white, glabrous, or the tube hairy within, the lower lip smooth, the tube 2.5-3.5 mm. long, entire except for the dorsal fissure, the lobes of the lower lip ovate, apiculate, equalling or exceeding the tube, the two upper lobes lanceolate, curved upward; filament-tube 2.5-3.5 mm. long, glabrous, the filaments connate more than half their length; anther-tube 1.6-1.8 (2.0) mm. long, bluish-gray, the two smaller anthers tufted, the three larger smooth or pubescent on the backs; hypanthium in anthesis conic or campanulate, smooth or with

brownish matted hairs, becoming long-oval, oblong, or subglobose in fruit, varying with age on the same plant (usually rounder when young); capsule more than three-fourths inferior, 3-6 mm. in diameter, 4-9 mm. long; calyx-lobes lanceolate or deltoid, acute at tip, entire, glabrous, 1.5-5 mm. long (averaging 2.5-3.5 mm.); auricles none; seeds long-fusiform, acute at both ends, 0.6-0.8 mm. long.

TYPE LOCALITY: Canada, *Kalm* (herb. Linn., photo!).

DISTRIBUTION: Newfoundland to Hudson Bay and Great Slave Lake, south to southeastern Pennsylvania, the Great Lakes region, Minnesota to Montana and British Columbia; Colorado?

ILLUSTRATION: Bot. Mag. pl. 2238; Mem. N. Y. State Mus. 15: pl. 222B.

40. *Lobelia Nuttalli* R. & S. Syst. Veg. 5: 39. 1819.

Lobelia Kalmii var. *caroliniana* Michx. Fl. Bor. Am. 2: 153. 1803.

Lobelia gracilis Nutt. Gen. 2: 77. 1818. Not *Lobelia gracilis* Andr. 1803.

Lobelia Kalmii var. *gracilis* W. Barton, Fl. N. Am. 1: 122. pl. 34, f. 2. 1821.

Rapuntium Nuttallianum Presl, Prodr. Mon. Lob. 23. 1836.

Dortmannia Nuttallii Kuntze, Rev. Gen. 973. 1891.

Stem slender, 0.5-1 (1.5) mm. in diameter at base, erect, 20-75 cm. high, sometimes simple, but usually with one or several filiform, racemose, upright or spreading branches, glabrous and green above, usually dark purplish-red and short-puberulent below; cauline leaves few-20, smooth, rather thin, the lower ones oblanceolate or ovate, the upper lanceolate or linear; blades 0.5-1.1 cm. wide by 2.5-4 cm. long, short-acute, or the lower obtuse, all subtire in outline, but with shallow callose teeth, usually about six times as long as wide; basal leaves ovate, petiolate, more or less pubescent, up to 1 cm. wide by 1.5 cm. long, with petioles up to 1 cm. long; inflorescence sometimes plainly secund, few-20 cm. long, loosely few-20-flowered; pedicels slender, flexuous, more or less upright, smooth or often minutely bristly, 5-11 mm. long in fruit, each with a pair of bracteoles at the base; flower-bracts equaling the pedicels or short (then 1-2 mm. long), glabrous, nearly linear, somewhat denticulate; flower 8-11 mm. long, including hypanthium; corolla pale bluish to white, with a white eye and two greenish tubercles at the base of the lower lip, glabrous or the tube hairy within, the tube 3.5-4.5 mm. long, entire except for the dorsal fissure, the lobes of the lower lip narrow-ovate, shorter than the tube, the two upper lobes lanceolate, curved upward; filament-tube about 3.0 mm. long, the filaments pubescent at base, connate more than half their length; anther-tube about 1.5 mm. long (1.0-1.8 mm.), bluish-gray, the two smaller anthers tufted at the tips, the three larger smooth or pubescent on the backs; hypanthium in anthesis flattish, often with few or numerous bristly hairs, sometimes smooth, becoming short-hemispheric in fruit, about 3 mm. in diameter; capsule about half inferior, 2.5-3.5 mm. long; calyx-lobes glabrous, entire, narrowly lanceolate or deltoid, 2-3.5 mm. long; auricles none; seeds ellipsoid-oblong, light-brown, about 0.5 mm. long.

TYPE LOCALITY: "On the dry margins of sandy swamps, from New Jersey to Carolina," *Nuttall* (Acad. Phila.).

DISTRIBUTION: Central Kentucky and Tennessee to Texas, east to northern Florida and north on the Coastal Plain to Long Island.

ILLUSTRATIONS: Barton Fl. N. Am. 1: pl. 34, f. 2; Britt. & Brown, Ill. Fl. 3: f. 4040.

41. *Lobelia Feayana* A. Gray, Proc. Am. Acad. 12: 60. 1876.

?*Lobelia microphylla* Raf. Atl. Jour. 147. 1832. (Type from "Florida and Louisiana.")

Dortmannia Feayana Kuntze, Rev. Gen. 972. 1891.

Stem weak, slender, decumbent or ascending, 5-30 cm. long, simple or diffusely branched, green, rarely purplish below, glabrous, sometimes trailing and rooting at nodes; cauline leaves 1-10, glabrous, lanceolate (or the upper lance-ovate), acute at tip, denticulate, usually about 2.5 mm. wide by 8 mm. long, the lower ones broad-ovate or orbicular, 8-13 mm. wide and long, with a definite petiole up to 2 cm. long, the blades entire or crenate-toothed; basal leaves similar to the lower cauline ones; rootstock slender, trailing; inflorescence 2-18 cm. long (often half the length of the entire plant), more or less secund, bearing 2-15 rather distant flowers upon smooth slender pedicels which are 4-7 mm. long in fruit, each with a pair of inconspicuous bracteoles near the base; flower-bracts small, inconspicuous, 1-3 mm. long, acute; flower 7-10 mm. long, including hypanthium; corolla purplish-blue, with a white eye, and two greenish

tubercles at the base of the lower lip, smooth, or the tube hairy within, the tube 2.5–3.5 mm. long, entire except for the dorsal fissure, the lobes of the lower lip narrow-ovate, shorter than the tube, the two upper lobes lanceolate, curved upward; filament-tube about 3.0 mm. long, deflexed, nearly glabrous, the filaments connate more than half their length; anther-tube 1.0–1.5 mm. long, bluish-gray, the two smaller anthers tufted at the tips, the three larger smooth or pubescent on the backs; hypanthium in anthesis conic or short-campanulate, glabrous, becoming turbinate in fruit, usually acute at the base, averaging 2.5 mm. in diameter; capsule two-thirds inferior or more, 3–4.5 mm. long; calyx-lobes narrowly lanceolate, glabrous, entire, 2 mm. long; auricles none; seeds rough-reticulate, ovoid, 0.4–0.5 mm. long.

TYPE LOCALITY: "Eastern and southern Florida" (Gray!).

DISTRIBUTION: Peninsular Florida, except in the extreme south portion.

ILLUSTRATION: Meehan Nat. Fl. II. 1: pl. 34.

42. *Lobelia appendiculata* A. DC. in DC. Prodr. 7: 376. 1839.

Annual; stem erect, 15–90 cm. high (averaging about 30–50 cm.), unbranched, or often with 1–6 filiform upright axillary branches, green, or with a brownish-red tinge near the base, nearly glabrous, except for a few chaffy hairs near the base, on the angles formed by the decurrent leaf-bases; cauline leaves 1–15, very thin in texture, practically glabrous, sessile or even somewhat clasping, the blades ovate to oblong, broadest below the middle, obtuse at tips or the upper short-acute, all irregularly sharply and finely toothed, 1–3 cm. wide by 2–7 cm. long, 2–2.5 (3) times as long as wide, the upper little smaller, with an abrupt change to the bracts of the inflorescence; basal leaves if present 1–5, obovate, obtuse, nearly smooth, narrowed at the base; inflorescence 5–30 cm. long (averaging about 15 cm.), usually distinctly secund, 15–40- (70-) flowered; pedicels curved, 4–6 (11) mm. long in fruit, nearly glabrous or roughened, each with a pair of inconspicuous bracteoles near the base; flower-bracts smooth, linear, callose-denticulate, longer than the pedicel (8–18 mm. long or less); flower 10–15 mm. long (averaging 12 mm.), including hypanthium; corolla light violet-blue or lilac, glabrous without, pubescent within at the base of the lower lip, the tube 4–5 mm. long, entire except for the dorsal fissure, the lobes of the lower lip broad-ovate, about as long as the tube, the two upper lobes shorter, lanceolate; filament-tube 2.0–4.0 mm. long, somewhat deflexed, nearly glabrous, the filaments connate about half their length; anther-tube 1.9–2.5 mm. long, bluish-gray, the two smaller anthers slightly tufted, the three larger usually pubescent on the backs; hypanthium in anthesis short-campanulate, glabrous, becoming long-campanulate in fruit, with a smooth, inflated appearance, 3.5–6 mm. wide by 5–6 mm. long; capsule two-thirds inferior or more, horizontal or somewhat pendent at maturity; calyx-lobes entire, narrowly lance-linear, 4–8 mm. long, smooth or ciliate; seeds oblong, 0.4–0.6 mm. long.

TYPE LOCALITY: Texas, *Drummond* (herb. Benth.).

Calyx-lobes strongly ciliate; auricles at base of calyx-lobes

ciliate, foliaceous, scarious-tipped.

Calyx-lobes glabrous; auricles none.

42a. *L. appendiculata* var. *appendiculata*.

42b. *L. appendiculata* var. *Gattingeri*.

42a. *Lobelia appendiculata* var. *appendiculata* McVaugh, var. nov.

Lobelia appendiculata A. DC. loc. cit., as to type.

Dortmannia appendiculata Kuntze, Rev. Gen. 972. 1891.

Calyx-lobes ciliate, usually strongly so; auricles at base of calyx-lobes present, ciliate, scarious-tipped, often conspicuous and foliaceous, up to 3–5 mm. long.

DISTRIBUTION: Southeastern Texas to central Alabama, north to Arkansas, Oklahoma, and eastern Kansas.

42b. *Lobelia appendiculata* var. *Gattingeri* (A. Gray) McVaugh, comb. nov.

Lobelia Gattingeri A. Gray, Proc. Am. Acad. 17: 221. 1882.

Dortmannia Gattingerii Kuntze, Rev. Gen. 972. 1891.

Calyx-lobes glabrous, ciliate; auricles none or very minute.

TYPE LOCALITY: Lavergne, Rutherford County, Tennessee, *Curtiss 1637* (Gray!).

DISTRIBUTION: Cedar barrens of central Tennessee.

43. *Lobelia Canbyi* A. Gray, Man. ed. 5. 284. 1867.

Dortmannia Canbyi Kuntze, Rev. Gen. 972. 1891.

Stem erect, tall and slender, mostly 1.5-3.5 mm. in diameter at base, unbranched or with few-several short racemose branches (sometimes much-branched), 30-100 cm. high, glabrous or sparsely pubescent and reddish below, becoming glabrous and deep green above; leaves cauline, 20-40, linear or narrowly lanceolate, 0.05-0.4 cm. wide by 0.9-5 cm. long, often closely appressed, giving the plant a very slender appearance, the blades rather thin, nearly glabrous, obscurely callose-denticulate, but subtire in outline, the upper often merging gradually into the bracts of the raceme; roots fibrous; inflorescence 10-30 cm. long, never prominently secund, (10-) 15-20- (30-) flowered; branches, if present, bearing 2-10 flowers each; pedicels somewhat angular, 7-11 mm. long in fruit, more or less upright, usually minutely upwardly-barbed, each with a pair of inconspicuous bracteoles near the base; flower-bracts linear, about as long as the pedicels, or longer, up to 10-20 mm. long, glabrous or ciliate, callose-denticulate; flower 9-14 mm. long, including hypanthium (averaging 11-12 mm.); corolla purplish-blue, glabrous without, the lower lip pubescent at base within, the tube 3.5-4 mm. long, entire except for the dorsal fissure, the lobes of the lower lip ovate, slightly shorter than the tube, the two upper lobes lanceolate, about the same length; filament-tube about 3.5 mm. long (3-4 mm.), nearly glabrous, the filaments connate more than half their length; anther-tube 1.9-2.1 mm. long, light bluish-gray, the two smaller anthers tufted, the three larger nearly glabrous or pubescent on the backs; hypanthium in anthesis long-campanulate, rough-puberulent, becoming oval or oblong-oval in fruit, 2.5-4 mm. wide by 4-7 mm. long; capsule more or less upright, about three-fourths inferior; calyx-lobes narrowly lance-linear, acute, 2.5-6 mm. long, obscurely callose-denticulate, glabrous or somewhat ciliate; auricles none; seeds oblong, 0.5-0.7 mm. long.

TYPE LOCALITY: Pine barrens of New Jersey (Quaker Bridge), *Canby* (Gray!).

DISTRIBUTION: Central Tennessee and central North Carolina; Coastal Plain from Georgia to New Jersey.

44. *Lobelia Boykinii* T. & G.; A.DC. in DC. Prodr. 7: 374. 1839.

Dortmannia Boykinii Kuntze, Rev. Gen. 972. 1891.

Aquatic, the lower part of the stem immersed; stem erect, slender, 1-3 mm. in diameter at base, simple or with spreading racemose branches above, glabrous, green, fistulose, 50-85 cm. high; leaves cauline, filiform, glabrous, 0.5-2.5 cm. long, few-50 or more, often deciduous, entire or obscurely callose-denticulate, the upper merging gradually into the bracts of the inflorescence; inflorescence more or less secund, 7-20 cm. long, 10-25-flowered; pedicels slender, glabrous, loosely spreading, (6) 10-17 mm. long in fruit; bracteoles none; flower-bracts glabrous, filiform, much shorter than the pedicels, 2-8 mm. long; flower 10-13 mm. long, including hypanthium; corolla pale blue, with a white eye, glabrous, or pubescent within, the lower lip smooth or pubescent at base, the tube 4-5 mm. long, entire except for the dorsal fissure, the lobes of the lower lip oblong, short-acute, shorter than the tube, the two upper lobes long-linear, nearly as long as the tube or shorter, erect; filament-tube 3.5-5 mm. long, deflexed, glabrous, the filaments connate about two-thirds of their length; anther-tube 1.5-1.8 mm. long, bluish-gray, the two smaller anthers sparsely white-tufted at the tips, the three larger pubescent on the backs; hypanthium in anthesis very small, subglobose or appearing flattish because of the spreading calyx-lobes, glabrous, becoming hemispheric in fruit, about 3 mm. in diameter; capsule about half inferior, somewhat longer than broad, 2.5-3.5 mm. long; calyx-lobes spreading, filiform, 3-4.5 mm. long, entire, glabrous; auricles none; seeds ovoid, dark-brown, 0.4-0.6 mm. long.

TYPE LOCALITY: Georgia or Florida ("in paludibus Georgiae et Floridae"), *Boykin* (herb. DC., photo), *Chapman*.

DISTRIBUTION: Coastal Plain, western Florida to southern Delaware.

45. *Lobelia inflata* L. Sp. Pl. 931. 1753.

Rapuntium inflatum Mill. Gard. Dict. ed. 8. *Rapuntium*, no. 5. 1768.

Lobelia Michauxii Nutt. Gen. 2: 76. 1818. (Based on *Lobelia cliffortiana* Michx., not L.)

Dortmannia inflata Kuntze, Rev. Gen. 380. 1891.

Lobelia inflata var. *simplex* Millsp. Bull. W. Va. Exp. Sta. 2¹² (24): 398. 1892 (W. Va. U.).

Stem erect, up to about 5 mm. in diameter at base, usually with many racemose axillary branches in age, sometimes becoming sub-corymbiform through elongation of the lower branches, few-100 cm. high (averaging 30-60), the lower part of the stem usually purplish (sometimes green), the upper part light green; whole plant loosely long-hirsute (rarely nearly glabrous), or the upper stem and upper sides of the leaves glabrous or strigose, the hairs flat, chaffy, most numerous near the angles formed on the stem by the decurrent leaf-bases; cauline leaves 10-25, irregularly rough-serrate or dentate, sessile or the lower subpetiolate, obtuse and obovate or the lower broad-ovate, the upper oblong or ovate-lanceolate, short-acute; blades usually 1.5-2.5 cm. wide by 4.5-8 cm. long (sometimes larger), usually 2-3 times as long as broad, the upper leaves often passing gradually into the broad-leafy lower flower-bracts; inflorescence consisting of loose racemes at the ends of the branches, the central one the largest, up to 30 cm. long (usually 10-15 cm.), not secund, 1-30-flowered; pedicels slender, more or less erect, finely prickly-puberulent, 5-10 mm. long in fruit, each with a pair of inconspicuous bracteoles at the base; flower-bracts leafy, the lower ones ovate, the upper lanceolate or linear, all about equaling the pedicels, finely callose-denticulate, glabrous or ciliate; flower inconspicuous, 8-10 mm. long, including hypanthium; corolla short in proportion to the hypanthium, only about 7 mm. long, violet-blue to nearly white, sometimes with a suggestion of pink which shows plainly in dried material, the base of the lower lip pubescent within, the corolla otherwise glabrous, the tube 2.5-3.5 mm. long, entire except for the dorsal fissure, the lobes of the lower lip oblong, shorter than the tube, the two upper lobes lanceolate; filament-tube 2.5-3 mm. long, slightly pubescent near base, the filaments connate two-thirds of their length; anther-tube 1.5-1.7 mm. long, bluish-gray, the two smaller anthers tufted at the tip, the three larger merely pubescent on the backs; hypanthium in anthesis campanulate, glabrous, becoming much inflated in fruit, ovoid to subglobose, 3.5-8 mm. wide by 7-11.5 mm. long; capsule inferior, immersed in the hypanthium; calyx-lobes subulate or linear, 3.5-5 (8) mm. long, entire, glabrous or rarely slightly ciliate; auricles none; seeds ellipsoid-fusiform, dark brown, 0.6-0.8 mm. long.

TYPE LOCALITY: "Habitat in Virginia, Canada."

DISTRIBUTION: Prince Edward Island and eastern Quebec to Minnesota, south to Louisiana and central Georgia; rare on the Coastal Plain.

ILLUSTRATIONS: Sweet, Brit. Fl. Gard. *pl.* 99; Mem. N. Y. State Mus. 15: *pl.* 222A; Britt. & Brown, Ill. Fl. 3: *f.* 4038.

46. *Lobelia spicata* Lam. Encyc. 3: 587. 1791.

Stem strict, erect, usually unbranched, 20-120 cm. high, 5 mm. in diameter or less at base, usually purplish-red and densely short-pubescent near base, becoming glabrous and green above, often pubescent on the angles formed below the decurrent leaf-bases; uppermost sterile leaves usually not to be distinguished from the lowest bracts of the spike; all the leaves pubescent on both sides with short stiff hairs, especially near the base and margins; inflorescence a narrow spikelike raceme 10-30 (60) cm. long; pedicels in fruit stout, 2-6 (8) mm. long, rough-puberulent, each with a pair of inconspicuous bracteoles near base; flower-bracts linear to lanceolate, acute, usually denticulate, the upper ones about equaling the pedicels, the lowest ones often leafy, up to 2.5-4 cm. long; corolla glabrous, or pubescent without, the lower lip pubescent within at the base, the tube entire except for the dorsal fissure, 3-4.5 mm. long, the lobes of the lower lip ovate, somewhat reflexed, usually shorter than the tube, up to 3 mm. wide, 3-6 mm. long; two upper lobes lanceolate, recurved; filament-tube (2) 3-3.5 (4) mm. long, the filaments connate about half their length, pubescent at base; two smaller anthers white-tufted at tips, the three larger ones glabrous or pubescent on the backs; seeds oblong, light brown, 0.6-0.8 mm. long.

TYPE LOCALITY: "Canada." The type specimen (herb. Paris, photo) is marked "envoyé de Pennsylvania."

Cauline leaves 1-5, much smaller than the basal ones, bract-like; basal leaves ovate to obovate or suborbicular, 1.5-5.5 cm. wide.

Cauline leaves more numerous, as large as the basal ones or the latter lacking, or, if present, rarely suborbicular.

Plants rough-pubescent, including stem, bracts and calyx-lobes; plants often short (20-50 cm.), with leaves low on the stem; auricles of the hypanthium small or wanting.

46e. *L. spicata* var. *scaposa*.

46b. *L. spicata* var. *hirtella*.

Plants glabrous or pubescent, the calyx-lobes rarely at all ciliate; stems leafy throughout; auricles various.

Auricles long-filiform, deflexed, often as long as the hypanthium.

Auricles very short or none.

Anthers blue; hypanthium in anthesis flattish; flower light blue.

Anthers white; hypanthium in anthesis roundish (this evident even in the bud); flowers dark purplish-blue.

46c. *L. spicata* var. *leptostachys*.

46a. *L. spicata* var. *parviflora*.

46d. *L. spicata* var. *campanulata*.

46a. ***Lobelia spicata* var. *parviflora*** A. Gray, Syn. Fl. 2¹: 6. 1878.

Lobelia spicata Lam. loc. cit., as to type.

?*Lobelia Claytoniana* Michx. Fl. Bor. Am. 2: 153. 1803. (Type from eastern United States.)

Lobelia goodenoides Willd. Hort. Berol. pl. 30. 1804. (Based on a cultivated plant.)

Lobelia pallida Muhl. Cat. 22, in part. 1813.

Lobelia nitea Raf. Ann. Nat. 15. 1820. (Type from Kentucky.)

?*Rapuntium Claytonianum* Presl, Prodr. Mon. Lob. 23. 1836.

Dortmannia spicata Kuntze, Rev. Gen. 380. 1891.

Lobelia spicata f. *albiflora* R. Hoffm. Proc. Bost. Soc. Nat. Hist. 36: 334. 1922.

Lobelia spicata var. *originalis* McVaugh, Rhodora 38: 308. 1936.

Cauline leaves 3-20, usually not appressed to the stem, thin, sessile, or the lower narrowed into short margined petioles, the lower obtuse, oblanceolate, oblong or obovate, up to 2.5 cm. wide by 10 cm. long, shallowly coarse-dentate or subentire, the upper gradually smaller, acute-lanceolate, the uppermost often more conspicuously denticulate and sometimes merging imperceptibly into the bracts of the inflorescence; basal leaves, if present, obovate, obtuse, pubescent, 1-12, narrowed into well defined petioles; inflorescence usually less than half the height of the plant, interrupted, not noticeably secund, (few-) 30-60- (200-) flowered; flower 9-12 mm. long, including hypanthium; corolla white to dark purplish-blue; anther-tube 1.7-2 mm. long, light bluish-gray; hypanthium in anthesis flattish or broad-conic, glabrous or sparingly pubescent, becoming hemispheric in fruit, strongly ribbed, about 3.5 mm. in diameter; capsule one-half to two-thirds inferior, 3.5-6 mm. long; calyx-lobes entire, subulate to deltoid, usually flat, 2-7.5 mm. long, glabrous or somewhat bristly-ciliate; auricles usually present at the base of each lobe, distinctly short-triangular, or longer, in extreme cases filiform, as long as 1 mm., sometimes lacking.

TYPE LOCALITY: Near Lancaster, Pennsylvania, Porter, June 25, 1857 (Gray!).

DISTRIBUTION: New Brunswick to Pennsylvania and in the mountains to Georgia, west to North Dakota and Arkansas.

ILLUSTRATION: Willd. Hort. Berol. pl. 30.

46b. ***Lobelia spicata* var. *hirtella*** A. Gray, Syn. Fl. 2¹: 6. 1878.

Lobelia hirtella Greene, Pittonia 3: 349. 1898.

Lobelia leptostachys var. *hirtella* Farwell, Rep. Mich. Acad. 15: 188. 1913.

Petromarula hirtella Nieuwl. & Lunell, Am. Midl. Nat. 5: 13. 1917.

Differs from var. *parviflora* in being bristly-pubescent nearly throughout; the lower stem is bristly, especially on the angles; leaves often clustered on the lower half of the stem; hypanthium densely bristly, especially on the conspicuous ribs, in fruit hemispheric or varying to ovoid, 3.5-6 mm. long and 3-3.5 mm. across; capsule one-half to three-fourths inferior; calyx-lobes usually narrowly lance-linear (sometimes deltoid), 3.5-7 mm. long, bristly, often with a conspicuous raised midrib; auricles often conspicuous.

TYPE LOCALITY: "Chiefly towards and beyond the Mississippi" (Gray!).

DISTRIBUTION: Northwestern Indiana to eastern Kansas, northwest to eastern Montana and the plains of Alberta and central Saskatchewan; Michigan and northern Ontario to the Gaspé Peninsula; Long Island.

46c. ***Lobelia spicata* var. *leptostachys*** (A. DC.) Mackenzie & Bush, Man. Fl. Jackson Co. 183. 1902.

Lobelia leptostachys A. DC. in DC. Prodr. 7: 376. 1839.

Dortmannia leptostachys Kuntze, Rev. Gen. 972. 1891.

Lobelia bracteata Small, Fl. SE. U. S. 1146. 1903. (Small, NY!)

Cauline leaves 10-40, usually quite close together and somewhat appressed to the stem, this giving them an imbricated appearance in dried material, the blades firm or leathery,

sessile, or the lowest narrowed to short petioles, the lower and middle ones obtuse, long-oblong, or oblanceolate, up to 2.5 cm. wide by 12 cm. long, appearing subentire, but beset with callose-glandular teeth along the margins, the upper leaves gradually smaller, lanceolate, acute, becoming definitely bract-like and merging into the bracts of the inflorescence; basal leaves usually few or none, oblanceolate, obtuse; inflorescence densely flowered, not noticeably secund, bearing 20-200 (averaging 30-60) flowers upon very short (in fruit 2-4 mm.), rough-puberulent, curved pedicels; flower 9-12 mm. long, including hypanthium; corolla light purplish-blue or white; anther-tube 1.8-2 mm. long, light bluish-gray; hypanthium in anthesis flattish or conic, glabrous or pubescent, becoming hemispheric in fruit, strongly ribbed, about 3.5 mm. in diameter; capsule one-half to two-thirds inferior; calyx-lobes entire, subulate, or linear-lanceolate, (2) 3-6 (7) mm. long, bristly-ciliate especially near the tips, or glabrous; auricles at the base of each lobe filiform, 1-3 (5) mm. long, deflexed or rarely practically lacking.

TYPE LOCALITY: "in Carolina merid.," *Fraser* (herb. DC., photo!).

DISTRIBUTION: Northern West Virginia to central Georgia and Alabama, west to northern Illinois, eastern Kansas and western Arkansas.

46d. *Lobelia spicata* var. *campanulata* McVaugh, *Rhodora*
38: 316. 1936.

Vegetatively not to be distinguished from the var. *parviflora*; inflorescence a loose raceme, hardly more than one-third the height of the plant, not noticeably secund, bearing 10-35 (50) widely spaced flowers; flower 7-9 mm. long, including the campanulate hypanthium; corolla dark purplish or paler, varying to white, glabrous, except for the slightly pubescent base of the lower lip; filament-tube 2-2.5 (3) mm. long; anther-tube 1-1.5 mm. long, white; style exerted, recurved; hypanthium in bud and in anthesis short-campanulate, glabrous or slightly puberulent, becoming subglobose in fruit, strongly ribbed, 3.5-5 mm. across by 4.5-6 mm. high; capsule two-thirds inferior or more; calyx-lobes short-lanceolate, flat, 3-4 mm. long, glabrous, entire; auricles lacking.

TYPE LOCALITY: Kinderhook, Columbia County, New York, *McVaugh 2673A* (Univ. Penna.).

DISTRIBUTION: Maine to Pennsylvania, Indiana, and Minnesota. Usually intimately associated with var. *parviflora* and perhaps only a minor genetic variant from that variety.

46e. *Lobelia spicata* var. *scaposa* McVaugh, *Rhodora*
38: 318. 1936.

Lobelia pallida Muhl. Cat. 22, in part. 1813.

?*Lobelia paniculata* Raf. New Fl. 2: 18. 1837. (Type from "Alleghany Mountains.")

Cauline leaves inconspicuous, thin, 1-6, below the middle of the stem, acute, bract-like, 1-2 cm. long, lanceolate, sharp-denticulate, or the lowest one oblanceolate or oblong, obtuse, about 1.5 cm. wide by 5 cm. long (in extreme cases 2.5 cm. wide by 9 cm. long); basal leaves 1-12, conspicuous, obovate, ovate or round, narrowed into margined petioles, 1.5-5.5 cm. wide by 3-10 cm. long (averaging about 3.5 cm. wide by 5 cm. long); inflorescence a loose raceme, usually about half the height of the plant, appearing naked, because of the disproportionately large basal leaves, somewhat interrupted, sometimes sub-secund, bearing 10-90 (averaging about 40) widely spaced flowers; flower 7-10.5 mm. long, including hypanthium (averaging 9 mm.); corolla pure white to light purplish-blue; anther-tube 1.7-2 mm. long, light bluish-gray; hypanthium in anthesis broad-conic, glabrous, becoming hemispheric to subglobose in fruit, about 4 mm. in diameter; capsule about two-thirds inferior; calyx-lobes lanceolate to linear, 2-6 mm. long, glabrous, entire; auricles usually conspicuous at the base of each lobe, triangular or short-filiform.

TYPE LOCALITY: Danville to Fall Creek, Pittsylvania County, Virginia, *Small & Heller 108* (Univ. Penna.).

DISTRIBUTION: Piedmont Region of southeastern United States, from southeastern Pennsylvania to South Carolina; Mississippi; Louisiana.

47. *Lobelia flaccidifolia* Small, Bull. Torrey Club 24: 338. 1897.

Lobelia ludoviciana A. Gray, Proc. Am. Acad. 12: 60. 1876. (*J. Hale*, Gray!) Not *Lobelia ludoviciana* Wood, 1861.

Lobelia Halei Small, Fl. SE. U. S. 1145. 1903. (Based on *L. ludoviciana* A. Gray.)

Dortmannia ludoviciana Kuntze, Rev. Gen. 972. 1891.

Stem slender, erect, simple or with several filiform branches each bearing a few flowers, 30-100 cm. high, glabrous or sparsely hirsute, green, or reddish below; leaves cauline, thin, few-20, glabrous, subtentire or inconspicuously crenate or serrate, the blades 0.5-1.5 cm. wide by 5-11 cm. long, 5-8 (12) times as long as wide, lanceolate or long-oblong, short-acute at the tip, mostly rather abruptly narrowed at base, the lower short-petiolate, oblanceolate; floral bracts definitely smaller than the leaves, the larger leaves well below the inflorescence; inflorescence a loose raceme, sometimes plainly secund, few-30 cm. long, bearing 3-30 flowers; pedicels rough, slender, curved, 4-11 mm. long in fruit, each with a pair of conspicuous green smooth or ciliate bracteoles near the middle or below; flower-bracts linear, glabrous, denticulate, about equaling the pedicels; flower 14-22 mm. long (averaging 15-16 mm.), including hypanthium; corolla blue, pubescent without or glabrous, the lower lip somewhat pubescent within at the base, with two tubercles, the tube 6.5-8.5 mm. long, entire except for the dorsal fissure, or fenestrate, the lobes of the lower lip oblong or narrow-ovate, nearly as long as the tube, the two upper lobes lanceolate, erect; filament-tube 5-8 mm. long, the filaments pubescent near base, connate more than half their length; anther-tube 2-3 mm. long, bluish-gray, the two smaller anthers tufted at the tips, the three larger pubescent on the backs; hypanthium in anthesis short-campanulate, somewhat rough-puberulent, becoming hemispheric in fruit, strongly ribbed; capsule more than half inferior, longer than wide, 4-6 mm. in diameter; calyx-lobes narrowly sagittate, acute or attenuate, glabrous or ciliate, usually glandular-toothed, 3-5 (7) mm. long; auricles reflexed, round, small, but conspicuous, 1 mm. long or less; seeds ovoid to linear-oblong, light-brown, 0.4-0.6 mm. long.

TYPE LOCALITY: Ochlockonee River swamp near Thomasville, Thomas County, Georgia, *Small* (NY!).

DISTRIBUTION: Coastal Plain, Georgia to eastern Texas.

48. *Lobelia floridana* Chapm. Bot. Gaz. 3: 9. 1878.

Lobelia patudosa var. *floridana* A. Gray, Syn. Fl. 2¹: 393. 1878.

Stem erect, up to about 5 mm. in diameter at base, unbranched, or with several stout upright or spreading branches, glabrous, 50-150 cm. high (averaging 80-100 cm.), green or stramineous, less often purplish at base; leaves basal, more or less erect, 1-10, glabrous, strap-shaped, fleshy, oblanceolate or lanceolate, acute or obtuse at tip, long drawn-out at base into a margined petiole, the blades up to 2.5 cm. wide by 40 cm. long (averaging about 1 cm. wide by 25 cm. long), entire or shallowly crenate, or dentate with callose teeth; stem-leaves bract-like, 3-4, lanceolate, 2-3 cm. long, acute, distant, callose-denticulate, the lowest sometimes larger, up to 0.5 cm. wide by 8 cm. long; inflorescence not secund, 10-50 cm. long, loosely or rather densely 10-40-flowered; pedicels stout, rough, more or less upright, 3-6 mm. long in fruit, each with a pair of inconspicuous bracteoles at the base; flower-bracts glabrous, linear, shorter than the pedicels or equaling them, inconspicuous; flower 13-20 mm. long (averaging 15-16 mm.), including hypanthium; corolla pale purplish to nearly white, usually pubescent without, the lower lip densely hirsute-pubescent at base within, the tube 8-9 mm. long, entire except for the dorsal fissure (rarely fenestrate), the lobes of the lower lip ovate, short-acute, reflexed, shorter than the tube, the two upper lobes lanceolate, erect; filament-tube 6-11 mm. long (averaging 7.5-9 mm.), strongly deflexed, the filaments pubescent near base, connate more than half their length; anther-tube about 3 mm. long, light bluish-gray, the two smaller anthers tufted at the tips, the three larger merely pubescent on the backs; hypanthium in anthesis flattish or conic, usually rough as seen under a lens, becoming hemispheric in fruit (sometimes acute at base), about 4 mm. in diameter or larger; capsule about two-thirds inferior, longer than broad, 5-7 mm. long; calyx-lobes broadly-lanceolate or deltoid, 2-6 mm. long, glabrous, acute, usually callose-denticulate (often obscurely so); auricles very small, triangular; seeds brown, ovoid, 0.6-0.7 mm. long.

TYPE LOCALITY: Western Florida, *Chapman* (Mo. Bot. Gard.).

DISTRIBUTION: Near the Gulf Coast, western Louisiana to western Florida; Wilmington, North Carolina.

49. *Lobelia paludosa* Nutt. Gen. 2: 75. 1818.

Lobelia nudicaulis Raf. Atl. Jour. 147. 1832. (Type from Florida.) Not *Lobelia nudicaulis* Lam. 1791.

Dortmannia paludosa G. Don, Gen. Hist. 3: 715. 1834.

Rapuntium paludosum Presl, Prodr. Mon. Lob. 18. 1836.

In habit and vegetative characters hardly separable from *L. floridana*, but smaller; stem 20-135 cm. high (averaging 50-60 cm.), usually unbranched, often purplish at base and at bases of leaves; leaves basal, smaller and shorter than in *L. floridana* (average size about 1 cm. wide by 12 cm. long), usually oblanceolate, short-acute (rarely with an ovate blade and a short petiole); stem-bracts 1-2.5 cm. long (rarely 5 cm.); inflorescence 2-35 cm. long (averaging about 15 cm.), loosely few-30-flowered; pedicels rough, not stiffly upright, rather slender, 5-9 mm. long in fruit, with no bracteoles visible under a lens; flower-bracts shorter than the pedicels, linear; flower 11-16 mm. long, including hypanthium (averaging 12-13 mm.); corolla light purplish-blue or nearly white, practically glabrous without, the lower lip densely hirsute-pubescent at base within, the tube 4-5 mm. long, fenestrate, the lobes of the lower lip ovate, little shorter than the tube, scarcely reflexed, the two upper lobes lanceolate; filament-tube 3-4.5 mm. long, somewhat deflexed, the filaments hairy below, connate about half their length; anther-tube 2-3 mm. long, light bluish-gray, the two smaller anthers tufted at tips, the three larger merely pubescent on the backs; hypanthium in anthesis conic, rough, becoming hemispheric in fruit, sometimes acute at base, 3.5-4 mm. in diameter; capsule about two-thirds inferior, longer than broad, 3-6 mm. long; calyx-lobes lanceolate or deltoid, acute, glabrous, entire, or callose-denticulate, about 3 mm. long; auricles none or very small; seeds as in *L. floridana*.

TYPE LOCALITY: "In deep sphagnose swamps, from Sussex county in Delaware to Georgia," Nuttall (Acad. Phila.!).

DISTRIBUTION: Southeastern Georgia; throughout peninsular Florida and west to the Apalachicola River.

50. *Lobelia puberula* Michx. Fl. Bor. Am. 2: 152. 1803.

Lobelia puberula var. *glabella* Hook. Bot. Mag. pl. 3292. 1834. Not *Lobelia puberula* var. *glabella* Ell. 1817.

Rapuntium puberulum Presl, Prodr. Mon. Lob. 23. 1836.

Rapuntium puberulum var. *glabellum* Presl, Prodr. Mon. Lob. 23. 1836.

Lobelia amoena A. DC. in DC. Prodr. 7: 377, in part. 1839.

Lobelia glandulosa var. *obtusifolia* A. DC. in DC. Prodr. 7: 378. 1839. (Herb. DC., photol)

Dortmannia puberula Kuntze, Rev. Gen. 973. 1891.

Lobelia puberula var. *laeviuscula* Mohr, Contr. U. S. Nat. Herb. 6: 750. 1901. (Based on *Lobelia puberula* var. *glabella* Hook.)

Lobelia puberula var. *mineolana* F. E. Wimmer, Repert. Sp. Nov. 26: 4. 1929. (Reverchon, isotype, Mo. Bot. Gard.)

Lobelia puberula f. *candida* Fernald, Rhodora 41: 570. 1939. (Fernald & Long 9631, Gray.)

Stem strict, usually unbranched, 30-100 (160) cm. high, up to about 7 mm. in diameter at base, green or sometimes with a purplish tinge throughout, darker below, densely short-hirsute throughout, or sometimes glabrate; cauline leaves few-40, hairy beneath and more or less strigose above, especially near the margins, the blades 1-2.5 cm. wide, 3-10 cm. long, mostly 2-4 times as long as wide, thin but fairly firm, varying from lanceolate, acute and sub-entire in outline, with prominent callose-denticulate teeth, to broadly obovate and obtuse, with coarse irregular serrations and inconspicuous callose teeth, the upper leaves merging gradually into the bracts of the inflorescence, becoming more finely toothed above; basal leaves none; inflorescence often distinctly secund, (few) 15-30 (50) cm. long, densely flowered or often somewhat interrupted, bearing few-70 flowers; pedicels stout, puberulent or hirsute, 3-5 mm. long in fruit, each with a pair of bracteoles at the base or somewhat above it; flower-bracts various, often leafy; flower 15-24 mm. long, including hypanthium (averaging 18-20 mm.); corolla purplish-blue, with a white eye, varying to purplish-pink or white, pubescent at least on the veins without, the lip glabrous within, the tube 5-8 mm. long, fenestrate, the lobes of the lower lip oblong or ovate, usually somewhat shorter than the tube, acute or obtuse, the two upper lobes lanceolate, erect; filament-tube 6-7 mm. long (rarely 9 mm.), the filaments pubescent near base, connate about one-third their length; anther-tube 3-3.5 mm. long, light bluish gray, the two smaller anthers tufted at the tip, the three larger usually pubescent on

the backs; hypanthium in anthesis flattish or short-hemispheric, more or less pubescent, or hirsute, becoming hemispheric in fruit, widest at the top, usually with a flaring rim, prominent ribs and a rough angular appearance, 5-9 mm. wide; capsule about half inferior, 4-7 mm. long; calyx-lobes lanceolate or broader, plainly broadest near the base, more or less straight-sided, without definite subulate tips, 5-12 mm. long, usually ciliate at least near the tip, entire or callose-denticulate; auricles very small and triangular, or rounded and short, formed of the rolled edges and basal lobes of the cordate calyx-lobes; seeds linear-oblong or ellipsoid, 0.5-0.7 mm. long.

TYPE LOCALITY: "Carolina."

DISTRIBUTION: New Jersey to Illinois, south to central Florida, Oklahoma, and eastern Texas.

ILLUSTRATIONS: Bot. Reg. 32: pl. 6; Bot. Mag. pl. 3292.

Lobelia puberula var. *pauciflora* Bush, Ann. Rep. Mo. Bot. Gard. 17: 122. 1906, *Reverchon* 3206 (Mo. Bot. Gard. l.), may deserve recognition. The plants are densely whitish-hirsute and the flowers larger than usual in the species (filament-tube 8-11 mm. long). Texas to southern Alabama, rare.

51. *Lobelia brevifolia* Nutt.; A. DC. in DC. Prodr. 7: 377. 1839.

Lobelia dentata Torr.; A. DC. in DC. Prodr. 7: 377, as syn. 1839.

Lobelia ludoviciana Wood, Class Book 476. 1861. (Type from Louisiana, *Hale*.)

Dortmannia brevifolia "(Torr.)" Kuntze, Rev. Gen. 972. 1891.

Stem unbranched, rather weak, 1.5-3.5 mm. in diameter at base, 30-90 cm. high, glabrous or nearly so, green or tinged with purplish-red near the base; cauline leaves 20-100 (in fasciation 200), crowded, the blades linear, oblong, or the lower oblanceolate, short-acute or obtuse, 0.2-0.8 cm. wide by 0.7-3 cm. long (averaging 0.5 cm. wide by 1.5 cm. long), strongly pectinately toothed, the teeth callose-tipped; leaves glabrous or somewhat strigose, decurrent, not much narrowed at the base, except the lowest, the upper more distant and merging gradually into the bracts of the inflorescence; inflorescence few-15 (25) cm. long, few-15- (30-) flowered; pedicels stout, upright, rough or hirsute, 5-10 mm. long in fruit, each with a pair of bracteoles near the base, the flowers often standing stiffly at right-angles to the stem; flower-bracts glabrous or somewhat pubescent beneath, 0.5-1.5 cm. long, inconspicuous, strongly toothed; flower 15-24 mm. long, including hypanthium (averaging 18-20 mm.); corolla pale blue or azure, pubescent without, the lower lip smooth or puberulent within, the tube 6.5-8 (10) mm. long, fenestrate or sometimes entire except for the dorsal fissure, the lobes of the lower lip narrowly ovate, short-acute, shorter than the tube, the two upper lobes lanceolate; filament-tube (5) 6.5-7 (8) mm. long, pubescent, the filaments connate distally; anther-tube 3.5-4 mm. long, bluish-gray, all the anthers white-tufted at the tip, or the three larger merely pubescent on the backs; hypanthium in anthesis short-hemispheric, nearly glabrous to densely long-hirsute, becoming subglobose or hemispheric in fruit; capsule 5-8 mm. in diameter, 5-7 mm. high, more than half inferior; calyx-lobes broad at the base, 4.5-8 mm. long (averaging about 6 mm.), long-acute, strongly pectinately toothed, sometimes fimbriate; auricles at the base of each lobe broad, round, foliaceous, usually as long as the hypanthium-tube and covering it, sometimes toothed; seeds oblong-ovoid, about 0.6 mm. long.

TYPE LOCALITY: Alabama (herb. DC., photo!).

DISTRIBUTION: Gulf Coastal Plain, southeastern United States, from western Florida to eastern Louisiana.

LOBELIA BREVIFOLIA × *LOBELIA PUBERULA* (McVaugh, *Rhodora* 38: 291. 1936). *Lobelia glandulosa* A. DC. in DC. Prodr. 7: 378, in part. 1839 (*Gates*, NY!). *Lobelia amoena* var. *glandulifera* A. Gray, Syn. Fl. N. Am. 2: 4, in part. 1878 (*Gates*, Gray!). Plants intermediate between *Lobelia puberula* and *Lobelia brevifolia* occur throughout the range of the latter, and are thought to be of hybrid origin.

52. *Lobelia glandulosa* Walt. Fl. Car. 218. 1788.

Lobelia crassiuscula Michx. Fl. Bor. Am. 2: 152. 1803.

Lobelia puberula var. *glabella* Ell. Bot. S. C. & Ga. 1: 267. 1817. (Type from Chatham County, Georgia.)

Rapuntium glandulosum Presl, Prodr. Mon. Lob. 21. 1836.

Dortmannia glandulosa Kuntze, Rev. Gen. 972. 1891.

Stem unbranched, weak, sometimes zigzag, erect or ascending, usually less than 2 mm. in diameter at base, 30-140 cm. long (often tall, 90-100 cm.), glabrous, green, or darker below;

leaves cauline, few-20, glabrous, thick, narrowly linear to broadly lanceolate, 0.2-1.4 cm. wide by 3-15 cm. long (averaging about 0.6 cm. wide by 8 cm. long), usually about 15 times as long as wide, decurrent, not much narrowed at the base except the lowest, somewhat appressed to the stem, strongly callose-denticulate or subentire in outline, the upper ones merging into the floral bracts, but the larger leaves well below the inflorescence; inflorescence usually strongly secund, 15 cm. long or less, bearing 1-20 (averaging 8-10) rather widely spaced flowers; pedicels stout, rough-puberulent or hirsute, straight, upright, 5-13 mm. long in fruit, each with a pair of bracteoles near the base; flower-bracts glabrous, linear, rarely much exceeding the pedicels, usually strongly callose-denticulate; flower 20-33 mm. long, including hypanthium (averaging 24-25 mm.); corolla blue with a white eye, glabrous or pubescent without, hirsute within at the base of the lower lip, the tube 9-12 mm. long, fenestrate, the lobes of the lower lip oblong or ovate, sometimes acute, about the length of the tube, sometimes as large as 8 mm. wide by 16 mm. long, the two upper lobes narrow-ovate, curved upward; filament-tube 7.5-10 mm. long (usually 8.5-9 mm.), the filaments pubescent near base, connate more than half their length; anther-tube 3.5-4 mm. long, light bluish-gray, all five anthers tufted, or the three larger merely pubescent on the backs; hypanthium in anthesis short-hemispheric or flatter, glabrous, puberulent or long chaffy-hirsute, becoming hemispheric or subglobose in fruit, 6-8 mm. in diameter; capsule more than three-fourths inferior, 6-8 mm. long, often slightly broader than long; calyx-lobes narrow, almost linear, or broader (long-lanceolate or wedge-shaped), glabrous, acute, 3-15 mm. long, usually strongly callose-denticulate, sometimes entire; auricles none, or small and triangular; seeds oblong, about 0.8 mm. long.

TYPE LOCALITY: South Carolina, probably in upper Berkeley County near the Santee River, Walter (Brit. Mus.).

DISTRIBUTION: Coastal Plain, southern Virginia to the Florida Keys and west to the Apalachicola River.

ILLUSTRATION: Britt. & Brown, III. Fl. 3: f. 4035.

53. *Lobelia amoena* Michx. Fl. Bor. Am. 2: 153. 1803.

Stem upright, unbranched, rather coarse, up to about 4 mm. in diameter, 30-125 cm. high, light green (sometimes reddish at base), glabrous or somewhat hirsute-pubescent below; leaves 6-20, cauline, rather widely spaced; bracts (sometimes with the exception of the lowest) not leafy, giving the inflorescence a naked appearance; inflorescence 10-40 cm. long, usually secund, few-40-flowered; pedicels rather slender, curved, 3-5 mm. long in fruit, short-prickly-ciliate or glabrous, each with a pair of rather prominent bracteoles (these sometimes 1 mm. long) near the base; flower-bracts glabrous, callose-denticulate, linear, 1-2 cm. long, the lowest often leafy, lanceolate or broader, 2-4 cm. long; all bracts sometimes leafy; flower 18-26 mm. long, including hypanthium (averaging 20-22 mm.); corolla bright blue, with a light eye, glabrous, the tube fenestrate, the lobes of the lower lip broadly ovate, obtuse, sometimes even spatulate, often apiculate, sometimes as long as the tube, the upper lobes lanceolate; filament-tube 5-7 (8.5) mm. long, the filaments pubescent near base, connate only about a third of their length; anther-tube 2.5-3.5 mm. long, light bluish-gray, the two smaller anthers tufted, the three larger glabrous or pubescent on the backs; hypanthium in anthesis hemispheric, glabrous or with a few hairs, becoming globose or somewhat flattened at base in fruit, widest about the middle or below, 5-8 mm. wide; capsule more than half to almost wholly inferior, 4-7 mm. long; auricles none or very small; seeds linear-oblong, about 1 mm. long.

TYPE LOCALITY: None given; presumably in Carolina.

Calyx-lobes entire; filament-tube 5-7 mm. long.

Calyx-lobes toothed; filament-tube 7-8 mm. long.

53a. *L. amoena* var. *amoena*.

53b. *L. amoena* var. *glandulifera*.

53a. *Lobelia amoena* var. *amoena* McVaugh, var. nov.

Lobelia amoena Michx. loc. cit., as to type.

?*Lobelia colorata* Sweet, Brit. Fl. Gard. II. 2: pl. 180. 1833.

Rapuntium amoenum Presl, Prodr. Mon. Lob. 23. 1836.

?*Lobelia hortiensis* A. DC. in DC. Prodr. 7: 377. 1839.

Dortmannia amoena Kuntze, Rev. Gen. 972. 1891.

Leaves very thin in texture, acute at the base, the lower subpetiolate, the blades glabrous or pubescent mostly on the veins beneath, and strigose above, the lower leaves subentire or

somewhat serrate, oblong or ovate, usually obtuse, 1.5–4.5 cm. wide by 4–18 cm. long, 2.5–4 times as long as wide, the upper leaves narrower, sometimes lanceolate, often prominently denticulate; raceme often crowded, strongly secund; corolla-tube 7–8 mm. long; calyx-lobes glabrous, entire, 5–12 mm. long (averaging 6–8 mm.), flat, linear, less than 1 mm. wide, or the base broad, short-deltoid, the upper portion linear.

DISTRIBUTION: Mountains and Piedmont, western North Carolina and eastern Tennessee to northern Georgia and Alabama.

NOTE: The identity of *Lobelia amoena* Michx. cannot be determined with certainty from the original description; no type locality is given, and Michaux's type material could not be found in Paris by Professor Humbert, who searched for it in 1934. The name may have been applied by Michaux to the species now called *Lobelia elongata* Small, as is suggested by the figure published by L. C. Richard (Ann. Mus. Paris 18: pl. 1, f. 1A. 1811).

53b. *Lobelia amoena* var. *glandulifera* A. Gray, Syn. Fl.

2¹: 4. 1878.

Lobelia amoena var. *obtusata* A. Gray, Syn. Fl. 2¹: 4. 1878. (Chapman, Gray!)

Lobelia glandulifera Small, Fl. SE. U. S. 1144. 1903. Not *Lobelia glandulifera* Kuntze, 1891.

Lobelia georgiana McVaugh, Bull. Torrey Club 67: 144. 1940. (Based on *Lobelia glandulifera* Small.)

Leaves spreading, glabrous (rarely with a few hairs beneath), thick, with a parchment-like texture and a characteristic bluish-green or gray-green sheen in dried material, short-ovate or elliptic, broadest at or below the middle, mostly short-acute at both ends, with small sharp regular teeth or subentire, mostly subpetiolate, usually 2–3 cm. wide by 5–12 cm. long, 2.5–4 times as long as wide; raceme often loosely few-flowered, not strongly secund; corolla-tube 7–9 (12) mm. long; calyx-lobes glabrous, narrow, nearly linear or with a broad base, 5–8 mm. long, acute, with 6 or fewer prominent glandular teeth on each edge.

TYPE LOCALITY: "S. Virginia to Florida and Alabama."

DISTRIBUTION: Western North Carolina to northern Florida and southeastern Virginia.

54. *Lobelia elongata* Small, Fl. SE. U. S. 1144. 1903.

Lobelia glandulosa var. *glabra* A. DC. in DC. Prodr. 7: 378. 1839. (Fraser, herb. DC., photo!)

Stem upright, unbranched, up to 5 mm. in diameter at base, 30–150 cm. high, green or with a purplish tinge, darker near the base, glabrous; leaves cauline, few–20, more or less upright and appressed, narrowly lanceolate, sharply dentate or subentire, long-acute at both ends with prominent veins, glabrous or strigose, sometimes papillose beneath, the blades usually 0.5–2.5 cm. wide by 5–12 cm. long, 5–8 (12) times as long as wide, the upper leaves gradually smaller, but definitely larger than the bracts of the inflorescence; inflorescence 10–30 cm. long (averaging 15–20 cm.), strongly secund, rather densely few–50-flowered; pedicels rough, 4–7 mm. long in fruit, each with a pair of bracteoles near the base; flower-bracts glabrous, dentate, lanceolate or linear, 1–2 cm. long, inconspicuous or the lowest leafy; flower 20–25 mm. long, including hypanthium (averaging 22.5 mm.); corolla deep blue, glabrous, the tube 11–13 mm. long, fenestrate, the lobes of the lower lip broadly ovate or oblong, shorter than the tube, the two upper lobes lance-linear; filament-tube 8–11.5 mm. long (averaging 9 mm.), the filaments pubescent near base, connate about half their length; anther-tube 4 mm. long, bluish-gray, the two smaller anthers tufted, the three larger pubescent on the backs or nearly glabrous; hypanthium in anthesis short-hemispheric, glabrous or with a few hairs, becoming subglobose in fruit, 6–8 mm. across, broadest at the middle; capsule inferior or essentially so, 6–8 mm. long; calyx-lobes glabrous, entire, linear-subulate or with a short-deltoid base, 6–13 mm. long (averaging about 9 mm.); auricles none or very small; seeds linear-oblong, about 1.0 mm. long.

TYPE LOCALITY: Northwest, Norfolk County, Virginia, *Heller 1246* (NY!).

DISTRIBUTION: Southern Maryland to Georgia, mostly near the coast; inland to Effingham County, Georgia.

55. *Lobelia siphilitica* L. Sp. Pl. 931. 1753.

Perennial by offsets; roots fibrous; rootstock short, thick; stem erect, unbranched, up to about 5 mm. in diameter at base, 20–130 cm. high, light green, quite glabrous or sparsely chaffy-hirsute, especially on the angles formed by the decurrent leaf-bases; cauline leaves

few-25, usually loosely spreading, very thin and papery when dry, the lower narrowed into margined petioles, the blades obovate, oblong, ovate or ovate-lanceolate, usually short-acute at the tip, 1.5-4 (6) cm. wide by 6-12 (18) cm. long, mostly 2-3 times as long as wide, nearly glabrous beneath, sparingly strigose above, subentire or more or less coarsely serrate, the teeth callose-tipped, the upper leaves usually merging gradually into the bracts of the inflorescence; inflorescence 10-30 (50) cm. long, usually densely few-75-flowered, not secund; pedicels more or less upright, 5-10 mm. long in fruit, more or less flattened, nearly glabrous or chaffy-hirsute, each with a pair of conspicuous bracteoles just below the hypanthium or 1.5-4 mm. below; flower-bracts glabrous or somewhat ciliate-fringed, the lower (sometimes all) leafy, the upper usually smaller, lanceolate, 1-2 cm. long; flower 23-26 (33) mm. long, including hypanthium; corolla bright blue (albino forms sometimes occur), white-striped in the throat, the base of the lower lip white, with two raised tubercles; corolla glabrous or hirsute on the veins without, the tube 11-15 mm. long, fenestrate, the lobes of the lower lip narrowly ovate, short-acute, sharply deflexed at base, about half as long as the tube, connate below or nearly to the tip, the two upper lobes long-acuminate, about as long as the lower; filament-tube 12-15 mm. long, somewhat deflexed, the filaments pubescent near base, connate more than half their length; anther-tube 4.0-5.5 mm. long, bluish-gray, the two smaller anthers tufted, the three larger glabrous; hypanthium in anthesis flattish-hemispheric, becoming hemispheric in fruit, somewhat flattened, often broader than high, (5) 8-12 mm. in diameter; capsule one-half to two-thirds inferior, 8-10 mm. long; calyx-lobes foliaceous, broadly lanceolate or ovate, acute, often 5-6 mm. wide by 8-11 (14) mm. long, the margins usually much folded back, ciliate and serrate, undulate or crisped; auricles foliaceous, flat, small or covering the entire hypanthium, obtuse or acute, sometimes connate, 2-5 mm. long; seeds oblong-ellipsoid, light-brown, about 0.8-1.0 mm. long.

TYPE LOCALITY: Virginia (herb. Linn., photo!).

Leaves, stem, hypanthium and calyx-lobes more or less hirsute; leaves mostly 2-6 cm. wide; flowers usually more than 20.
Leaves, stem, hypanthium and calyx-lobes glabrous or nearly so; leaves mostly 1.5 cm. wide or less; flowers 6-20.

55a. *L. siphilitica* var. *siphilitica*.

55b. *L. siphilitica* var. *ludoviciana*.

55a. *Lobelia siphilitica* var. *siphilitica* McVaugh, var. nov.

Lobelia siphilitica L. loc. cit., as to type.

Rapuntium siphiliticum Mill. Gard. Diet. ed. 8. *Rapuntium*, no. 2. 1768.

Lobelia reflexa Stokes, Bot. Mat. Med. 1: 342. 1812.

Lobelia coelestis Nutt.; Loud. Hort. Brit. ed. 2. 592. 1832.

Lobelia antisiphilitica Hayne, Arzn. Gew. 13: pl. 9. 1837.

Lobelia siphilitica f. *albiflora* Britton, Bull. Torrey Club 17: 125. 1890.

Dorimannia siphilitica Kuntze, Rev. Gen. 380. 1891.

Leaves, stem, hypanthium, and calyx-lobes more or less hirsute; leaves mostly 2-6 cm. wide; flowers usually more than 20.

DISTRIBUTION: Maine to Minnesota, south to Tennessee (Louisiana?) and northern Georgia. Rare and mostly lacking on the eastern Coastal Plain.

ILLUSTRATIONS: Bot. Reg. pl. 537; Lodd. Bot. Cab. pl. 955; Jacq. Ic. Pl. Rar. 3: pl. 597; Mem. N. Y. State Mus. 15: pl. 221.

55b. *Lobelia siphilitica* var. *ludoviciana* A. DC. in DC.

Prodr. 7: 377. 1839.

Lobelia Bollii P. H. Wimmer, Repert. Sp. Nov. 26: 3. pl. 71, f. 8a. 1929. (Type from Texas, Boll.)

Leaves, stem, hypanthium, and calyx-lobes glabrous or nearly so; leaves mostly 1.5 cm. wide or less; flowers few, usually 6-20.

TYPE LOCALITY: "In Louisiana," *Tainturier* (herb. DC., photo!).

DISTRIBUTION: Wisconsin to eastern Texas (Louisiana?), west to southern Manitoba, western South Dakota, and central Colorado.

LOBELIA SIPHILITICA × LOBELIA CARDINALIS. *Lobelia speciosa* Sweet, Brit. Fl. Gard. II. pl. 174. 1833. *Rapuntium speciosum* Presl, Prodr. Mon. Lob. 19. 1836; *Lobelia siphilitica* var. *Eschra* Hook. Bot. Mag. pl. 3604. 1837; *Lobelia Cardinalis* var. *Milleri* D. Don in Sweet, Brit. Fl. Gard. II. pl. 372. 1837. Occurs rarely as a natural hybrid where the ranges of the parent species coincide.

ILLUSTRATIONS: Bot. Mag. pl. 3604; Sweet, Brit. Fl. Gard. II. pl. 372.

56. *Lobelia Cardinalis* L. Sp. Pl. 930. 1753.

Perennial by offsets; roots fibrous; stem erect, unbranched, coarse (sometimes 1.5 cm. in diameter at the base), green, usually dark purplish-red below, sometimes purple-flecked or purplish throughout, 40–200 cm. high, glabrous or pubescent; cauline leaves 10–30, spreading, thin or papery, glabrous or short bristly-pubescent, subentire to very irregularly coarsely or finely dentate, the teeth callose-tipped, the blades linear to lanceolate, lance-ovate or oblong, or ovate, usually acute at the tip, narrowed at the base, the lower leaves short-petiole; inflorescence few–50 cm. long, not noticeably secund, densely (or loosely) few–100-flowered; pedicels more or less upright, slender, 4–15 (20) mm. long in fruit, short-bristly-pubescent, each with a pair of bracteoles at or near the base; flower-bracts linear or the lower broader, leafy; flower 30–50 mm. long, including hypanthium; corolla deep crimson (pink or albino forms occur rarely), somewhat puberulent, the lip glabrous, the tube mostly 15–20 mm. long, fenestrate, the lobes of the lower lip spreading, deflexed, ovate, acute, narrowed at the base, nearly equaling the tube, 3.5 mm. wide by 13–20 mm. long, the two upper lobes erect, linear, 1–2 mm. wide by 13–20 mm. long; filament-tube exceeding the corolla-tube, red, pubescent below, the filaments connate more than half their length; anther-tube bluish-gray, the two smaller anthers white-tufted, the three larger glabrous or lightly pubescent; hypanthium in anthesis conic or short-campanulate, glabrous or somewhat pubescent, becoming cup-shaped or hemispheric in fruit, strongly ribbed, usually broader than high, 8–11 mm. across; capsule about half inferior, mostly 6–8 (10) mm. long; calyx-lobes entire, linear-subulate, with a short-deltoid base, smooth, or ciliate at the tip, 8–16 (20) mm. long; auricles none, or minute, triangular; seeds linear-oblong, light brown, up to about 1.2 mm. long.

TYPE LOCALITY: Virginia (herb. Linn., photo!).

Anther-tube 4–5.5 mm. long; filament-tube (24) 28–30 (33) mm. long; leaves lanceolate to ovate-lanceolate, usually coarsely and irregularly toothed; blades mostly 3–5 times as long as wide.

Anther-tube 3.5–4.5 (5) mm. long; filament-tube 19–25 (rarely 30) mm. long; leaves linear to linear-lanceolate or even ovate-lanceolate, entire to coarsely toothed; blades mostly 6–12 times as long as wide.

Leaves mostly 8–14 times as long as wide, linear to linear-lanceolate or the lower oblanceolate; plants glabrous or sparsely pubescent, never densely short-pubescent throughout.

Leaves entire or very nearly so, often subcoriaceous, the bases often broad and subauriculate; inflorescence usually ample, scarcely if at all pedunculate.

Leaves finely and evenly to coarsely and irregularly dentate, rarely subentire, not subcoriaceous, the blades plainly narrowed to the base, not at all subauriculate; inflorescence often short, appearing pedunculate.

Leaves mostly 6–8 times as long as wide, lanceolate to oblong or ovate; plants densely pubescent to nearly glabrous; inflorescence usually ample, often leafy.

Plants densely short-pubescent throughout (hypanthium sometimes glabrous); leaves mostly obscurely toothed or subentire.

Plants glabrous or sparsely pubescent; leaves usually plainly toothed.

56a. *L. Cardinalis* subsp. *Cardinalis*.

56b. *L. Cardinalis* subsp. *graminea*.

var. *graminea*.

var. *pseudosplendens*.

var. *multiflora*.

var. *phyllostachya*.

56a. *Lobelia Cardinalis* subsp. *Cardinalis* McVaugh, Ann. Mo. Bot. Gard. 27: 348. 1940.

Lobelia Cardinalis L. loc. cit., as to type.

Rapuntium Cardinalis Mill. Gard. Dict. ed. 8. *Rapuntium*, no. 1. 1768.

Rapuntium coccineum Moench, Meth. Suppl. 277. 1802.

Lobelia coccinea Stokes, Bot. Mat. Med. 1: 343. 1812.

Lobelia Cardinalis var. *alba* Eaton, Man. ed. 7. 375. 1836.

Dortmannia cardinalis Kuntze, Rev. Gen. 380. 1891.

Lobelia cardinalis f. *rosea* St. John, *Rhodora* 21: 217. 1920.

Lobelia cardinalis f. *alba* St. John, *Rhodora* 21: 218. 1920.

Leaves lanceolate to ovate-lanceolate, usually coarsely and irregularly toothed; blades mostly 3-5 times as long as wide; anther-tube 4-5.5 mm. long; filament-tube (24) 28-30 (33) mm. long.

DISTRIBUTION: New Brunswick to Minnesota, south to eastern Texas and southern Florida.

ILLUSTRATIONS: Bot. Mag. pl. 320; Meehan, Nat. Fl. II. 2: pl. 5; Nat. Geogr. Mag. 27: 496; Mem. N. Y. State Mus. 15: pl. 220.

56b. *Lobelia Cardinalis* subsp. *graminea* (Lam.) McVaugh, Ann.

Mo. Bot. Gard. 27: 347. 1940.

Lobelia graminea Lam. Encyc. 3: 583. 1791.

Lobelia splendens Willd. Hort. Berol. pl. 86. 1809. (Type from southern Mexico.)

Rapuntium splendens Presl, Prodr. Mon. Lob. 26. 1836.

Lobelia ignea Paxton, Paxton's Mag. Bot. 6: 247. 1839. (Type of garden origin.)

Lobelia papalis? Lem. Herb. Gen. Amat. II. 3: pl. 31, as syn. 1843.

Lobelia splendens var. *atro-sanguinea* Hook. Bot. Mag. pl. 4002. 1843. (Type of garden origin.)

Lobelia fulgens var. *glabriuscula* Walp. Rep. 2: 707. 1843. (Based on *Lobelia splendens* Willd.)

Lobelia splendens var. *ignea* Hook. Bot. Mag. pl. 4960. 1857.

Dortmannia splendens Kuntze, Rev. Gen. 973. 1891.

Leaves linear to linear-lanceolate or ovate-lanceolate, entire to coarsely toothed; blades mostly 6-12 times as long as wide; anther-tube 3.5-4.5 (5) mm. long; filament-tube 19-25 (rarely 30) mm. long.

TYPE LOCALITY: "Perou," the type, *Joseph de Jussieu* (herb. Paris, photo!), is almost certainly from Panama.

Lobelia Cardinalis subsp. *graminea* var. *graminea* McVaugh, Ann. Mo. Bot. Gard. 27: 348. 1940. *Lobelia graminea* Lam. loc. cit., as to type. *Rapuntium gramineum* Presl, Prodr. Mon. Lob. 26. 1836. *Dortmannia graminea* Kuntze, Rev. Gen. 972. 1891.

Leaves linear or narrowly lanceolate, 0.4-1.5 cm. wide, 9-15 cm. long, usually 10-14 times as long as wide, entire or practically so, often subcoriaceous and often subauriculate at the base; plants glabrous or essentially so; inflorescence usually ample, many-flowered; bracts often leafy, similar to and adjacent to the upper foliage leaves.

DISTRIBUTION: Panama to Oaxaca, Hidalgo, and Mexico (state).

Lobelia Cardinalis subsp. *graminea* var. *pseudosplendens* McVaugh, Ann. Mo. Bot. Gard. 27: 348. 1940. *Lobelia mucronata* Engelm. in Wislitz. Tour Northern Mex. 103. 1848. (*Wislizenus* 177, Mo. Bot. Gard.) Not *Lobelia mucronata* Cav. 1800. *Dortmannia Engelmanniana* Kuntze, Rev. Gen. 972. 1891. (Based on *Lobelia mucronata* Engelm.)

Leaves lanceolate to linear, 0.4-1 (1.5) cm. wide, 5-10 (17) cm. long, usually 8-10 times as long as wide, evidently but finely toothed, thin, narrowed at base, plants glabrous or essentially so; inflorescence usually short, with 20 flowers or fewer, appearing pedunculate, the stem naked just below it; bracts usually not leafy, much smaller than the upper foliage leaves and distant from them.

TYPE LOCALITY: Twelve miles northeast of Bella Vista, Mun. de Madera, Chihuahua, *Muller* 3707 (U. S. Nat. Arb.).

DISTRIBUTION: Chihuahua to Baja California, California, southern Nevada, and western Texas; sparingly south to Oaxaca.

Lobelia Cardinalis subsp. *graminea* var. *multiflora* (Paxton) McVaugh, Ann. Mo. Bot. Gard. 27: 349. 1940. *Lobelia cordigera* Cav. Ic. 6: 14, pl. 523. 1800. ("Chile," *Née*, Madrid, Field Mus. Neg. 29445.) *Lobelia fulgens* Willd. Hort. Berol. pl. 85. 1809. (Type from southern Mexico.) *Lobelia formosa* Roth, R. & S. Syst. Veg. 5: 50, as syn. 1819. *Lobelia texensis* Raf. Atl. Jour. 176. 1833. (From Rafinesque's herb., Acad. Phila.) *Rapuntium fulgens* Presl, Prodr. Mon. Lob. 26. 1836. ?*Lobelia fulgens* var. *propinqua* Paxton, Paxton's Mag. Bot. 2: 52. 1836. ?*Lobelia propinqua* Lond. Hort. Brit. ed. 3. 636. 1839. ?*Lobelia princeps* Otto & Dietr. Allg. Gart. 7. 298. 1839. ?*Lobelia pauciflora* Otto & Dietr. Allg. Gart. 7: 299. 1839. *Lobelia Schiedeana* Heynh. Nonn. 2: 367, as gen. 1836. *Lobelia fulgens* var. *multiflora* Paxton, Paxton's Mag. Bot. 15: 7. 1849. *Lobelia fulgens* var. *pyramidalis* Paxton, Paxton's Mag. Bot. 15: 7. 1849. *Lobelia fulgens* var. *Marsvallae* Paxton, Paxton's Mag. Bot. 15: 7. 1849. ?*Lobelia porphyrantha* Decaene; Greenl. Rev. Hortie. 1860. 129. 1860. *Dortmannia fulgens* Kuntze, Rev. Gen. 972. 1891.

Leaves lanceolate to ovate, 1-2.5 (3.5) cm. wide, 8-15 cm. long, usually 6-8 times as long as wide, often entire, sometimes serrate; plants densely short-pubescent throughout with stiff sericeous or brownish hairs; inflorescence usually ample, many-flowered, not appearing pedunculate, the bracts often broad, leafy.

TYPE LOCALITY: Of garden origin; the original source of the seed is supposed to have been Mexico.
 DISTRIBUTION: Western Texas to British Honduras and Guatemala; in Mexico chiefly along the eastern Sierra Madre; California.
 ILLUSTRATIONS: Bot. Reg. *pl.* 165; Willd. Hort. Berol. *pl.* 85.

Lobelia Cardinalis subsp. *graminea* var. *phyllostachya* (Engelm.) McVaugh, Ann. Mo. Bot. Gard. 27: 349. 1940. *Lobelia phyllostachya* Engelm. in Wisliz. Tour Northern Mex. 108. 1848. *Dortmannia phyllostachya* Kuntze, Rev. Gen. 973. 1891.

Leaves lanceolate, elliptic or oblong, 1–2.5 (3.5) cm. wide, 8–15 (20) cm. long, usually 6–8 times as long as wide, usually toothed, occasionally entire; plants varying from entirely glabrous to slightly hairy, but never densely short-pubescent; inflorescence usually ample, many-flowered, not pedunculate, the bracts often leafy.

TYPE LOCALITY: Nuevo León ("between Monterey and Cerralbo"), *Wislizenus* 337 (Mo. Bot. Gard.).

DISTRIBUTION: Nebraska to Nevada and Sonora, south to central Texas, and, chiefly at low elevations, along the eastern coast of Mexico to Honduras and Tabasco.

ILLUSTRATIONS: Bot. Mag. *pl.* 4964; Link, Klotzsch, & Otto, Ic. Pl. Rar. *pl.* 33.

57. *Lobelia rotundifolia* Juss.; A.DC. in DC. Prodr. 7: 383. 1839.

Tupa domingensis Vatke, Linnaea 38: 728. 1874. (*Schomburgk*, Berlin!)

Dortmannia rotundifolia Kuntze, Rev. Gen. 973. 1891.

Lobelia rotundifolia var. *angustifolia* Ekman; O. C. Schmidt, Repert. Sp. Nov. 32: 94. 1933. (*Ekman* H12923, isotype, US!)

Stem erect, shrubby, woody, 0.9–1.2 m. high, the branches as much as 0.4 cm. in diameter, yellowish-brown, the bark mostly striate longitudinally, rough; plants pubescent above with fine hairs interspersed with minute spreading or upwardly hooked prickly processes; cauline leaves 30 or more, spreading, 0.5–1.5 cm. apart, thick and coriaceous, when fresh rather rigid and shining (according to G. W. Bachman), glabrous above, rough beneath because of the somewhat papillose and rough-pubescent veins, the margin crenate with 3–4 inconspicuous brownish callose teeth per cm., the leaves appearing subentire, the blades 1–2.5 cm. wide by 4–6 cm. long, about 2–3 (6) times as long as wide, narrowly or broadly elliptic, the apex acute, short-acuminate, the base acute, the sides sometimes unequal; lower leaves petiolate, the petiole up to 0.5 cm. long; inflorescence few–18 cm. long, not secund, rather loosely 8–50-flowered, the terminal flowers aborting (always?) so that the raceme becomes more or less determinate, tipped by a cluster of small bracts; pedicels horizontally spreading from the base, slender (about 0.5 mm. in diameter), strongly short-prickly-pubescent with often hooked prickles, 10–17 mm. long, in anthesis bent up abruptly near tip so that the flower is erect or strongly ascending, in fruit declined from the base or stiffly spreading, each with a pair of brownish pubescent bracteoles (less than 1 mm. long) at the base or 1–5 mm. above it; flower-bracts linear, acute (or the lower leafy), pubescent, toothed, 1–1.5 mm. wide by 6–8 mm. long, decurrent; flower 34–43 mm. long, including hypanthium; corolla 28–36 mm. long, deep coral pink (according to Bachman) or crimson (according to Leonard), glabrous or slightly ciliate without, the tube rather abruptly contracted above the base, and uniformly arcuate, fenestrate at base, the slits 7–13 mm. long, the lobes little spreading, arcuate, nearly linear, acute, 1–2 mm. wide, the two next the dorsal fissure 10–14 mm. long, the other 3 about as long or very slightly shorter; filament-tube 24–28 mm. long, somewhat deflexed, exerted about half its length, glabrous, the filaments connate except the proximal third; anther-tube 4.5–6.5 mm. long, bluish-gray, the two smaller anthers white-tufted at tip; hypanthium in anthesis cup-shaped, somewhat prickly-pubescent or papillose, in fruit hemispheric (or slightly broader than high), 7–8 mm. broad; capsule two-thirds inferior; calyx-lobes linear-subulate, slightly dilated at base, 1–1.5 mm. wide by 4–7 mm. long, bristly-pubescent and usually obscurely callose-toothed; auricles none; seeds linear (when immature), roughly cellular-reticulate, nearly 1 mm. long.

TYPE LOCALITY: Hispaniola, *Nectoux* (herb. Paris).

DISTRIBUTION: Hispaniola and Puerto Rico, at elevations of 1000–2100 m.

Section 5. *Tylomium* (Presl) Benth. & Hook. Gen. Pl. 2: 552. 1876. *Tylomium* Presl, Prodr. Mon. Lob. 31, as genus. 1836. Stout herbs or subshrubs with flowers red or red-purple

to brown, yellow, green or white, never blue; bracteoles of the pedicel evident, somewhat foliaceous, never basal; seeds ovoid to globose, smooth and usually polished, pitted.

58. *Lobelia assurgens* L. Syst. Nat. ed. 10. 1237. 1759.

Stem coarse, shrubby, 0.9–2.4 m. high, glabrous below, angled by the persistent ridges formed by the decurrent leaf-margins; cauline leaves few—20, 4.5–11 cm. wide by 14–38 cm. long, usually about 3–5 times as long as wide, spreading, thin and membranous, smooth, glabrous above, sparsely chaffy-pubescent along the main veins beneath, the blades elliptic, rather abruptly narrowed to a short-acuminate tip about 2 cm. long, somewhat less abruptly narrowed to the attenuate subpetiolate base, the winglike margins decurrent, serrate, the teeth in the apical half of the blade mostly callose, 2–5 per cm., not over 1 mm. long, the teeth on the basal part of the blade often distant, as much as 1.5 cm. apart and prolonged into spiniform processes as much as 1 cm. long; inflorescence few—35 cm. long, densely few—60-flowered; pedicels in anthesis spreading-ascending, in fruit becoming loose and spreading, 1 mm. in diameter (flattened and up to 2 mm. wide where the bracteoles are decurrent), 17–33 mm. long; flower-bracts linear or the lowest broader, finely serrate with callose teeth, the margins decurrent; length of bract as much as 7 cm., but usually less; bracts often adherent to the base of the pedicel for a distance of 1–5 mm. and sometimes seeming to arise from the pedicel; flower not inverted in anthesis; corolla dull or dark red, the tube strongly falcate, the lobes recurved, not spreading, the two upper ones linear, 2 mm. wide or less, 12–13 mm. long, the lobes of the lower lip linear-elliptic, slightly broader and shorter than the others and more strongly recurved, united at base, their tips free about 6 mm.; filament-tube deflexed and much exerted, the filaments united more than half their length; hypanthium in anthesis turbinate or cup-shaped, usually acute at base, in fruit higher than broad, 7–9 mm. wide; capsule a little more than half inferior, 10–15 mm. long; calyx-lobes linear or subulate, with deltoid base, attenuate at tip, with 5–10 callose teeth on each edge; seeds oblong-ovoid, shallowly and regularly impressed-reticulate.

TYPE LOCALITY: Jamaica, *P. Browne* (herb. Linn., photo.).

Bracteoles of the pedicel 12–22 mm. long, standing 5–10 mm. below the base of the hypanthium; inflorescence when young conspicuously white- or brownish-tomentose; native of Jamaica.

58a. *L. assurgens* var. *jamaicensis*.

Bracteoles of the pedicel 5–10 mm. long, about the middle of the pedicel or below; inflorescence densely short-pubescent, but not conspicuously tomentose; native of Cuba (and Haiti?).

58b. *L. assurgens* var. *santa-clarae*.

58a. *Lobelia assurgens* var. *jamaicensis* Urban, Symb. Ant.

1: 453. 1900.

Lobelia assurgens L. loc. cit., as to type.

Tylomium assurgens Presl, Prodr. Mon. Lob. 32. 1836.

Tupa assurgens A. DC. in DC. Prodr. 7: 394. 1839.

Dortmannia assurgens Kuntze, Rev. Gen. 972. 1891.

Lobelia jamaicensis Urban, Ark. Bot. 23A: 104. 1930. (Based on *Lobelia assurgens* var. *jamaicensis* Urban.)

Pedicels densely short-tomentose with white or brownish wool, each with a pair of subopposite bracteoles 2–10 mm. below the hypanthium; bracteoles decurrent, tomentose, linear, acute, entire (always?), 12–22 mm. long; flower-bracts woolly or the lowest nearly glabrous; calyx-lobes about 2 mm. wide by 12–22 mm. long, tomentose; flower about 40 mm. long, including hypanthium; corolla 26–30 mm. long, tomentose without, especially near the tips of the lobes, nearly glabrous within, the tube about 17 mm. long, fenestrate or entire except for the dorsal suture; filament-tube 20–25 mm. long, tomentose or distally nearly glabrous; anther-tube 7–9 mm. long, the two smaller anthers short-bearded at apex and usually white tufted at base, the three larger anthers often sparsely white bearded near apex and sometimes tufted at base.

TYPE LOCALITY: Jamaica (type not designated).

DISTRIBUTION: Eastern Jamaica (Blue Mountains and Port Royal Mountains).

ILLUSTRATION: Bot. Repos. 9: pl. 553.

58b. *Lobelia assurgens* var. *santa-clarae* McVaugh, var. nov.*

?*Siphocampylus cubensis* A. Rich. in Sagra, Hist. Cuba 11: 68. 1850.

Pedicels densely short-pubescent with white or brown woolly hairs, but not matted, each with a pair of subopposite decurrent bracteoles about the middle or below (sometimes as little as 5 mm. from the base); bracteoles linear-filiform, less than 1 mm. wide, 5–10 mm. long, bristly-pubescent, sometimes obscurely toothed; flower-bracts pubescent; calyx-lobes pubescent, 1–2 mm. wide by 10–11 mm. long; flower 30–33 mm. long, including hypanthium; corolla 24–27 mm. long; tube not fenestrate (rarely so?); filament-tube 16–25 mm. long, pubescent; anther-tube 7–8 mm. long, the two smaller anthers short-bearded at apex and sometimes sparsely tufted at base, the three larger nearly glabrous or bearded on back.

TYPE LOCALITY: Trinidad Mountains, Santa Clara (Las Villas), Cuba, at an elevation of 900 m., *Britten & Wilson 5331* (NY).

DISTRIBUTION: Central Cuba; Massif de la Selle, Haiti.

NOTE: The single Haitian specimen seen by the writer (*Ekman H7762*, US!) has the flowers as large as those of var. *jamaicensis* but is otherwise identical with Cuban material.

59. *Lobelia robusta* Graham, Edinb. New Phil. Jour.

11: 378. 1831.

Not separable by vegetative characters from *L. assurgens*, but less pubescent and with much smaller flowers; bracteoles of the pedicel 4–10 mm. long; flower-bracts linear, about 0.15 cm. wide by 2.5–3 cm. long, the lower larger; flower not inverted in anthesis, 20–25 mm. long, including hypanthium; corolla 15–19 mm. long, pinkish to rose, dark red, or dull purple, the tube 7–10 mm. long, entire except for the dorsal fissure (sometimes fenestrate at base in age), curved near the distal end and the lobes further curved, so that the corolla as a whole is strongly recurved-falcate, the two lobes next the dorsal fissure 7–9 mm. long, the three others 5–6 mm. long; filament-tube pink, 8–12 (15) mm. long, deflexed and much exerted, pubescent, especially along the margins of the filaments, which are united half their length or less; anther-tube lead-colored, 5–6 mm. long, the larger anthers smooth or sparsely bearded in a line along the back, all anthers sometimes tufted at base, the two smaller short white-bearded at tip; hypanthium in anthesis cup-shaped, short-campanulate, or short-turbinate, in fruit turbinate to hemispheric or subglobose, 7–10 mm. broad; capsule about half inferior or a little less, 8–12 mm. long; seeds as in *L. assurgens*, about 0.5–0.6 mm. long.

TYPE LOCALITY: Haiti.

Pedicels in fruit 18–27 (40) mm. long; bracteoles of the pedicel mostly below the middle; calyx-lobes narrowly deltoid or lanceolate, obscurely toothed or subentire, 2–2.5 (3) mm. wide just above the often dilated-deltoid base, usually more than three times as long as wide; native of Hispaniola and eastern Cuba.

59a. *L. robusta* var. *robusta*.

Pedicels in fruit 30–50 mm. long; bracteoles of the pedicel mostly above the middle; calyx-lobes mostly deltoid, strongly pectinately toothed, 2.5–3.5 mm. wide just above the base, usually less than three times as long as wide; native of Puerto Rico.

59b. *L. robusta* var. *porto-ricensis*.

59a. *Lobelia robusta* var. *robusta* McVaugh, var. nov.

Lobelia robusta Graham, loc. cit., as to type.

Tylomium robustum Presl, Prodr. Mon. Lob. 32. 1836.

Tupa robusta A. DC. in DC. Prodr. 7: 394. 1839.

Dortmannia robusta Kuntze, Rev. Gen. 973. 1891.

Pedicels in fruit 18–27 (40) mm. long; bracteoles of the pedicels mostly below the middle; calyx-lobes narrowly deltoid or lanceolate, usually more than three times as long as wide, obscurely toothed or subentire, 2–2.5 (3) mm. wide just above the base, which is usually dilated-deltoid.

DISTRIBUTION: Mountains of Hispaniola and eastern Cuba, mostly at elevations of 500 m. or more.

ILLUSTRATION: Bot. Mag. pl. 3138.

**Lobelia assurgens* var. *santa-clarae*, var. nov., a var. *jamaicense* bracteolis 5–10 mm. longis, calycis lobis 10–11 mm. longis, racemo floribusque pubescentibus sed non tomentosis, differt.

59b. *Lobelia robusta* var. *porto-ricensis* (A. DC.) McVaugh,
Bull. Torrey Club 67: 144. 1940.

Tupa assurgens var. *Porto-Ricensis* A. DC. in DC. Prodr. 7: 394. 1839.

Dorimannia acuminata var. *pubescens* Kuntze, Rev. Gen. 379. 1891. (Kuntze, NY!)

Lobelia assurgens var. *portoricensis* Urban, Symb. Ant. 1: 454. 1900.

Pedicels in fruit 30–50 mm. long; bracteoles of the pedicel mostly above the middle; calyx-lobes mostly deltoid, strongly pectinately toothed, 2.5–3.5 mm. wide just above the base, usually less than three times as long as wide.

TYPE LOCALITY: Puerto Rico, Wylder 422 (herb. DC., photo.).

DISTRIBUTION: Mountains of Puerto Rico.

60. *Lobelia cubana* Urban, Symb. Ant. 1: 455. 1900.

Tupa montana C. Wright; Griseb. Cat. Pl. Cub. 159. 1866. Not *Lobelia montana* Reinw.; Blume, 1825.

Stem suffruticose, 6–10 ft. high (according to Wright); whole plant glabrous; cauline leaves few–15 or more, spreading-ascending, thickish in texture (?), the blades uniformly shallowly crenate on the distal three-quarters, with 2–3 teeth per cm., 2–3 cm. broad by 7–11 cm. long, usually about 3 times as long as wide, elliptic to oblong, short-acute at tip (less often obtuse and mucronate), narrowed at base to a definite petiole 2.5–3.5 cm. long; inflorescence shortly pedunculate (less than 5 cm.), 8–10 cm. long, usually about 20-flowered, more or less secund, the terminal buds often abortive and soon surpassed by the opening flowers just below; pedicels ascending in anthesis, fleshy (?), in fruit 18–23 mm. long, each with a pair of inconspicuous bracteoles one-third to one-half the distance from base to apex; bracteoles subulate, mostly less than 1 mm. long, decurrent, entire; flower-bracts linear, nearly entire, acute, about 1 mm. wide by 6 mm. long, decurrent; flower not inverted (?), 27–30 mm. long, including hypanthium; corolla about 21 mm. long, greenish-red (according to Wright), the tube sometimes fenestrate, somewhat curved, the lobes not spreading, somewhat recurved, the two next the dorsal fissure linear-attenuate, about 1.5 mm. wide by 10 mm. long, the three others about 1.5 mm. wide by 8 mm. long; filament-tube 10–14 mm. long, the filaments united less than half their length; anther-tube 7–8 mm. long, light yellow (?), the two shorter anthers white-tufted at tip, the others glabrous; hypanthium in anthesis campanulate, asymmetric, in fruit longer than broad, 6–7 mm. broad, two-thirds to three-fourths inferior, 6–11 mm. long, the apex obtusely conical, the rim as much as 3–4 mm. high; calyx-lobes deltoid, 1.5–2 mm. wide by 2–5 mm. long, entire; seeds ellipsoid-oblong, nearly 1.0 mm. long, tuberculate and with faint longitudinal striae.

TYPE LOCALITY: Pan de Guajaibón, Pinar del Río, Cuba, Wright 2880 (isotype, Gray!).

DISTRIBUTION: Known only from the type locality.

61. *Lobelia cacuminis* Britton & Wilson, Bull. Torrey Club
50: 50. 1923.

Stems shrubby, simple or branched, up to 0.5 cm. in diameter, up to 3–4 m. tall, yellowish-brown and rough below, ridged by decurrent leaf-bases, pubescent above; cauline leaves 14 or more, spreading, stiff and papery when dry, glabrous above, the younger ones somewhat pubescent on the veins beneath and in the axils; blades coarsely serrate-dentate with 1–4 triangular spreading or hooked teeth per cm., 2–4 cm. broad by 8–11 cm. long, 3–4 times as long as wide, narrowly to broadly elliptic, the apex cuneate with a short acuminate tip which is often somewhat falcate, the base narrowly cuneate, with a definite petiole 1–1.5 cm. long; inflorescence scarcely pedunculate, 5 cm. long or less, few–20-flowered; pedicels spreading-ascending in anthesis, stiff, appressed-pubescent, in fruit about 10 mm. long, widely spreading, each with a pair of subopposite bracteoles 1–2 mm. long, 2–5 mm. above the base; flower-bracts linear, about 1 mm. wide by 8 mm. long, decurrent, nearly glabrous; flower 15–18 mm. long, including hypanthium, not inverted; corolla 10–13 mm. long, glabrous, when dry purplish-maroon in color, the tube strongly fenestrate, even in bud, little curved; corolla as a whole somewhat arcuate, the lobes about 5 mm. long (?); filament-tube about 10 mm. long, somewhat

pubescent, the filaments distinct more than half their length; anther-tube 4.0 mm. long (or slightly more), purplish-gray in dry material, glabrous, the two smaller anthers obscurely white-roughened at tip; hypanthium in anthesis cup-shaped or hemispheric, pubescent near base, in fruit subglobose, about 7 mm. wide; capsule less than half inferior, about 9 mm. long, the narrowed tip projecting from the hypanthium; calyx-lobes deltoid, 2.5-3 mm. wide at base, 6 mm. long, glabrous, entire or nearly so (sometimes nearly linear, 2 mm. wide, with dilated base); seeds not seen.

TYPE LOCALITY: Pico Turquino, Oriente, Cuba, *Léon 10862* (NY!).

DISTRIBUTION: Pico Turquino, Oriente, Cuba.

62. *Lobelia oxyphylla* Urban, Symb. Ant. 7: 418. 1912.

Lobelia Shaferi Urban, Symb. Ant. 7: 419. 1912. (*Shafer 3465*, Berlin!)

Lobelia obtusata Urban, Ark. Bot. 23A⁵: 105. 1930. (*Ekman 15937*, Berlin!)

Lobelia nipensis Urban, Ark. Bot. 23A⁵: 106. 1930. (*Ekman 9890*, Berlin!)

Stem erect, suffrutescent, coarse (sometimes 1 cm. in diameter), 1.2-2.4 m. high, angulate and nearly smooth below, tomentulose above and about the leaf-bases; cauline leaves stiff (leathery?), glabrous except for scattered hairs (these especially along the veins beneath), smooth above, roughened beneath by the prominent veins, the margin uniformly and finely callose-denticulate, appearing subentire or sinuate-dentate, the teeth 2-4 per cm., rarely 1 mm. high, the blades 2-5 cm. wide by 10-31 cm. long, usually 3.5-4.5 (6) times as long as wide, elliptic-oblong, elliptic, or sometimes oblanceolate, abruptly narrowed to a rounded acumen 0.5-1.5 cm. long or sometimes the acumen obsolete, the apex then blunt, the basal third usually nearly entire, the base long-acuminate, the margins decurrent on the petiole; petiole below leaf margins about 0.5-1 cm. long; inflorescence scarcely pedunculate, 5-11 cm. long, few-40-flowered; pedicels up to 15 mm. long, crisply pubescent or glabrate, about 0.5 mm. in diameter, flexuous, each with a pair of subopposite pubescent filiform bracteoles 1-2 mm. long about one-third the distance from base to apex; flower-bracts linear or the lowest broader, nearly glabrous, acute, 2-10 mm. long (the lowest larger), decurrent; flower not inverted, about 15 mm. long, including hypanthium; corolla 11-12 mm. long, smooth or granulose, purplish (according to Shafer), the tube fenestrate, narrow, slightly curved, the lobes arcuately curved, the two next the dorsal fissure about 5 mm. long, the others about 4 mm. long; filament-tube 7-9 mm. long, nearly glabrous, the filaments connate more than half their length; anther-tube 3.0-3.5 mm. long, glabrous, all anthers beardless; hypanthium in anthesis turbinate, sparsely pubescent, in fruit asymmetric, obliquely campanulate, longer than broad, 4-6 mm. wide; capsule about two-thirds inferior, 7-9 mm. long, the narrowly conical beak woody-walled; calyx-lobes triangular, acute or blunt, about 1.5-3 mm. wide at base by 4-5 mm. long, glabrous or slightly ciliate, entire or obscurely toothed; seeds oblong-ovoid, shallowly and regularly pitted-reticulate.

TYPE LOCALITY: Camp La Gloria, south of Sierra Moa, Oriente, Cuba, *Shafer 8039* (Berlin!).

DISTRIBUTION: Mountains of Oriente, Cuba.

63. *Lobelia imberbis* (Griseb.) Urban, Symb. Ant. 1: 455. 1900.

Tupa imberbis Griseb. Mem. Am. Acad. II. 8: 516. 1862.

Dorimannia imberbis Kuntze, Rev. Gen. 972. 1891.

Lobelia piedrana Urban, Ark. Bot. 23A⁵: 105. 1930. (*Ekman 8838*, Berlin!)

Stem simple or branched, coarse (sometimes 0.8 cm. in diameter just below the inflorescence), sparsely light-chaffy-pubescent (only upper half seen), with green ciliate-serrate wings 1 mm. wide or less, formed by the decurrent leaf-margins; cauline leaves few-10 or more, spreading, thin and membranous, smooth and glabrous above, sparsely chaffy-pubescent beneath, especially along the veins, somewhat roughened beneath by the prominent veins, which are conspicuously reticulate, the margin coarsely serrate, with 1-3 somewhat irregular deltoid teeth per cm., the teeth callose-tipped, the blades 3-6 cm. broad by 10-16 cm. long, usually about 3 times as long as wide, obovate or broadly elliptic, narrowed at apex to an acuminate tip 1 cm. long or less, gradually narrowed at base to a margined petiole 1.3 cm. long or less; inflorescence little or not at all pedunculate, about 25-flowered, about 10 cm. long; pedicels spreading-ascending in anthesis, less than 1 mm. in diameter, in fruit 16-18 (25?) mm. long,

nearly glabrous or short-pubescent, each with a pair of subopposite glabrous subulate bracteoles 2-3 mm. long, about the middle or below; flower-bracts narrowly linear, toothed, nearly glabrous, strongly decurrent, about 1 mm. wide by 8 mm. long; flower apparently not inverted, about 30 mm. long, including hypanthium; corolla 26 mm. long, sparingly short-pubescent without (?), the lobes glabrous within, dark reddish-purple (?), the tube plainly fenestrate, only slightly curved, the lobes recurved (?), the two next the dorsal fissure narrowly linear, 1 mm. wide by 12 mm. long, the other three shorter (?); filament-tube (17?)—19 (24) mm. long, somewhat deflexed (?), the filaments nearly glabrous, connate about two-thirds their length; anther-tube 6-6.5 mm. long, the two smaller anthers very minutely beaded at tip, the three larger glabrous; hypanthium in anthesis obconic, nearly or wholly glabrous or pubescent at base only, in fruit hemispheric, about 5-7 mm. wide; capsule more than half inferior, 6-9 mm. long, the apex conical; calyx-lobes narrowly triangular to linear, gradually dilated at base, about 2 mm. wide by 6-8 mm. long, glabrous or minutely ciliate on margins, usually blunt and rounded at apex, obscurely callose-toothed; seeds ovoid, shallowly and regularly pitted-reticulate.

TYPE LOCALITY: Near Monte Verde, Oriente, Cuba, *Wright 1319* (isotype, Gray!).

DISTRIBUTION: Mountains of Oriente, Cuba.

64. *Lobelia portoricensis* (Vatke) Urban, Symb. Ant.

1: 453. 1900.

Tupa portoricensis Vatke, *Linnaea* 38: 727. 1874.

Stem erect, shrubby (always?), coarse (less than 1 cm. in diameter at base), 1-2 m. high, nearly smooth above or appearing granular-pulverulent with minute rusty-brown hairlike projections, usually roughened below by small papillae; cauline leaves few-20 or more, spreading, thin in texture, the upper surface smooth and glabrous (in dried material somewhat shining or lustrous), the lower surface rough to the touch because of the prominent pubescent brownish veins, the margins often sinuate, finely and evenly crenate-dentate with 5-10 minute brownish or purplish callose teeth per cm., the callosities sometimes intramarginal, so that they are visible from above only, the blades 4-6.5 cm. broad by 10-23 (30) cm. long, about 3-4 (5) times as long as wide, elliptic, narrowed rather abruptly to a short-acuminate tip 1-2 cm. long, at base somewhat less abruptly narrowed to a definite petiole 1-4 cm. long, the base sometimes unequal-sided; inflorescence often reddish, 6-20 cm. long, 10-25-flowered, pedunculate few-15 cm., usually strongly corymbose when young; pedicels ascending in anthesis, often strongly so, 25-40 mm. long in fruit, 1 mm. in diameter or less, sparsely short-bristly-pubescent, each with a pair of subopposite bracteoles about the middle or below; bracteoles linear, 1 mm. wide by 3-7 mm. long, pubescent, entire or obscurely toothed, decurrent; flower-bracts inconspicuous, green (?), decurrent, broadly linear, pubescent, finely toothed, 1-3 mm. wide by 16-17 mm. long; flower usually not inverted, but sometimes apparently so, 37-42 mm. long, including hypanthium; corolla 28-30 mm. long, pulverulent, minutely pubescent or glabrous without, glabrous within, "green," "green, shading to red," "reddish," or "purple," the tube 14-16 mm. long, conspicuously fenestrate at base, arcuate, the lobes mostly somewhat recurved, but not strongly falcate-recurved, little (not at all?) spreading, the two next the dorsal fissure linear or narrowly oblanceolate, acute, 12-15 mm. long, the three shorter lobes similar or a little broader, 10-13 mm. long; filament-tube 16-23 mm. long, more or less pubescent, the filaments connate more than half their length; anther-tube (6.5?) 7.5-9 mm. long, the two smaller anthers beaded at apex but lacking apical tufts, the three larger anthers glabrous or sparsely ciliate on the backs; hypanthium in anthesis broadly turbinate, pubescent or nearly glabrous especially in age, in fruit turbinate or obovoid, 8-11 mm. wide; capsule more than half inferior, 9-14 mm. long; calyx-lobes lanceolate, varying to linear or less often to oblanceolate, acute at tip, glabrous or few-ciliate, 1.5-2 (3) mm. wide by (7) 9-14 mm. long; seeds ellipsoid, shallowly pitted, about 0.6 mm. long.

TYPE LOCALITY: Puerto Rico, *Schwanecke* (Berlin!).

DISTRIBUTION: Puerto Rico; mountain forests, mostly at elevations of 500-1000 m.

65. *Lobelia Christii* Urban, Symb. Ant. 7: 420. 1912.

Stems herbaceous (?), coarse (sometimes 0.6 cm. in diameter), loosely pubescent below, rather abundantly crisp-pubescent above; cauline leaves few—12 or more, spreading, thin and membranous, smooth, glabrous above, finely strigose-pubescent on the veins beneath, the margins conspicuously serrate with irregular spreading often arcuate teeth 4–7 mm. high (less often 1 cm.), these averaging fewer than 2 per cm., often incised or doubly serrate, the blades 2.5–6 cm. broad by 6.5–15 cm. long, elliptic, with acute tip which is sometimes abruptly short-acuminate, the base acute, with the margins somewhat decurrent upon the petiole, which is 2–4 cm. long, at least in the lower leaves; flowers about 15–20 in the axils of the little reduced upper leaves, or the uppermost leaves smaller; axis of the “inflorescence” about 10–12 cm. long; pedicels spreading-ascending in anthesis, in fruit 23–35 mm. long, finely short-pubescent, weak, the mature capsule pendent (always?), each pedicel with a pair of subopposite linear green bracteoles about the middle; bracteoles about 1 mm. wide by 5–7 mm. long, ascending, entire, very sparsely pubescent; lowest flower-bracts little smaller than the foliage leaves, petiolate, the blades up to 4.5 cm. wide by 12 cm. long, the petiole as much as 1.5 cm. long, strongly decurrent and fused with the pedicel at base for 0.5–1 cm., so that the leaf and flower appear to arise from a common stalk; flower not inverted (?), 28–32 mm. long, including hypanthium; corolla 22 mm. long, puberulent without, yellowish-green when dry, the tube about 15 mm. long, arcuate, strongly dilated below and fenestrate, the lobes little recurved (?), linear-elliptic, the two next the dorsal fissure about 1 mm. wide by 9 mm. long; filament-tube 16–17 mm. long, exerted over half its length, the filaments pubescent, connate more than half their length; anther-tube 5–5.5 mm. long, glabrous, the two smaller anthers very minutely beaded at apex; corolla and androecium nearly hidden by the large leafy calyx-lobes (dried material); hypanthium in anthesis turbinate, puberulent, about as broad as high when pressed, 8–9 mm. across; capsule 9–11 mm. long (?), about half inferior (?), the upper half surrounded by the free rim of the hypanthium, which may be 4 mm. high; calyx-lobes foliaceous, membranous, broadly lanceolate or elliptic, 5–7 mm. wide by 15–16 mm. long, obtuse, mucronate, crenulate along the margin, nearly glabrous; seeds ovoid, finely pitted-reticulate, about 0.7 mm. long.

TYPE LOCALITY: Southern Haiti, in the valley of the left branch of the Grande Anse, at an elevation of 100–150 m., *Christ 2212* (isotype, NY!).

DISTRIBUTION: Massif de la Hotte, Haiti.

66. *Lobelia conglobata* Lam. Encyc. 3: 585. 1791.

Tylomium conglobatum Presl, Prodr. Mon. Lob. 32. 1836.

Tylomium conglobatum var. *virescens* Presl, Prodr. Mon. Lob. 32. 1836. (Nomen nudum.)

Tupa conglobata A. DC. in DC. Prodr. 7: 395. 1839.

Lobelia conglomerata Sieber; Steud. Nom. Bot. ed. 2. 2: 59. 1841. (Nomen nudum.)

Dortmannia conglobata Kuntze, Rev. Gen. 972. 1891.

Stem coarse, up to 0.5 cm. (or more), in diameter, glabrous (except the inflorescence); cauline leaves spreading, membranous, smooth and glabrous, or finely pubescent on the main veins beneath, evenly serrate-dentate with fine spiny teeth, the serrations about 4 per cm., or farther apart toward the base, up to 2 mm. long and standing at right angles to the margin, the blades 3–6 cm. wide by 12–22 cm. long, oblanceolate to elliptic, the tip narrowed abruptly to a short acuminate about 1 cm. long, the base long-attenuate, subpetiolar; inflorescence a subcapitate raceme, about 5 cm. long, apparently more or less determinate, rather densely about 20-flowered; pedicels loosely spreading, very slender, 17–20 mm. long in flower, finely chaffy-hirsute, each with a pair of ciliate bracteoles 5–6 mm. long, about two-thirds of the distance from stem to hypanthium; flower-bracts linear or oblanceolate, 2–3 mm. broad by 20–28 mm. long, spreading, pubescent, spiny-toothed along the margins; flower inverted (?), about 20 mm. long, including hypanthium; corolla glabrous, the tube entire except for the dorsal fissure, the lobes next the dorsal fissure more or less erect, 1.5 mm. wide by 11 mm. long, the three lobes of the lower lip slightly decurved, ovate, 3 mm. long; filament-tube 13–15 mm. long, little exerted, glabrous; anther-tube 3 mm. long, all anthers densely white-tufted at tip; hypanthium in anthesis shallowly hemispheric, glabrous, about 4 mm. across; calyx-lobes subulate, acuminate,

glabrous, conspicuously pectinately toothed, about 2 mm. wide by 13 mm. long; seeds and fruit not seen.

TYPE LOCALITY: Martinique, *Surian herb. n. 799* (Paris, photo).

DISTRIBUTION: Martinique.

67. *Lobelia stricta* Sw. Prodr. 117. 1788.

Lobelia areolata Rich.; Juss. Ann. Mus. Par. 18: 3. 1811. (Type from Guadeloupe.)

Rapuntium strictum Presl, Prodr. Mon. Lob. 27. 1836.

Tylomium flavescens Presl, Prodr. Mon. Lob. 32. 1836. (Nomen nudum.)

Tupa flavescens A. DC. in DC. Prodr. 7: 395. 1839. (Type from Martinique.)

Tupa stricta A. DC. in DC. Prodr. 7: 395. 1839.

Dortmannia flavescens Kuntze, Rev. Gen. 972. 1891.

Dortmannia stricta "(Lam.)" Kuntze, Rev. Gen. 973. 1891.

Lobelia brigittalis E. H. L. Krause, Beih. Bot. Centr. 32: 337. 1914. (*Krause 21832*, Berlin)

Stem erect or decumbent, 20–135 cm. high, suffrutescent, often twisted or sinuous, coarse, the woody base often 1.5 cm. in diameter, covered with the reniform raised scars left by leaf-bases of previous years; whole plant glabrous or with bristly-pubescent inflorescence; cauline leaves 10–40, rosulate, crowded into a space of from 1–10 cm. of the axis (usually clustered 3–30 cm. below the inflorescence, often with 1–10 leafy bracts scattered along the axis between the rosette and the base of the inflorescence), the blades spreading or ascending, subcoriaceous, 2–3.5 cm. broad by 7–18 cm. long, about 3–5 times as long as wide, oblanceolate, usually widest at a point one-fourth to one-third the distance from the tip, evenly serrate with yellowish conspicuous spreading callose teeth 1–1.5 mm. long, 4–7 per cm. (the basal 1–2 cm. of blade often entire or with distant teeth somewhat longer than those of the rest of the blade), the apex acute, short-acuminate, the base long-attenuate, mostly narrowed into a short petiole 1 cm. or less in length; inflorescence erect, spicate, 10–35 cm. long, densely 20–100-flowered; pedicels spreading-ascending, 7–15 mm. long in fruit, often somewhat curved so that the flower stands erect and the mature fruit is incurved, each pedicel with a pair of smooth linear serrate bracteoles 1–1.5 mm. broad by 7–15 mm. long, 1–8 mm. below the hypanthium; flower-bracts linear-elliptic to oblong or narrowly ovate, serrate, acute, 0.6–1 cm. wide by 2–4 cm. long; flower 17–20 (29) mm. long, including the hypanthium; corolla greenish-yellow, the tube 8–12 mm. long, strongly falcate-recurved, entire except for the dorsal fissure, the two upper lobes linear, 7–12 mm. long, the three lower segments 5–9 mm. long, connate nearly half their length; filament-tube 9–13 (16) mm. long, somewhat deflexed and exserted, the filaments connate two-thirds their length; anther-tube 3.5–4.5 mm. long, the two smaller anthers white-tufted at tip, the others glabrous; hypanthium in anthesis cup-shaped, often shallowly so, in fruit similar, the margin flaring so as to make it saucer-like; capsule half inferior, 5–6 mm. across at widest part, 5–8 mm. long; calyx-lobes narrowly lanceolate or linear, acute, serrate with few–10 teeth on each side, 1.5–3 mm. wide by 5–10 mm. long; seeds ellipsoid-lenticular, reticulate, about 0.8 mm. long.

TYPE LOCALITY: Guadeloupe.

DISTRIBUTION: Lesser Antilles, St. Kitts to St. Vincent, at elevations of 500–1200 m.

68. *Lobelia digitalifolia* (Griseb.) Urban, Symb. Ant. 1: 455. 1900.

Tupa digitalifolia Griseb. Fl. Brit. W. Ind. 387. 1861.

Stem erect, suffrutescent, simple or branched (according to Urban), 3–4 m. high, coarse, up to 1 cm. in diameter at base, stoloniferous (according to Duss); whole plant smooth and glabrous, naked at base; cauline leaves few–15, not crowded, spreading-ascending, apparently subcoriaceous, shallowly and evenly crenate-dentate with 2–4 brownish callose teeth per cm., the blades 2.5–3.7 cm. broad by 18–21 cm. long, 5–8 times as long as broad, narrowly elliptic or oblanceolate, acute at apex, acute to attenuate at base, the lower ones petiolate, the midvein often arcuate at apex; inflorescence erect, pedunculate up to 15 cm., 13–33 (50) cm. long, 22–50 (60) flowered; pedicels widely spreading, often nearly at right angles to main axis, often flattened, straight except for the distal quarter (10–15 mm.) which is abruptly bent upward so that the long axis of the flower in anthesis is parallel to that of the inflorescence, the capsule curved by further bending of the pedicel; each pedicel with a pair of subopposite linear entire bracteoles 3–10 mm. long, 5–20 mm. below hypanthium; flower bracts 3–5 mm. wide by 25–30

mm. long, entire or with obscure callose teeth, linear-lanceolate, acute or blunt at tip, decurrent but not much fused with pedicel; flower up to 45 mm. long, including hypanthium; corolla red-purple (according to Urban), strongly falcate-recurved, the tube 20-24 mm. long, entire or fenestrate at base, the two upper lobes linear, decurved, the three lower ones shorter, connate about half their length; filament-tube somewhat deflexed and exerted more than half its length, the filaments distinct about a third of their length; all five anthers white-tufted at tip; hypanthium in anthesis short-campanulate, becoming truly campanulate in fruit, higher than broad, 7-8 mm. across; capsule about two-thirds inferior, about 10-12 mm. long; calyx-lobes foliose, lanceolate, acute or blunt at tip, entire or obscurely callose-toothed, (2) 3-5 mm. wide at base, (10) 12-18 mm. long; seeds ovoid-oblong, brown, minutely reticulate, about 0.8 mm. long.

TYPE LOCALITY: Dominica, *Imray*.

Pedicels 30-35 mm. long in fruit; filament-tube about 25 mm. long; anther-tube 5.0-5.5 mm. long; native of Dominica.

68b. *L. digitalifolia* var. *digitalifolia*.

Pedicels 40-65 mm. long in fruit; filament-tube 28-32 mm. long; anther-tube 7-8 mm. long; native of Guadeloupe.

68a. *L. digitalifolia* var. *guadeloupensis*.

68a. *Lobelia digitalifolia* var. *guadeloupensis* (Urban)

McVaugh, comb. nov.

Lobelia guadeloupensis Urban, *Symb. Ant.* 1: 454. 1900.

Leaf-blades toothed except in the proximal third, which is usually nearly entire; pedicels 40-65 mm. long in fruit; corolla about 38 mm. long, the two lobes next the dorsal fissure about 12 mm. long, the three others about 10 mm. long; filament-tube 28-32 mm. long; anther-tube 7-8 mm. long.

TYPE LOCALITY: Guadeloupe ("Hab. in Guadeloupe parum frequens et passim locis humidis v. aquaticis regionis, superioris 800-1300 m. alt., in sylvis primaevae circa Bains-Jaunes, Matelyane, Coulée de la Ravine-à-Dejeuner, Morne Gouyavier").

DISTRIBUTION: Mountains of Guadeloupe.

68b. *Lobelia digitalifolia* var. *digitalifolia* McVaugh, var. nov.

Tupa digitalifolia Griseb. loc. cit., as to type.

Dortmannia digitalifolia Kuntze, *Rev. Gen.* 972. 1891.

Leaf-blades toothed almost to the base; pedicels 30-35 mm. long in fruit; corolla about 30 (?) mm. long, the two lobes next the dorsal fissure about 9 mm. long, the three others about 7 (?) mm. long; filament-tube about 25 mm. long; anther-tube 5-5.5 mm. long.

DISTRIBUTION: Mountains of Dominica.

69. *Lobelia santa-luciae* Rendle, *Jour. Bot.* 75: 74. 1937.

Stem erect, herbaceous, tall, with a few short leafy branches, 1 cm. in diameter above the base, glabrous; radical leaves narrowly oblanceolate, narrowed into a petiole, acute at tip, the margin crenate-dentate above the middle; leaves papery when dry, with a prominent midrib, up to 20 cm. long, including petiole, and 2.2 cm. broad; inflorescence elongated, about 80-flowered, the whole flowering branch about 1 m. long, sparsely leafy below, floriferous above the middle; pedicels about 2 cm. long, stiff and ascending in fruit, each with a pair of linear-lanceolate denticulate bracteoles about the middle; flower-bracts narrowly oblanceolate, acute, sparsely denticulate, shorter than the pedicels and scarcely adnate to them; corolla about 25 mm. long, rose-colored, falcate about the middle, the tube about 12 mm. long, entire except for the dorsal fissure (?), the two upper lobes linear, acute or subacute, the three lower lobes similar, much shorter, forming a distinct lower lip; filament-tube about 16 mm. long; anther-tube 5 mm. long, the anthers all bearded at the tips; hypanthium hemispheric, in fruit becoming about 1 cm. in diameter; capsule hemispheric, suberect, the woody valves recurved; calyx-lobes broadly linear, denticulate above the middle, 6 mm. long; seeds ellipsoid, minutely reticulate, 1.25 mm. long.

TYPE LOCALITY: On a high knife-like ridge leading to summit of Mt. Gimie (3145 ft. alt.), St. Lucia, British West Indies, *H. E. Box* (Brit. Mus.).

DISTRIBUTION: Known only from the type locality.

ILLUSTRATION: *Jour. Bot.* 75: 75.

70. *Lobelia circisifolia* Lam. Encyc. 3: 584. 1791.

- Lobelia racemosa* Sims, Bot. Mag. pl. 2137. 1820. (Type from St. Kitts.)
Siphocampylus ? circisifolius G. Don, Gen. Hist. 3: 703. 1834.
Rapuntium racemosum Presl, Prodr. Mon. Lob. 25. 1836.
Rapuntium circisifolium Presl, Prodr. Mon. Lob. 27. 1836.
Tupa racemosa A. DC. in DC. Prodr. 7: 394. 1839.
Tupa circisifolia A. DC. in DC. Prodr. 7: 395. 1839.
Tupa infesta Griseb. Fl. Brit. W. Ind. 387. 1861. (St. Kitts, Eelsey.)
Dortmannia circisifolia Kuntze, Rev. Gen. 972. 1891.
Dortmannia infesta Kuntze, Rev. Gen. 972. 1891.
Dortmannia racemosa Kuntze, Rev. Gen. 973. 1891.
Lobelia infesta Urban, Symb. Ant. 1: 455. 1900.
Lobelia heterodonta Sprague, Gard. Chron. III. 36: 252. 1904. (Kew!)
Lobelia Ryanii Rendle, Jour. Bot. 73: 277. f. 1C, 2A. 1935. (Montserrat, Ryan, Brit. Mus.)

Stem erect, simple or with few subordinate side branches, herbaceous, coarse, sometimes more than 1 cm. in diameter at base, green, 0.7-1.5 m. high, glabrous; leaves cauline, 50-100 or fewer, often crowded on the stem, spreading-ascending, papery when dry, serrate with sharp teeth, the teeth ascending or somewhat incurved, 1-4 per cm., except near base of blade, where they are more widely spreading and may be as much as 2 cm. apart and 5 mm. long, the blades narrowly elliptic, tapering at both ends, acute or attenuate at base and apex, 1-5 cm. wide, (5) 10-30 cm. long, 5-12 times as long as wide; inflorescence 20-50 cm. long, 35-65-flowered; pedicels straight, divaricate (except the distal end, which is curved so that the flower in anthesis is nearly erect and the capsule is incurved when mature), 12-25 (37) mm. long in fruit, bristly or nearly glabrous, each with a pair of glabrous decurrent bracteoles one-third to two-thirds the distance from the base of pedicel to hypanthium; bracteoles 2-3 (6) mm. long; flower-bracts linear, narrowed to both ends, callose-toothed, glabrous, about 2 mm. broad and 15 mm. long (or the lowest larger), usually adherent to the pedicel for 2-5 mm.; flower 26-37 mm. long, including hypanthium; corolla green or greenish-yellow, glabrous or nearly so, the tube nearly straight or curved distally, entire except for the dorsal fissure, 14-18 mm. long, the two upper lobes linear-oblong, 1.5-2.5 mm. wide, 7-13 mm. long, the three lower lobes 5-10 mm. long; filament-tube 13-23 mm. long, glabrous, the filaments connate most of their length; anther-tube 5.0-7.5 mm. long, all the anthers white-tufted at tip; hypanthium in anthesis hemispherical or shallowly cup-shaped, smooth or roughened at base, symmetrical or essentially so, in fruit becoming hemispherical or somewhat broader than high, 6-8 mm. in diameter; capsule less than half-inferior, 6-9 mm. long, the free part more or less inclosed in the free rim of the hypanthium, which is 2-3 mm. high; calyx-lobes narrowly deltoid, glabrous, 1.5-3 mm. wide at base, 4-9 mm. long, with 1-7 rather prominent appressed teeth on each edge; seeds oblong-ovoid, shallowly pitted-reticulate, about 0.7 mm. long.

TYPE LOCALITY: St. Vincent, *Surian. herb. n. 642* (Paris, photo.).

DISTRIBUTION: Lesser Antilles, St. Kitts to Trinidad.

ILLUSTRATION: Bot. Mag., pl. 2137.

71. *Lobelia viridiflora* McVaugh, sp. nov.*

Lobelia ensifolia Hitchc. Rep. Mo. Bot. Gard. 4: 103, excl. syn. 1893. Not *Tupa ensifolia* A. DC. 1839.

Stem erect, herbaceous, simple or with few subordinate side branches, coarse (up to 1.5 cm. diam. at base), green, brittle, 1-2 m. high, glabrous except the inflorescence; cauline leaves 10-50, crowded (on the upper half of the stem sometimes 50 in 20 cm.), spreading-ascending, firm or membranous, smooth and glabrous, finely and evenly crenate or serrate, the blades 1.5-4 cm. broad by 9-29 cm. long (usually 2.5-3 cm. wide by 15-20 cm. long and 6-8 times as long as wide), narrowly linear-elliptic, attenuate at both ends, the apex acute, the base sometimes narrowed into a distinct short petiole 0.5 cm. long; inflorescence 10-36 cm. long (averaging about 20 cm.), often pedunculate by absence of leaves from the upper 5-10 cm. of the stem, sometimes secund, closely 20-100-flowered (averaging 40-50); pedicels spreading, in flower horizontal or somewhat ascending, but the distal third bent abruptly upward so that the long axis of the flower is nearly vertical, the capsule usually somewhat incurved by further bending.

* *Lobelia viridiflora*, sp. nov., *L. salicinae* similis, sed foliis latioribus, lineari ellipticis, 6-8 plo longioribus quam latioribus, lobis calycis 1-2 mm. latis, 3-6 mm. longis; floribus 30-45 mm. longis; filamentis 17-21 mm. longis; tubo antherarum 7-8 mm. longo.

of the pedicel; pedicels 12–20 mm. long, finely short-pubescent, each with a pair of subopposite decurrent green bracteoles near the middle; flower-bracts linear, narrowed at both ends, finely pubescent, decurrent, often fused with pedicel for 1–3 mm. at base, averaging about 2 mm. wide by 20 mm. long, the lowest larger; flower 30–45 mm. long, including hypanthium; corolla 24–30 (38) mm. long, "greenish-white," "greenish-yellow," "light greenish-yellow," "green, striped with brown," or the "lobes greenish, streaked with brown," finely pubescent without, the tube 10–15 mm. long, nearly straight or slightly curved downward, entire except for the dorsal fissure, the lobes of the lower lip erect or somewhat curved outward, linear-elliptic, subacute, 1–2 mm. wide by 9–13 mm. long, the two upper lobes erect, linear-attenuate, 11–15 mm. long; filament-tube 17–21 mm. long, nearly glabrous except at base, the filaments connate except at base; anther-tube 7–8 mm. long, "dark-gray," glabrous, the two smaller anthers white-tufted at tip; hypanthium in anthesis short-campanulate or cup-shaped, often unequal-sided, short-pubescent, becoming obliquely cup-shaped in fruit, 7–10 mm. across when pressed, about as broad as high; capsule half inferior or slightly more, 7–10 mm. long; calyx-lobes narrowly deltoid, 1–2 mm. broad at base by 3–6 mm. long, pubescent, entire or with 1–3 teeth on each edge; seeds oval, pitted-reticulate, about 0.7 mm. long.

TYPE LOCALITY: Soho, St. Ann, Jamaica, at an elevation of 1400 ft., *Harris 11996* (NY!).
DISTRIBUTION: Central Jamaica.

72. *Lobelia caudata* (Griseb.) Urban, Symb. Ant. 1: 455. 1900.

Tupa caudata Griseb. Fl. Brit. W. Ind. 386. 1861.
Dorimannia caudata Kuntze, Rev. Gen. 972. 1891.

Stem erect, simple or with few subordinate branches, coarse, up to about 0.6 cm. in diameter at base, herbaceous, glabrous below the peduncle of the inflorescence, up to 1.2 m. high; cauline leaves 120 or fewer, crowded, sometimes in the upper 20 cm. of the stem, spreading-ascending, membranous, glabrous and smooth above, pubescent along the rather prominent midvein beneath, the margin pectinately toothed, with 2–4 subulate spine-tipped teeth per cm., the teeth 1–5 mm. long, the blades 1–2 cm. broad by 15–25 cm. long, narrowly linear-lanceolate, the tip long caudate-acuminate, the base acute, narrowed into a pubescent petiole 0.5–2 cm. long (the lower leaves sometimes glabrous); inflorescence secund (often strongly so), 8–25 cm. long, 25–60-flowered, pedunculate 5–10 cm., the peduncle and raceme-axis short-bristly-pubescent; pedicels spreading and abruptly bent as described for *L. viridiflora*, 15–18 mm. long, short-bristly-pubescent, each with a pair of filiform pubescent bracteoles 2–3 mm. long, decurrent at the middle of pedicel or above; flower-bracts narrowly linear, pubescent, pectinately toothed, 1–2 mm. wide, 50–60 mm. long, sometimes adnate to base of pedicel; flower about 20–23 mm. long, including hypanthium; corolla 15–16 mm. long, greenish-white (according to Grisebach), pubescent without, the tube 5–10 mm. long, nearly straight, fenestrate shortly near base (always?), the lobes somewhat decurved, the two upper ones 9–10 mm. long, the three lower ones 5–8 mm. long; filament-tube 8.5–10 mm. long, sparsely pubescent, the filaments connate more than half their length; anther-tube 4.8–5.5 mm. long, the 2 smaller anthers densely white-tufted at tip; hypanthium in anthesis obliquely cup-shaped, sparsely short-pubescent, in fruit similar, 6–7 mm. across; capsule half inferior, 6–8 mm. long, the base of the free part overtopped about 1.5 mm. by the rim of the hypanthium; calyx-lobes narrowly triangular or nearly linear, about 1 mm. broad by 4 mm. long, dilated at base, pubescent, toothed; seeds ovoid, reticulate, light-brown, about 0.7 mm. long.

TYPE LOCALITY: Jamaica, *Purdie*.
DISTRIBUTION: Jamaica (Blue Mountains).

73. *Lobelia salicina* Lam. Encyc. 3: 583. 1791.

Tupa ensifolia A. DC. in DC. Prodr. 7: 396. 1839. (Haiti, *Poiteau*).
Dorimannia ensifolia Kuntze, Rev. Gen. 972. 1891.
Lobelia Tuerckheimii Rendle, Jour. Bot. 73: 279. f. 2B, C. 1935. (*H. von Tuerckheim 2705*, isotype, NY!).

Vegetative characters much as in *L. viridiflora*; stem 0.6–3 m. high, the whole plant, including the inflorescence, sometimes smooth and glabrous; leaves as in *L. viridiflora*, but,

on the average, somewhat narrower (usually 8-10 times as long as wide and sometimes as narrow as 1 cm. and as long as 20 cm.); inflorescence about as in *L. viridiflora*, 10-50 cm. long, often secund, 20-80-flowered, usually short-pubescent but rarely glabrous; pedicels 13-25 mm. long; pedicel-bracts and flower-bracts as in *L. viridiflora*; flower 22-33 mm. long, including hypanthium; corolla 24 mm. long or less, "green," "greenish and brown," or "purplish," usually finely pubescent without, the tube about 8-13 mm. long, entire except for the dorsal fissure, nearly straight or slightly curved downward, the lobes somewhat decurved or finally erect, those of the lower lip 7-10 mm. long, the two upper ones 9-12 mm. long; filament-tube 7-10 (15) mm. long, glabrous except at base, the filaments connate more than half their length; anther-tube 5-7 (8) mm. long, purplish (according to Wright), glabrous, the two smaller anthers white-tufted at tip; hypanthium and capsule much as in *L. viridiflora*; calyx-lobes deltoid, 2-3 mm. wide at base by 2-4 mm. long, pubescent or less often nearly glabrous, entire or with 1-3 short teeth on each edge; seeds ovoid, shiny, pitted-reticulate, about 0.8 mm. long.

TYPE LOCALITY: Santo Domingo (Paris, photo.).

DISTRIBUTION: Hispaniola; Oriente, Cuba.

ILLUSTRATION: Tussac, Fl. Ant. 3: pl. 36.

Lobelia salicina var. *brachyantha* Urban, Symb. Ant. 9: 431. 1925 (*Ekman 10512*, Berlin!). From Sierra de las Animas, Pinar del Río, Cuba, differs in the smaller flowers (corolla about 15 mm. long; filament-tube 6.5-7.0 mm. long). DISTRIBUTION: Pinar del Río, Cuba.

NOTE: The type of *Lobelia salicina* Lam. was examined by Rendle in 1935, and taken by him to represent the Jamaican plant now called *Lobelia viridiflora*; he further assumed the plants of Jamaica and Hispaniola to be identical. According to Lamarck, "Cette espèce croît à St.-Domingue, à la Jamaïque, & nous a été communiquée par M. Dupuis." It is clear from a photograph, however, that the type of *Lobelia salicina* is the short-flowered species native to Hispaniola, we may, therefore, restrict Lamarck's name to that species only, and rename the Jamaican species.

74. *Lobelia Martagon* (Griseb.) Hitchc. Rep. Mo.

Bot. Gard. 4: 103. 1893.

Tupa Martagon Griseb. Fl. Brit. W. Ind. 386. 1861.

Dortmannia Martagon Kuntze, Rev. Gen. 972. 1891.

Stem erect, shrubby, coarse, sometimes 4 cm. in diameter at base, green, "0.5"-3 m. high, sparsely bristly-pubescent or sometimes smooth below with numerous crowded hoof-shaped leaf-sears below; cauline leaves few-45, crowded, appressed-ascending, glabrous or bristly-pubescent on the margins, finely and evenly serrate with small but conspicuous appressed brownish callose teeth, these 4-7 per cm., the blades 1.5-3.6 cm. broad by 8-20 cm. long, about 6 times as long as wide, narrowly elliptic to lanceolate, or the upper narrowly ovate, mostly widest near the middle and tapering to an acute apex and acute base, sometimes shortly acuminate, the texture apparently subcoriaceous; inflorescence erect, pedunculate 15 cm. or less, not secund, 15-63 cm. long, 15-45-flowered, the axis pubescent; pedicels spreading-ascending (usually at an angle of 45° or more from the axis), 1-2 mm. in diameter, usually somewhat flattened, (35) 45-80 mm. long in fruit, finely bristly-pubescent, straight below but the distal third or half curved upward or in fruit recurved so that the long axis of the capsule parallels that of the basal part of the pedicel, each pedicel with two bracteoles 1-2 mm. wide by 8-17 mm. long, these 2-9 mm. below the hypanthium, ciliate, lanceolate to oblong-linear, acute, finely callose-toothed; flower-bracts lanceolate to ovate, leafy, 0.8-2.5 cm. wide by 3-11 cm. long, serrate, glabrous except on the margins; corolla 30-35 mm. long, purple or brownish-purple (according to Harris), pubescent without, the tube about 20 mm. long, arcuately curved, entire except for the dorsal fissure, the lobes recurved, the two upper ones 2.5 mm. wide by 13 mm. long, the three shorter ones free 12 mm. at the tips; filament-tube deflexed, 20-22 mm. long, pubescent, the filaments connate more than half their length; anther-tube 9.0-11.5 mm. long, nearly glabrous or pubescent, only the two smaller anthers short-barbed at tip; hypanthium in anthesis short-campanulate or turbinate, pubescent, in fruit campanulate to subglobose, 9-12 mm. across; capsule about half inferior, 15 mm. long; calyx-lobes narrowly deltoid to lanceolate or oblong, 4-6 mm. wide (or slightly more at the very base) by 10-16 mm. long, pubescent, with 10 or more bristly callose teeth on each edge; seeds oblong ellipsoid, about 1 mm. long, flattened, reticulate pitted, the pits flat-bottomed (as in *Centropogon*).

TYPE LOCALITY: Jamaica, Purdie.

DISTRIBUTION: Jamaica (Blue Mountains, from 1700 to 2200 m. elevation; Mt. Diabolo).

75. *Lobelia Kraussii* Graham, Edinb. New Phil. Jour. 8: 379. 1830.

Rapuntium Kraussii Presl, Prodr. Mon. Lob. 27. 1836.

Stem erect, herbaceous, mostly simple, slightly woody at base, where 0.5–0.7 cm. in diameter, up to 120 cm. high, glabrous, often roughened and ridged below; leaves indistinguishable from those of *L. persicifolia*; flowers axillary, the inflorescence like that of *L. persicifolia*; pedicels and bracteoles as in that species; flower inverted, mostly 29–37 mm. long, including hypanthium; corolla red, glabrous, the tube about 20 mm. long, straight or nearly so, fenestrate at base and scarcely dilated there; filament-tube red, 17–21 mm. long; flowers and seeds otherwise as in *L. persicifolia*; hypanthium in anthesis conic or cup-shaped, in fruit conic, turbinate or broadly turbinate, 4.5–6 mm. in width at widest point; capsule about two-thirds inferior, 6–9 mm. long; calyx-lobes like those of *L. persicifolia*.

TYPE LOCALITY: Dominica, *Dr. Krauss 409* (Edinb.!).

DISTRIBUTION: Dominica and Martinique, at elevations up to about 1000 m.

ILLUSTRATION: Bot. Mag. pl. 3012.

76. *Lobelia persicifolia* Lam. Encyc. 3: 584. 1791.

Rapuntium persicifolium Presl, Prodr. Mon. Lob. 27. 1836.

Tupa persicaefolia A. DC. in DC. Prodr. 7: 395. 1839.

Dortmannia persicifolia Kuntze, Rev. Gen. 973. 1891.

Stem erect, simple or branched, woody and up to 0.7 cm. in diameter at base, 60–130 cm. high, glabrous, often roughened and ridged below; leaves few–50 (sometimes more, the lower ones early deciduous), spreading, thin and papery, smooth and glabrous, irregularly serrate or sinuate-dentate with callose-tipped teeth, these mostly 2–4 per cm. (the margin and type of dentation very variable, the teeth often larger and fewer near base), the blades 2–3 cm. broad by 10–21 cm. long, usually about 5–8 times as long as wide, mostly narrowly elliptic, varying to lanceolate, usually long-tapering to base and apex, the latter often arcuate, the base sometimes merely acute, narrowed to a definite petiole 1–2.5 cm. long; inflorescence erect, leafy, the flowers axillary to the uppermost 6–25 leaves, the inflorescence thus occupying the terminal 7–21 cm. of the axis; pedicels red (always?), slender (less than 1 mm. in diameter), flexuous, often more or less appressed-upright, but sometimes widely spreading, glabrous, 30–62 mm. long (average about 45 mm.), each with a pair of filiform green decurrent bracteoles 2–10 mm. long, about the middle or below it; flower inverted, mostly 37–48 mm. long, including hypanthium; corolla red, glabrous, the tube 25–30 mm. long, strongly arcuate and dilated at base, but not fenestrate, the lobes not spreading, all about equal, the two upper 7–11 mm. long, linear, abruptly narrowed to a subulate tip, the three lower 5–9 mm. long; filaments red, united more than half their length, 23–32 mm. long; anther-tube gray, 4.5–6.0 mm. long, all 5 anthers tufted at the tip; hypanthium in anthesis conic or cup-shaped, in fruit conic, turbinate, or broadly cup-shaped, 7–8 mm. across at the widest point; capsule about two-thirds inferior, 7–10 mm. long; calyx-lobes linear-subulate, glabrous, red, 7–15 mm. long, often spreading widely in fruit, with a deltoid base expanded to at least 3 mm. wide; seeds ellipsoid-lenticular, little longer than wide, shallowly depressed-reticulate, about 0.8 mm. long.

TYPE LOCALITY: Guadeloupe, *Badier* (Paris, photo!).

DISTRIBUTION: Guadeloupe, at elevations up to about 1000 m.

ILLUSTRATIONS: Deless. Ic. 5: pl. 11; Am. Midl. Nat. 24: 700, f. 11.

77. *Lobelia nubicola* McVaugh, sp. nov.*

Stems shrubby, 5 ft. tall (according to Steyermark), the whole plant smooth and glabrous; leaves spreading, 10–30 on each shoot of the current year, those of the previous years' growth deciduous, leaving prominent raised scars; blades grass-green (according to Steyermark), membranous when dry, lanceolate, attenuate to base, attenuate-caudate to apex, 1–1.6 cm. wide, 5–12 cm. long, usually 6–10 times as long as wide, on margined petioles 1–2 cm. long, the margins shallowly crenate with 3–4 minute sharp teeth per cm., the teeth often purplish;

* *Lobelia nubicola*, sp. nov.; frutex glaber foliis lanceolatis attenuatis crenulatis, corolla purpurea (in sicca rubra), corollae tubo fissio, non fenestrali, lobis lineari-attenuatis, falcatis, anthesi plusminusve connatis.

flowers few-15 in the axils of the little-reduced upper leaves, the "inflorescence" up to 10 cm. long; pedicels orchid-purple (according to Steyermark), spreading-ascending, about 0.7 mm. in diameter, 30-35 mm. long in fruit, ebracteolate or apparently so at maturity (minute filiform bracteoles are found near the summits of the pedicels of abortive flowers); flower about 4.5 cm. long, including hypanthium; corolla orchid-purple (according to Steyermark), glabrous without, pubescent within at base of lower lip and along ventral side of the tube, the tube about 27 mm. long, entire except for the dorsal fissure, which extends to a point about 3.5 mm. from base, cylindrical, somewhat enlarged distally (about 6 mm. wide when pressed, at base of corolla-lobes) and narrowest about 5 mm. above the base, the lobes linear-attenuate, all de-curved-falcate and somewhat coherent at tips in anthesis, the two upper ones about 3 mm. wide at base, about 15 mm. long, the three lower lobes forming a lip about 13 mm. long, the lobes themselves about 3 mm. wide at base, distinct at tip for a distance of about 7 mm.; filament-tube about 28 mm. long, the distal half glabrous, the filaments distinct near base and there loosely adherent to the corolla; anther-tube about 7 mm. long, bluish-gray, the two smaller anthers white-tufted at tips, the three larger glabrous except for a few stiff bristles on the distal half; hypanthium in anthesis turbinate or cup-shaped, about as broad as high when pressed, 7-8 mm. long; fruit capsular, apically dehiscent by 2 valves; complete fruit not seen; calyx-lobes narrowly triangular, obscurely denticulate, acute, about 1.5 mm. wide by 4-5 mm. long; seeds not seen.

TYPE LOCALITY: In mixed Liquidambar forest below cloud forest, middle slopes of Montaña Norte to El Jutal, on Cerro Brujo, southeast of Concepción de las Minas, alt. 1700-2000 m., Dept. Chiquimula, Guatemala, *Steyermark 31048* (U. S. Nat. Arb.).

DISTRIBUTION: Known only from the type locality.

NOTE: This species simulates in appearance and characters of flowers and leaves the West Indian species of *Siphocampylus*. It appears to be, however, a true *Lobelia* according to present usage, with its closest affinities with *L. persicifolia* and *L. Kraussii*. Because of these apparent affinities it is provisionally referred to *Tylomium* although seeds are not available to confirm this disposition.

Section 6. Homochilus A. DC. in DC. Prodr. 7: 383. 1839. Shrubs or subshrubs with red or yellow flowers; bracteoles of the pedicels minute, about the middle of the pedicel, or wanting; seeds ellipsoid or oblong, nearly smooth, with faint longitudinal lines.

78. *Lobelia laxiflora* H.B.K. Nov. Gen. & Sp. 3: 311. 1819.

Perennial, from a stout woody root; often in clumps; stem erect or ascending, shrubby, suffrutescent or sometimes herbaceous, usually more or less branched, green above and covered below with yellowish-brown bark, 20 cm. to 3 m. high (average height exceeding 1 m.), sometimes 1 cm. in diameter at base, glabrous, or densely short-pubescent above, terete, or somewhat angled below; cauline leaves mostly 10-30 (not including the leafy bracts), the lower often early deciduous; blades glabrous or pubescent, especially on the lower surface, thin and membranous or thicker and sometimes rugose, subentire in outline or somewhat sinuate, mostly finely and regularly serrate, the serrations tipped with callose teeth; blades variable in size, usually from 0.9 cm. wide by 8.8 cm. long to 3 cm. wide by 9 cm. long and sometimes reaching 15-25 cm. in length, in shape varying from linear-lanceolate to ovate or broad-elliptic, the tip acute or acuminate, the base cuneate or rarely rounded; lower leaves usually with a petiole 0.2-1 cm. long; inflorescence few-60 cm. long, generally not secund, few-80-flowered; pedicels stiffly upright or loosely spreading, 10-100 mm. long in fruit, glabrous or sparsely villous-hirsute, each with a pair of tiny inconspicuous bracteoles near the middle or below; flower-bracts leafy, lanceolate to ovate, glabrous or pubescent, 2-15 cm. long, finely serrate, often so large that the flowers appear to be in the axils of the upper foliage leaves rather than in a definite inflorescence; flower 27-48 mm. long, including hypanthium (averaging about 35 mm.); corolla red ("cerise," "coral-red," "orange-red," "pale-red," "scarlet") or the lobes yellow ("yellow," "orange-yellow," "orange"), or all yellow, glabrous or short-pubescent without, the tube mostly 16-25 mm. long, fenestrate, the lower lip linear-oblong, 10-18 mm. long (usually

slightly shorter than the tube), terminated by 3 acute teeth 1-3 (10) mm. long, not deflexed (sometimes slightly recurved), the two upper lobes of the corolla linear, acute, 10-20 mm. long by about 1 mm. wide; filament-tube 18-35 mm. long (averaging 22-25 mm.), slightly deflexed, pink, red, or "yellow, basally reddish," glabrous or strongly pubescent, the filaments connate about two-thirds their length; anther-tube 5-9 mm. long (averaging 6-7 mm.), yellowish, gray or "purplish," the two smaller anthers densely white-tufted at tip, the three larger villous-hirsute, especially near the tip, or infrequently glabrous; hypanthium in anthesis campanulate or shallowly cup-shaped, often wider than high, glabrous or pubescent, becoming broadly hemispheric in fruit, 6-9 mm. across by 4-7 mm. high; capsule more than half inferior, mostly 5-10 mm. long; calyx-lobes triangular, entire, acute, 1-6.5 mm. long (averaging about 3 mm.), glabrous or pubescent; seeds smoothish, ellipsoid or ovoid, with faint longitudinal lines, about 0.6 mm. long.

TYPE LOCALITY: Guerrero ("inter Quaxiniquilapa et Acaguisotla, alt. 500 hex.") (herb. Berlin, Field Mus. Neg. 9109!).

Leaves linear-lanceolate, averaging 10 times as long as wide; plants glabrous or essentially so, often purplish (highlands of the Mexican Plateau, from Oaxaca to Baja California and Arizona).

Leaves broader, usually 3-5 times as long as wide; plants glabrous to tomentose, rarely if ever purplish.

Flower-bracts conspicuously smaller than the foliage-leaves; leaves broad, mostly about 3 times as long as wide; inflorescence often compact, averaging not more than 20 cm. in length (western Mexico, from Sonora to Chiapas).

Flower-bracts as large as the foliage leaves or nearly so, and essentially identical with them; leaves averaging 5 times as long as wide but often wider than this; inflorescence various, often long.

Pedicels flexuous, loosely spreading from the base; plants glabrous or sparsely pubescent (Guatemala and Honduras to Vera Cruz and Puebla).

Pedicels stiff, closely and prominently appressed, at least at base; plants (rarely glabrous) slightly to densely pubescent (Michoacán and Jalisco through Central America to Colombia).

78d. *L. laxiflora* var. *angustifolia*.

78c. *L. laxiflora* var. *Nelsonii*.

78b. *L. laxiflora* var. *laxiflora*.

78a. *L. laxiflora* var. *stricta*.

78a. *Lobelia laxiflora* var. *stricta* (Planch. & Oerst.)

McVaugh, comb. nov.

Lobelia rigidula H.B.K. Nov. Gen. & Sp. 3: 311. 1819. (Type probably from Mexico.)

Rapuntium rigidulum Presl, Prodr. Mon. Lob. 26. 1836.

Lobelia ovalifolia H. & A. Bot. Beech. Voy. 300. 1838. (Beechey, Kew!)

Lobelia angulato-dentata H. & A. Bot. Beech. Voy. 301. 1838. (Beechey, Kew!)

Lobelia floribunda Bonpl.; A. DC. in DC. Prodr. 7: 383, as syn. 1839.

Lobelia ? andina Benth. Pl. Hartw. 213. 1845. (Hartweg 1183, Kew!)

Siphocampylos mollis Regel, Flora 33: 353. 1850. (A garden plant, originally from Guatemala.)

Siphocampylos Warszewiczii Regel, Schweiz. Zeitschr. Gartenb. 8: 143. 1850. (Based on *Siphocampylos mollis* Regel, not *S. mollis* Planch.)

Tupa costaricana Planch. & Oerst. Vidensk. Meddel. 1857: 154. 1857. (Oersted pl. centroam. 9245, Copenhagen!)

Tupa costaricana var. *stricta* Planch. & Oerst. Vidensk. Meddel. 1857: 155. 1857.

Tupa costaricana var. *patula* Planch. & Oerst. Vidensk. Meddel. 1857: 155. 1857.

Lobelia persicaefolia var. *mollis* Vatke, Linnaea 38: 722. 1874. (Herb. Berlin!)

Lobelia persicaefolia var. *Warszewiczii* Vatke, Linnaea 38: 723. 1874. (Based on *Siphocampylos Warszewiczii* Regel.)

Lobelia patzcuarensis Sessé & Moc. Pl. Nov. Hisp. 152. 1890. (Madrid!)

Lobelia laxiflora var. *brevifolia* Zahlbr. Repert. Sp. Nov. 14: 185. 1915. (Lehmann 4674.)

Lobelia laxiflora var. *foliosa* Zahlbr. Repert. Sp. Nov. 14: 185. 1915. (Lehmann 3656, isotype, US!)

Lobelia laxiflora var. *mollis* Zahlbr. Repert. Sp. Nov. 14: 185. 1915.

Lobelia costaricana F. E. Wimmer, Ann. Naturhist. Mus. Wien 46: 239. 1933.

?*Lobelia costaricana* var. *magna* F. E. Wimmer, Repert. Sp. Nov. 38: 85. 1935. (Hegewisch.)

Lobelia Rensonii F. E. Wimmer, Repert. Sp. Nov. 38: 85. 1935. (Renson 54, NY!)

Leaves 1.5-3 (4.5) cm. wide, 4-10 (17) cm. long, usually 3-5 times as long as wide; plants usually pubescent, often densely so; pedicels stiff, straight, closely appressed to the stem at least at base.

TYPE LOCALITY: Not given; presumably in Costa Rica.

DISTRIBUTION: Mountains, Michoacán, Jalisco, and Nayarit; Guatemala to Colombia.

78b. *Lobelia laxiflora* var. *laxiflora* McVaugh, Ann.
Mo. Bot. Gard. 27: 350. 1940.

Lobelia persicifolia Cav. Ic. 6: 12. pl. 518. 1800. (Type from Mexico.) Not *Lobelia persicifolia* Lam. 1791.

Lobelia laxiflora H.B.K. loc. cit., as to type.

Lobelia Cavanillesiana R. & S. Syst. Veg. 5: 43. 1819. (Based on *Lobelia persicifolia* Cav.)

Lobelia fissa Willd.; R. & S. Syst. Veg. 5: 57. 1819. ("In Amer. Merid.," Humboldt & Bonpland.)

Rapuntium laxiflorum Presl, Prodr. Mon. Lob. 26. 1836.

Rapuntium Cavanillesianum Presl, Prodr. Mon. Lob. 27. 1836.

Siphocampylus bicolor D. Don in Sweet, Brit. Fl. Gard. II. 4: pl. 389. 1838.

Lobelia concolor Mart. & Gal. Bull. Acad. Brux 9: 46. 1842. (Galeotti 1972, Brux.)

Tupa laxiflora Planch. & Oerst. Vidensk. Meddel. 1857: 154. 1857.

?*Lobelia persicaefolia* var. *amygdalina* Vatke, Linnaea 38: 723. 1874.

Dortmannia concolor Kuntze, Rev. Gen. 972. 1891.

Dortmannia laxiflora Kuntze, Rev. Gen. 972. 1891.

Lobelia Delessertiana F. E. Wimmer, Repert. Sp. Nov. 19: 386. 1924. (Ghiesbreght, herb. Delessert. photo.)

Leaves mostly 1.5-3 cm. wide, 4-10 (15) cm. long, the blades usually 3-5 times as long as wide; plants glabrous or sparingly pubescent; pedicels flexuous, loosely spreading from the base.

DISTRIBUTION: In the mountains, Vera Cruz (region of Orizaba) to Guatemala.

ILLUSTRATIONS: Gartenflora 38: pl. 1301; Sweet, Brit. Fl. Gard. II. pl. 389.

78c. *Lobelia laxiflora* var. *Nelsonii* (Fernald) McVaugh, Ann.
Mo. Bot. Gard. 27: 349. 1940.

Lobelia lanceolata H. & A. Bot. Beech. Voy. 301. 1838. (Beechey, Kew) Not *Lobelia lanceolata* H. & A. Bot. Beech. Voy. 88. 1832.

Lobelia Nelsonii Fernald, Proc. Am. Acad. 36: 503. 1901.

Leaf-blades 2-3.5 (5) cm. wide, 6-10.5 (13) cm. long; usually about 3 times as long as wide; bracts 1-1.5 cm. wide by 3-7 cm. long, usually about half as large as the leaves; inflorescence often compact, usually not exceeding 20 cm. in length.

TYPE LOCALITY: Near Huauchinango, Jalisco, *Nelson 4009* (Gray!).

DISTRIBUTION: Mountains of western and southern Mexico, chiefly in the states bordering on the Pacific Ocean.

78d. *Lobelia laxiflora* var. *angustifolia* A. DC. in DC.
Prodr. 7: 383. 1839.

?*Lobelia persicifolia* Cav.; H.B.K. Nov. Gen. & Sp. 3: 310. 1819. Not *Lobelia persicifolia* Lam. 1791.

Lobelia Cavanillesii Mart. Ausw. Merkw. Pfl. 12. pl. 9. 1830. (Type of garden origin.)

?*Rapuntium Kuntzianum* Presl, Prodr. Mon. Lob. 27. 1836. (Based on *Lobelia persicifolia* H. B. K.)

Lobelia persicaefolia var. *angustifolia* Vatke, Linnaea 38: 723. 1874.

Lobelia angustifolia H. B. K.; Urbina, Cat. Pl. Mex. 201. 1897. Not *Lobelia angustifolia* Cham. 1833.

Lobelia Nelsonii var. *fragilis* Rob. & Fern. Proc. Am. Acad. 43: 27. 1907. (*Pringle 10360*, Gray!)

Lobelia lorentensis M. E. Jones, Contr. W. Bot. 18: 68. 1933. (*Jones 27279*, Pomona)

Leaves 0.5-1.5 cm. wide, 6-12 (25) cm. long, the blades usually about 10 times as long as wide; plants glabrous or essentially so, often purplish; pedicels appressed to the stem, at least at base.

TYPE LOCALITY: Mexico.

DISTRIBUTION: In the mountains, Oaxaca to San Luis Potosí, Baja California, and Arizona.

ILLUSTRATION: Bot. Mag. pl. 3600.

79. *Lobelia aguana* F. E. Wimmer, Repert. Sp. Nov. 38: 86. 1935.

Lobelia laxiflora var. *insignis* Donn. Smith, Bot. Gaz. 16: 12. 1891. (*J. D. Smith 2173*, USI)

Plant with aspect of *L. laxiflora* but larger in every respect; stem 1-2 m. high, 1 cm. or more in diameter at base, glabrous above, green or purplish, the bark peeling off in thin papery layers in age; cauline leaves numerous, often densely covering the stem, the lower often early deciduous, leaves pubescent on the lower surface or on both or entirely glabrous, membranous, or papery, finely serrate with hooked teeth or subentire with tiny ciliate teeth, these about 8 per cm., the blades up to 4 cm. wide by 20 cm. long, usually 5-7 times as long as wide,

lanceolate or narrowly elliptic, the tip attenuate or almost caudate, the base cuneate or somewhat rounded; petiole none, the leaf margins slightly decurrent on the stem; flowers few—35, solitary in the axils of the upper leaves, which are usually as large as the lower ones; “inflorescence” as much as 30–40 cm. long; pedicels stiffly upright or declining in age, about 1 mm. in diameter, 100–210 mm. long in fruit, the upper end sometimes flexuous; pedicels smooth and glabrous, with a pair of tiny bracteoles about the middle or below; flower 44–56 mm. long, including hypanthium; corolla yellow varied with red (according to Smith, who writes also: “divisions of the upper lip red on both sides; lower lip . . . yellow margined with red”), bright red and yellow, or yellowish-red (according to Standley), glabrous, or sparsely pubescent without, the tube 21–25 mm. long, fenestrate laterally and cleft dorsally nearly to base, the two upper lobes linear-subulate, about 3 mm. wide at base by 21–25 mm. long, slightly decurved at tips, the lower lip about the same length, the 3 lobes connate to within 5–6 (12) mm. from the tips; filament-tube 28–38 mm. long; anther-tube 7.5–11 mm. long, the two smaller anthers with a yellowish-white tuft of hairs at tip, the three larger ones slightly tufted near the end; hypanthium in anthesis cup-shaped, glabrous, becoming broadly hemispheric in fruit, up to 10–13 mm. across; capsule about two-thirds inferior, 10–15 mm. long, usually truncate at base; calyx-lobes linear to narrowly triangular, somewhat broadened at base, glabrous, entire (6) 8–14 mm. long, acute; seeds indistinguishable from those of *L. laxiflora*.

TYPE LOCALITY: Volcán de Agua, Sacatepéquez, Guatemala, *Kellermann 7502* (Field!).

DISTRIBUTION: High mountains of southwestern Guatemala and adjacent Chiapas, at elevations of 2700 m. and above.

80. *Lobelia Ghiesbreghtii* Decaisne, Rev. Hort. III. 2: 341.

pl. 18. 1848.

Tupa crassicaulis Hook. Bot. Mag. *pl. 4505.* 1850. (Based on a cultivated plant.)

Lobelia regalis Fernald, Proc. Am. Acad. 36: 503. 1901. (*L. C. Smith, Gray!*)

Plant closely resembling *L. laxiflora*, but differing as follows: stem attaining a height of 2 m., the whole upper part of the plant canescent-tomentose with white soft crisped woolly hairs; cauline leaves many (usually more than 20), green but sparsely short-pubescent above, white floccose-tomentose beneath; blades elliptic to oblong, cuneate at base and apex, the margin subentire or irregularly denticulate with 4–6 minute callosities per cm.; leaves definitely petiolate, the stout canescent petioles 1–3 cm. long, the blades 4–7 cm. wide by 10–20 cm. long; flowers solitary in the axils of the upper leaves, 20–28 in number, the “inflorescence” becoming 15–30 cm. long; pedicels strongly ascending, 45–60 mm. long in fruit, white-tomentulose or crisp-puberulent, each with a pair of subulate bracteoles 0.5–1 (3) mm. long near the middle or above; “flower-bracts” (upper leaves) up to 4.5 cm. wide by 15 cm. long, with a petiole 1–1.5 cm. long, the upper bracts often much reduced, 2–3 mm. wide; flower 39–41 mm. long, including hypanthium; corolla glabrous within, tomentose or crisp-puberulent without, bright red (according to Fernald), yellow with a crimson overcast (according to Camp), purplish-red mixed with flame-color (according to Decaisne), the tube about 20 mm. long, fenestrate and cleft dorsally to a point 1 mm. from the base, the two lobes next the dorsal fissure nearly straight, linear, about 2 mm. wide by 18 mm. long, the three lower lobes somewhat recurved, fused to within about 6 mm. from the tips; filament-tube 24–36 mm. long, slightly deflexed, strongly pubescent, the filaments connate about two-thirds their length; anther-tube (6) 7–8 mm. long, yellow, the two shorter anthers yellow-tufted at tip, the three larger villous near the tip; hypanthium in anthesis cup-shaped, often broader than high, white-tomentulose or crisp-puberulent; capsule less than half inferior, 6–9 mm. across, 10–12 mm. long; calyx-lobes narrowly or broadly deltoid, entire, acute, 2–4 mm. wide, 4–6 mm. long; seeds as in *L. laxiflora*.

TYPE LOCALITY: Described from a cultivated plant; the seeds are said to have been collected in Oaxaca by Ghiesbreght.

DISTRIBUTION: Mountains of Oaxaca.

ILLUSTRATIONS: Bot. Mag. *pl. 4505*; Rev. Hort. III. 2: *pl. 18.*

DOUBTFUL AND EXCLUDED SPECIES.

LOBELIA APHYLLA Nutt. Am. Jour. Sci. 5: 297. 1822, is a member of the Burmanniaceae.

TUPA ATROPURPUREA Vis. Nuovi Saggi Accad. Pad. 6: 95. 1847. This was doubtfully referred to *Lobelia fulgens* Willd., by the authors of the Index Kewensis. So far as can be made out from the description it appears to be a *Lobelia*, but its native country is not given and it may well have been South American in origin.

- LOBELIA CIRCAEOIDES* (Presl) A. DC. in DC. Prodr. 7: 379. 1839; *Rapuntium circaeoides* Presl, Prodr. Mon. Lob. 25. 1836. This species is based on *Schiede & Deppe 1232*, from "Cuesta Grande de Chiconquiaco reg. temp." (Mexico), and apparently belongs to the section *Hemipogon*.
- LOBELIA CLADLONESA* Raf. New Fl. 2: 17. 1837. TYPE LOCALITY: Alabama.
- TUPA CONLOBATA* var. *ELATIOR* A. DC. in DC. Prodr. 7: 395. 1839. TYPE LOCALITY: "in insula Haiti."
- LOBELIA DECUMBENS* Rich.; R. & S. Syst. Veg. 5: 67. 1819.
- LOBELIA FISTULOSA* Raf. New Fl. 2: 18. 1837. TYPE LOCALITY: Alabama.
- LOBELIA FRUTESCENS* Mill. Gard. Dict. ed. 8. *Lobelia*, no. 1. 1768, is a member of the Goodeniaceae.
- LOBELIA GHIESBREGHTII* Lemaire, III. Hortic. 1: pl. 34. 1854. TYPE LOCALITY: "México" (Michoacán). The plate does not represent any member of the Lobelioideae known to the writer, but the description suggests *Diasatea virgata* Scheidw.
- LOBELIA INCURVA* Raf. New Fl. 2: 18. 1837. TYPE LOCALITY: Florida.
- LOBELIA KERNERI* von Nagy, Gartenflora 38: 302. 1889. TYPE LOCALITY: Costa Rica.
- LOBELIA MINUTA* Sessé & Moc. Pl. Nov. Hisp. 151. 1890. Not *Lobelia minuta* L. 1753. TYPE LOCALITY: "Habitat Chapultepec; prope Mexicum area." The description suggests *Lobelia nana* H. B. K., but the writer has not been able to locate the type.
- LOBELIA MINUTIFLORUM* Kunze, Linnaea 16: 318. 1842. TYPE LOCALITY: Of garden origin; said to have come from seeds sent "e regione frigida, Mexico."
- LOBELIA PANICULATA* Raf. New Fl. 2: 18. 1837. Not *Lobelia paniculata* L. 1753. TYPE LOCALITY: "mts. Alleghany."
- LOBELIA PARVIFOLIA* Raf. New Fl. 2: 18. 1837. Not *Lobelia parvifolia* R. Br. 1810. TYPE LOCALITY: "Apalachian mts."
- LOBELIA PLUMIERI* L. Sp. Pl. 929. 1753, is a member of the Goodeniaceae.
- LOBELIA SYMPHYLITICA* var. *MACULATUS* G. Don, Gen. Hist. 3: 706. 1834. Based on a description by Lamarck (Encyc. 3: 586. 1791) of an unnamed variety from "Carolina." The description suggests *Lobelia puberula* Michx.

11. HIPPOBROMA G. Don, Gen. Hist. 3: 717. 1834.

Lobelia, section *Solenanthis* H.B.K. Nov. Gen. & Sp. 3: 309. 1819.

Isotoma, section *Solenanthis* A. DC. in DC. Prodr. 7: 412. 1839.

Plants herbaceous, annual or biennial. Flowers [?] inverted] salverform, white. Corolla-tube elongated, not cleft dorsally. Filaments connate except near base; anthers connate; orifice of the anther-tube oblique, not closed by the tips of the three longer anthers. Corolla, style, and androecium persistent in fruit. Fruit capsular, bilocular, apically dehiscent. Seeds minute, numerous, foveolate-reticulate.

Type species, *Lobelia longiflora* L.

1. *Hippobroma longiflora* (L.) G. Don, Gen. Hist. 3: 717. 1834.

Lobelia longiflora L. Sp. Pl. 930. 1753.

Rapuntium longiflorum Mill. Gard. Dict. ed. 8. *Rapuntium*, no. 7. 1768.

Isotoma longiflora Presl, Prodr. Mon. Lob. 42. 1836.

Laurentia longiflora P. E. Wimmer, Field Mus. Publ. Bot. 13: 474. 1937. Not *Laurentia longiflora* Schlechter, 1922.

Roots somewhat fleshy (woody?); stems coarse, with acrid, milky, poisonous juice, erect or decumbent, up to 7 mm. in diameter at base, simple or with a few subordinate side branches, pubescent at least above, or nearly glabrous, pale yellow-green, 15-50 (90) cm. high; cauline leaves few 25, spreading or ascending, membranous, pubescent on the veins and on the lower surface or almost glabrous, said to be dull blue-green above and glossy gray-green beneath, the blades elliptic to oblanceolate, coarsely repand-dentate and minutely callose-denticulate on the margin, narrowed abruptly to the obtuse or subacute mucronate apex and drawn out gradually to the narrow subpetiolar decurrent base, 2.5-6 cm. wide by 10-24 cm. long, usually 3-4 times as long as wide; flowers 8-35 in the axils of the upper leaves, the "inflorescence" 6-26 cm. long and comprising half to two-thirds the height of the entire plant or even more; pedicels more or less upright in flower (declined in fruit), 7-15 mm. long in fruit, about 1 mm. in diameter, short hirsute, each normally with a pair of filiform bractcoles, 2-4 mm. in length, at or near the base; flower 90-160 mm. long, including hypanthium; corolla slightly fragrant, puberulent except on the inner side of the lobes, the tube narrowly cylindrical, 50-135 mm. long, 1.0-2.5 mm. in diameter, the lobes subequal, spreading, 3-10 mm. wide by 13-27 mm. long; filaments 58-95 mm. long, equaling or somewhat exceeding the corolla-tube, connate by their edges (or exceptionally free) at apex, adnate to the corolla-tube and free from each other from base to a point just below the apex of the tube; anther-tube 5-6 mm. long by about 2 mm. in diameter, all the anthers white-bearded at extreme tip, the two shorter ones densely tufted, hypanthium in anthesis turbinate, sparsely short hirsute, becoming ellipsoid or ellipsoid campanulate in fruit, 7-9 mm. in diameter; capsule three fourths inferior or more, 12-17 mm. long, often appearing

wholly inferior because closely invested by the free rim of the hypanthium, pendent when mature, dehiscing loculicidally by two apical valves; calyx-lobes narrowly linear, 1 mm. wide by 10-22 mm. long, callose-denticulate on the margins, ciliate or nearly glabrous; seeds ellipsoid or cylindrical with rounded ends, 0.6-0.8 mm. long, light brown, minutely and regularly foveolate-reticulate.

TYPE LOCALITY: Jamaica. Type, *Sloane herb.*, in herb. Brit. Mus.

DISTRIBUTION: Throughout the West Indies; lowlands from Florida and Sonora to Brazil and Peru; tropics of the Old World, where sparingly introduced.

ILLUSTRATIONS: Bot. Mag. pl. 2563; Bot. Reg. pl. 1200; Tussac, Fl. Ant. 4: pl. 25.

12. SIPHOCAMPYLUS Pohl, Pl. Bras. Ic. 2: 104. 1831.

Terrestrial shrubs, suffrutescent plants or coarse herbs. Flowers in the axils of the upper leaves or of much reduced bracts, usually inverted in anthesis. Corolla red, red and yellow, or red tinged with green, rarely blue; tube and lobes various, the tube entire or fenestrate at base. Filaments distinct at base, adnate to the narrow basal portion of the corolla (in the continental North American species) or essentially free from it (in the West Indian species). Anther-tube with the orifice partially closed by the incurved tips of the longer anthers; two shorter anthers white-tufted at tips with stiff hairs. Ovary bilocular, the placentae axile; summit of ovary usually conic, often elongated; style not jointed, withering-persistent, with the corolla and stamens, on the fruit. Fruit capsular, dehiscent by two apical loculicidal valves, the walls papery or woody at maturity. Seeds ovoid or ellipsoid, foveate-reticulate, mostly 0.8 mm. long or less.

Type species, *Lobelia Westiniana* Billberg.

Leaves ovate, cordate at base, with rounded lobes or, if merely rounded at base, then the filament-tube about 30 mm. long or more; natives of Central America.

Filament-tube 40-43 mm. long.

Filament-tube about 30-32 mm. long.

Leaves pubescent beneath, membranous when dry; calyx-lobes narrowly subulate, toothed; corolla red.

Leaves glabrous, thick and somewhat leathery when dry; calyx-lobes broadly linear, entire; corolla white-tipped.

Leaves acute to rounded at base, never cordate; natives of Cuba and Hispaniola.

Anther-tube 14-17 mm. long.

Anther-tube 8 mm. long or less.

Leaves thick and usually coriaceous, the margins subentire with minute, often inrolled, callose teeth; pedicels in fruit 30-65 mm. long (except in one species which has prominently reticulate veins of the leaves); natives of eastern Cuba.

Pedicels 15-28 mm. long in fruit; leaf-blades with the veins of the lower surface raised, hairy and prominently reticulate.

Pedicels 30-100 mm. long in fruit; leaf-blades lacking raised and prominently reticulate veins on the lower surface.

Corolla short-pubescent without; calyx-lobes pubescent, subulate, 10-12 mm. long; bracteoles of the pedicel just below the hypanthium.

Corolla glabrous without; calyx-lobes glabrous, 7 mm. long or less; bracteoles of the pedicel at or about the middle.

Leaf-blades mostly 3-4 times as long as wide; corolla green or tinged with red, the lobes 13-22 mm. long.

Leaf-blades mostly about 10 times as long as wide; corolla blue, or red with yellow lobes, the lobes 8 mm. long less.

Corolla blue, glabrous within and without; capsule 8 mm. long or less, about three-fourths inferior, the open valves about 2 mm. long, plainly exceeding the rim of the hypanthium; leaves and petioles entirely glabrous.

Corolla red with yellow throat, pubescent in lines within; capsule 10-12 mm. long, wholly inferior, the open valves very short, surpassed and concealed by the rim of the hypanthium; petioles and leaf-bases marginally hairy.

Leaves membranous to subcoriaceous, usually evidently toothed and often incised, if inconspicuously toothed the blades thin and the margins never inrolled; pedicels in fruit usually much less than 30 mm. long; natives of Hispaniola.

Petioles of the principal leaves 1.5-3 cm. long.

13. *S. nematosepalus*.

12. *S. Maxonis*.

14. *S. albigitur*.

11. *S. caudatus*.

3. *S. manettiaeflorus*.

2. *S. cernuus*.

1. *S. patens*.

5. *S. glaber*.

4. *S. subglaber*.

9. *S. decumbens*.

Petioles about 1 cm. long or less.

Stem and leaves pubescent more or less throughout with fine short sharp whitish hairs; leaf-margins irregularly repandentate, the teeth usually blunt and dark-tipped; flowers in a definite inflorescence, the bracts conspicuously smaller than the foliage leaves and sharply set off from them.

Stems and leaves glabrous, or sparsely pubescent in the young growth; leaf-margins sharply serrate to incised, the teeth not dark-tipped; flowers in the axils of the upper leaves, these usually not much reduced in size.

Leaf-blades somewhat irregularly toothed, the teeth very variable in size on the same leaf, the blades often incised-serrate; calyx-lobes 3.0-7.5 mm. long; plants herbaceous, annual.

Leaf-blades regularly toothed, the teeth uniform in size, slender; blades never incised; calyx-lobes 7-12 mm. long; plants perennial, woody at least at base.

Anther-tube 6.5-7 mm. long; corolla-tube 20-22 mm. long; leaf-blades scarcely petiolate, the base attenuate, broadly winged; marginal teeth of the leaf-blades strongly incurved.

Anther-tube 4-4.5 mm. long; corolla-tube 14-15 mm. long; leaf-blades, at least the lower, with a scarcely winged petiole; marginal teeth spreading or slightly incurved at tips.

10. *S. domingensis*.

8. *S. sonchifolius*.

7. *S. igneus*.

6. *S. leptophyllus*.

Section 1. Hemisiphocampylus A. DC. in DC. Prodr. 7: 397. 1839. Corolla-tube usually somewhat enlarged and often fenestrate at base (in some species 3-fenestrate, the corolla opening on the dorsal side as well as by two lateral slits); filaments not adherent to the corolla-tube or rarely slightly adherent at the very base; pedicels conspicuously bibracteolate, the bracteoles usually at or about the middle of the pedicel; species native to Cuba and Hispaniola.

1. *Siphocampylus patens* Griseb. Cat. Pl. Cub. 159. 1866.

Plants suffruticose, glabrous (except the leaves as noted), the stems erect, up to 5 mm. in diameter, green or purplish, glabrous but somewhat roughened, 3-4 ft. high (according to Wright); cauline leaves 30 or more, spreading, coriaceous and shining, the veins somewhat impressed on the upper surface, the blades glabrous or sparsely hairy on the veins beneath, 0.8-2.4 cm. wide, 4-8 cm. long, mostly 3-4 times as long as wide, elliptic, the tip acute or broadly acuminate, the base narrowed or attenuate and subpetiolar, the margins subentire, somewhat revolute, with 2-4 callose teeth per cm., these more prominent near the serrulate apex of the blade; upper leaves scarcely smaller; flowers few-15 in the axils of the little-reduced upper leaves, the inflorescence up to 30 cm. long, often interrupted by flowerless leaves; pedicels spreading-ascending, about 1 mm. in diameter, 35-100 mm. long in fruit, smooth and glabrous, each with a pair of filiform bracteoles 2-3.5 mm. long, at the middle or below; flower 3.5-4 cm. long, including hypanthium; corolla green with a red tinge on the upper side and near the base (according to Wright), glabrous, the tube broad, shaped like an hour-glass, about 11 mm. long, about 4 mm. broad in the middle and enlarged toward base and apex, fenestrate at base or not at all so, the lobes oblong or elliptic to ovate, acute, not recurved, the two upper oblong or narrowly elliptic, 4-5 mm. wide, 16-22 mm. long, the three lower lobes lanceolate to ovate, 5-6.5 mm. wide, 13-18 mm. long; filament-tube 18-19 mm. long, glabrous distally, the filaments free from the corolla, distinct about half their length and there strongly hairy; anther-tube 5.5-6.5 mm. long, the two shorter anthers densely white-tufted with hairs 2 mm. long, the others glabrous; hypanthium in anthesis campanulate or turbinate, attenuate into the pedicel, about 10 mm. long by about 7 mm. wide when pressed flat; capsule woody, turbinate, 7-9 mm. in diameter, 16-13 mm. long, the base attenuate, the apex rounded or truncate, surpassed by the free rim of the hypanthium which is about 2 mm. high; calyx-lobes narrowly triangular or subulate, acute, entire or very remotely denticulate, 1.5-2 mm. wide at base, 6-7 mm. long; seeds ellipsoid, light brown, faintly reticulate.

TYPE LOCALITY: Cuchillas de Baracoa, Oriente, Cuba, C. Wright 2893 (isotype, Gray!).
DISTRIBUTION: Oriente, Cuba.

2. *Siphocampylus cernuus* Griseb. Cat. Pl. Cub. 159. 1866.

Siphocampylus cernuus var. *nipensis* Urban, Symb. Ant. 9: 430. 1925. (Ekman 10089.)

Stems suffruticose, green or brownish, 6 feet high (according to Wright), glabrous below, the young growth finely pubescent; leaves cauline, spreading, stiff-papery when dry, dark green and glabrous above and somewhat lustrous, sparsely short-pubescent and glaucescent below, the margins subentire, repand, with minute callosities at irregular intervals, the blades broadly elliptic or ovate, 2–5 cm. wide, 5–12.5 cm. long, mostly about 2.5 times as long as wide, the tip rather abruptly narrowed to a broad blunt mucronate acumen, the base acute, attenuate into a slender petiole 1–1.5 cm. long; flowers 1–3 in the axils of the little-reduced upper leaves, often widely spaced; pedicels widely spreading, short-pubescent, about 0.7 mm. in diameter, 65–95 mm. long in fruit, each with a pair of filiform bracteoles about 6 mm. long, 5–18 mm. below the base of the hypanthium; bud about 3.5 cm. long, including hypanthium; corolla short-pubescent without when young, glabrous at maturity, the tube straight, cylindrical, 18–20 mm. long, entire, the two upper lobes oblong, 3 mm. wide, about 20 mm. long, the lower lip deeply divided into 3 oblong-linear lobes about 3 mm. wide and 15 mm. long; filament-tube about 30 mm. long; anther-tube 7–8 mm. long, the two shorter anthers densely white-tufted at tip, the others glabrous or essentially so; hypanthium in anthesis turbinate, short-pubescent, acute at base, 5 mm. long, 4 mm. broad when pressed; capsule campanulate, about 10 mm. long by 6 mm. wide, about four-fifths inferior; calyx-lobes subulate, short-pubescent, entire, about 1.3 mm. wide at base, 10–12 mm. long; seeds oblong-ellipsoid, about 0.6 mm. long, conspicuously pitted.

TYPE LOCALITY: Monte Verde, Oriente, Cuba, *C. Wright 2882* (isotype, Mo. Bot. Gard.).

DISTRIBUTION: Oriente, Cuba.

3. *Siphocampylus manettiaeflorus* Hook. Bot. Mag.

pl. 4403. 1848.

Siphocampylus nitidus De Jonghe; Morren, Ann. Soc. Agr. Bot. Gand 2: 319. *pl.* 78. 1846. Not

Siphocampylus nitidus Pohl, 1831.

Lobelia salviaefolia A. Rich. in Sagra, Hist. Cuba 11: 69. 1850. (*Linden 1832.*)

Siphocampylus impressus Urban, Symb. Ant. 7: 417. 1912. (*C. Wright 339*, isotype, NY!)

?*Siphocampylus undulatus* Urban, Symb. Ant. 9: 428. 1925. (*Ekman 9558.*)

?*Siphocampylus Ekmanii* Urban, Symb. Ant. 9: 429. 1925. (*Ekman 9535.*)

?*Siphocampylus libanensis* Urban, Symb. Ant. 9: 429. 1925. (*Ekman 15817.*)

Stems suffruticose, 0.6–1.5 m. high, up to 4.5 mm. in diameter, green or yellowish, glabrous or sparsely pubescent in the young growth; leaves cauline, 30 or more, spreading, subcoriaceous, the upper surface shining and glabrous, the lower surface prominently reticulate-veined and clothed with soft white hairs especially between the veins, the margins minutely denticulate with 3–4 callose teeth per cm., but usually somewhat revolute and appearing entire, the blades elliptic, acute at base and apex, 0.6–2.3 cm. wide, 2–6 cm. long, 2–6 times as long as wide; petiole hairy or glabrous, 0.2–0.8 cm. long; flowers 5–13 in the axils of the little-reduced upper leaves, mostly distant; pedicels slender and flexuous, wide-spreading, about 0.5 mm. in diameter, 15–28 mm. long in fruit, pubescent, or glabrous except at the base, each with a pair of filiform bracteoles 3–4 mm. long, at or about the middle; flower 3–3.5 cm. long, including hypanthium; corolla red, the tips yellow (according to Shafer), pubescent or nearly glabrous without, somewhat pubescent within at base, the tube straight, 15–19 mm. long, fenestrate at base a distance of 5 mm. or less, nearly cylindrical, the narrowest point near the base, the lobes lanceolate, acute, not recurved, the two upper 1.5–2.4 mm. wide at base, 7–8 mm. long, the three lower similar, smaller; filament-tube 17–22 mm. long, glabrous distally, the filaments free from the corolla, distinct below about a third their length and there strongly white-hairy; anther-tube 4.0–4.5 mm. long, the two shorter anthers white-tufted at tip, the others conspicuously white-hairy near tip; hypanthium in anthesis glabrous or pubescent, obconic, acute at base, about as broad as high when pressed, in fruit becoming broadly campanulate and somewhat rounded at base; capsule almost wholly inferior, 5–7 mm. long by about 4 mm. in diameter; calyx-lobes subulate, glabrous, with a single small callose tooth on each edge near base and rarely an additional tooth on each edge, about 1 mm. wide at base, 3–7 mm. long; seeds oblong-ellipsoid, shallowly pitted-reticulate, light brown, about 0.8 mm. long.

TYPE LOCALITY: Described from a cultivated plant, "probably from New Grenada."

DISTRIBUTION: Mountains of Oriente, Cuba.

ILLUSTRATIONS: Bot. Mag. *pl.* 4403; Ann. Soc. Agr. Bot. Gand 2: *pl.* 78; Paxton's Mag. Bot. 15: 267.

4. *Siphocampylus subglaber* Urban, Symb. Ant. 7: 418. 1912.

Slender shrub 1 m. high or less; basal part of leaves and the petioles marginally hairy, the whole plant otherwise glabrous; stems green, up to 6 mm. in diameter; cauline leaves crowded, spreading-ascending, 50 or fewer, coriaceous, shining above (?), the blades narrowly elliptic, 0.8-1.5 cm. wide, 4-11 cm. long, usually about 10 times as long as wide, the upper gradually smaller, the tip acute, blunt-acuminate, the base attenuate, subpetiolar, the margins entire, somewhat revolute, firm, with few obscure usually inrolled callosities; inflorescence 15 cm. long or less, interrupted, the 10-25 flowers in the axils of the upper leaves; pedicels slender, spreading-ascending, 30-40 mm. long in fruit, each with a pair of decurrent puberulent filiform bracteoles 1-4 mm. long, at the middle or above; flower 2.5-3 cm. long, including hypanthium; corolla red, the throat yellow (according to Shafer), glabrous without, retrorsely-pubescent in lines within, especially near base, the tube straight, about 15 mm. long, entire, nearly cylindrical, narrowest near base and slightly enlarged distally, the lobes narrowly lanceolate or almost linear, not recurved, about 1.5 mm. wide at base, 7-8 mm. long, acute, the two upper ones slightly the longest; filament-tube about 17 mm. long, glabrous distally, the filaments free from the corolla or slightly adnate to it at base, distinct about a third their length at base and there strongly white-hairy; anther-tube 5 mm. long, all the anthers somewhat tufted at or near the tip; hypanthium in anthesis obconic, or turbinate, the base acute, in fruit becoming campanulate with attenuate base, or turbinate, slightly oblique, 6-7 mm. in diameter; capsule 10-12 mm. long, almost wholly inferior, the open valves very short, surpassed and concealed by the short rim of the hypanthium (in dried material); calyx-lobes triangular-subulate, entire, up to 3 mm. wide at base, 3-5 mm. long; seeds light brown, slightly lustrous, ellipsoid with rounded ends, about 0.7 mm. long, 0.45 mm. wide, nearly smooth, shallowly pitted-reticulate.

TYPE LOCALITY: Camp La Gloria, south of Sierra Moa, Oriente, Cuba, *Shafer 8241* (isotype, NY!).

DISTRIBUTION: Known only from the type locality.

5. *Siphocampylus glaber* McVaugh, sp. nov.*

Slender shrub 1 m. high or less, glabrous, the branches up to 3 mm. in diameter, green or purplish (?); cauline leaves crowded, 50 or fewer, coriaceous, shining (?) above, the blades narrowly elliptic, 0.6-1.1 cm. wide, 5-12 cm. long, usually about 10 times as long as wide, the upper little reduced, the margins appearing entire, somewhat revolute, with few obscure mostly inrolled callosities, the base and apex acute, attenuate, the former subpetiolar; flowers few-10 in the axils of the upper leaves, distant, the inflorescence often interrupted by sterile nodes; pedicels spreading-ascending, 1 mm. in diameter or less, 50-60 mm. long in fruit, each with a pair of filiform decurrent bracteoles 1-2 mm. long, at the middle or near it; flower about 2.5 cm. long, including hypanthium; corolla blue (according to Shafer), glabrous, the tube straight, cylindrical or essentially so, about 13 mm. long, entire, the lobes linear-attenuate, not recurved, 1-1.5 mm. wide at base, the two upper lobes 7-8 mm. long, the others slightly shorter; filament-tube about 17 mm. long, glabrous distally, the filaments free from the corolla, distinct for about 3 mm. at base and there hairy; anther-tube 3.5-4.0 mm. long, the two shorter anthers densely white-tufted at tip, the others densely hairy near tip; hypanthium in anthesis turbinate, the base acute, in fruit becoming campanulate with attenuate base, slightly oblique, about 5 mm. in diameter; capsule 8 mm. long or less, about three-fourths inferior, the open valves about 2 mm. long, plainly exceeding the rim of the hypanthium; calyx-lobes triangular-subulate, entire, 2-2.5 mm. wide at base, 3-5 mm. long; seeds light brown, ellipsoid with rounded ends, about 0.75 mm. long, shallowly pitted-reticulate.

TYPE LOCALITY: Arroyo del Medio, above the falls, Oriente, Cuba, *Shafer 3225*, Dec. 20, 1909 (NY!).

DISTRIBUTION: Known only from the type locality.

* *Siphocampylus glaber*, sp. nov.; frutex, a *S. subglabro* foliis petiolisque glabris, corolla caerulea, intus glabra, capsula 8 mm. longa, valvis 2 mm. longis, hypanthii marginem superantibus distinguitur.

6. *Siphocampylus leptophyllus* Urban, Ark. Bot. 23A⁵: 104. 1930.

Plants entirely glabrous except the stamens; stems straggling, weakly erect, woody, green or purplish, up to 3 mm. in diameter, up to 60 cm. high or more; cauline leaves 50 or fewer, the lower often early deciduous; blades 2–2.5 cm. wide, 7–9 cm. long, mostly 3.5–4 times as long as wide, somewhat lustrous, thick-papery or subcoriaceous when dry, elliptic, gradually acuminate at base and apex, the apex spiny-tipped, the base attenuate into a margined petiole 1 cm. long or less, the margins regularly serrate with 2–4 slender spiny teeth per cm., the teeth ascending, 2 mm. long or less, often unciniate; flowers few (3–5?), in the axils of the upper leaves, most of the upper axils not flower-bearing; pedicels spreading-ascending, about 0.6 mm. in diameter, 35–40 mm. long in fruit, each with a pair of subulate bracteoles 6 mm. long, about 10 mm. above the base; flower about 3 cm. long, including hypanthium; corolla red, glabrous except near base within, the tube more or less cylindrical, straight, slightly narrowed at base, 14–15 mm. long, slightly fenestrate at base, the lobes slightly spreading, the two upper lanceolate, 3–3.5 mm. wide at base, 12–13 mm. long, acute, the three lower forming a slightly deflexed lip, its lobes elliptic, acute, 3–3.5 mm. wide, 10 mm. long; filament-tube 21–22 mm. long, with stiff white hairs in lines extending to the summit, these becoming very dense near base, the filaments distinct near base and fused to corolla at very base; anther-tube 4.0–4.5 mm. long, gray, the two smaller anthers densely white-tufted at tips, the larger ones with small tufts near tip and with short stiff hairs along the backs; hypanthium in anthesis campanulate or obconic, acute at base or obtuse at the very base, 3.5–4.5 mm. wide at summit, 4.5–5.5 mm. long (when pressed); fruit not seen; calyx-lobes narrowly triangular, attenuate to a spiny point, finely denticulate, green or reddish, 1.8–2 mm. wide at base, about 8 mm. long; seeds ovoid or ellipsoid, light brown, shallowly pitted, about 1 mm. long.

TYPE LOCALITY: Morne Brigand, Massif du Nord, Haiti, at an elevation of 900–1150 m., *Ekman H2973* (isotype, US!).

DISTRIBUTION: Known only from the type locality.

7. *Siphocampylus igneus* Urban, Symb. Ant. 1: 452. 1900.

Siphocampylus Urbanii F. E. Wimmer, Repert. Sp. Nov. 22: 214. 1926. (Based on *Siphocampylus igneus* Urban.)

Stems erect, suffrutescent (?), up to about 4 mm. in diameter, green or stramineous, the whole plant glabrous except in the very young growth, 50 cm. high or more; cauline leaves 50–65, the lower often early deciduous; blades 0.6–1.8 cm. wide, 6–12 cm. long, mostly 7–10 times as long as wide, lustrous, thick-papery or subcoriaceous when dry, elliptic or oblanceolate, acute at tip and tapering to a sharp point, long-attenuate into a broadly margined subpetiolar base, the margins finely and regularly serrate with 4–6 slender incurved teeth per cm.; flowers few—25 in the axils of the little-reduced upper leaves, the inflorescence 10–20 cm. long; pedicels spreading-ascending, sparsely bristly-pubescent, about 0.5 mm. in diameter, about 25 mm. long in fruit, each with a pair of purplish linear bracteoles about 4 mm. long, above the middle of the pedicel; flower 3–4 cm. long, including hypanthium; corolla red, pubescent without and at base within, the tube more or less cylindrical, slightly curved, about 22 mm. long, fenestrate at base and cleft dorsally near base, the lobes not curved, the two upper oblong, about 3.5 mm. wide by 13 mm. long, the three lower similar, narrower, linear-subulate, about 2 mm. wide by 15 mm. long; filament-tube about 20–21 mm. long, the distal third glabrous, the basal part white-hairy, the filaments free at base for about a third of their length, strongly white-hairy, free from the corolla; anther-tube about 7 mm. long, all the anthers densely white-tufted at tip; hypanthium in anthesis hemispheric or broadly campanulate, often subacute at base, rather densely short-pubescent with spreading hairs, about as broad as high when pressed, 5–7 mm. across; fruit not seen; calyx-lobes narrowly triangular or subulate, reddish or purplish, pubescent, acute, serrate with prominent slender teeth, about 2 mm. wide at base, 7–12 mm. long; seeds not seen.

TYPE LOCALITY: "Hab. in Sto. Domingo in pinetis montis Redondo," *Eggers 2058*.

DISTRIBUTION: Mountains of central Hispaniola (República Dominicana).

8. *Siphocampylus sonchifolius* (Sw.) McVaugh, comb. nov.

Lobelia sonchifolia Sw. Fl. Ind. Occ. 1947. 1806.

Stems herbaceous or slightly woody at base, erect or nearly so, simple or few-branched, up to about 5 mm. in diameter at base, green, or purplish below (rarely nearly all purplish), few-76 cm. high, glabrous to sparsely pubescent; cauline leaves up to about 50, ascending, thin and usually membranous when dry, glabrous or sparsely pubescent beneath or above near base and margins; flowers few-20 (30) in the axils of the somewhat reduced upper leaves, the inflorescence axis few-20 cm. long; pedicels slender, strongly ascending, 10-20 (28) mm. long in fruit, short-bristly-pubescent, each with a pair of filiform bracteoles 1-3.5 mm. long at the middle or below; corolla-tube straight or slightly curved, cylindrical or somewhat enlarged distally, fenestrate at base and cleft dorsally near base, the lobes acute, scarcely at all recurved, the two upper elliptic to oblong, the three lower elliptic to triangular; filaments distinct at base and there prominently hairy, entirely free from the corolla; two shorter anthers densely white-tufted at tips, the larger ones pubescent; hypanthium in anthesis turbinate, puberulent or nearly glabrous, acute or slightly rounded at base, 3-6 mm. broad when pressed and about as broad as high; capsule oblong or ellipsoid, one-third to one-half inferior, 3-4.5 mm. in diameter, 5.5-9 mm. long; calyx-lobes linear or subulate, often red, entire or denticulate, pubescent or nearly glabrous, 0.8-2 mm. wide at base, 3-7.5 mm. long; seeds subglobose, light-brown, about 0.6 mm. in diameter, nearly smooth, obscurely pitted.

TYPE LOCALITY: "Provenit in graminosis depressis juxta fluenta Hispaniolae," Swartz herb. (Stockholm!).

Corolla red, without yellow tips; leaves prominently incised-serrate.

Divisions of the principal leaves mostly rounded and mucronate at tip, 3-8 mm. wide at base; corolla-tube partially cleft dorsally at apex, the filament-tube somewhat exerted; lobes of lower lip of corolla about 5.5 mm. long.

Divisions of the principal leaves mostly narrowed and acute at tips, 1-3 mm. wide at base; corolla-tube not cleft dorsally except at base; lobes of the lower lip 7-17 mm. long.

Corolla red, with yellow lobes; leaves finely toothed to somewhat incised.

8b. *S. sonchifolius* var. *sonchifolius*.

8a. *S. sonchifolius* var. *laciniatus*.

8c. *S. sonchifolius* var. *Tuerckheimii*.

8a. *Siphocampylus sonchifolius* var. *laciniatus* (Lam.) McVaugh, comb. nov.

Lobelia laciniata Lam. Encyc. 3: 584. 1791.

Rapuntium laciniatum Presl, Prodr. Mon. Lob. 27. 1836.

Siphocampylus Lamarckii A. DC. in DC. Prodr. 7: 397. 1839. (Based on *Lobelia laciniata* Lam.)

Siphocampylus laciniatus Urban, Symb. Ant. 1: 451. 1900. Not *Siphocampylus laciniata* G. Don, 1834.

Siphocampylus formati-cotus Gleason, Bull. Torrey Club 50: 56. 1923. (Nash & Taylor 1701, NY!)

Leaf-blades 1-5 cm. wide (including teeth), 4-15 cm. long, usually about 2.5-3 times as long as wide, narrowly to broadly elliptic, acuminate at tip, attenuate at base into a short margined petiole 1 cm. long or less, the margins irregularly serrate or incised, the serrations very variable in size and shape, the divisions of the principal leaves mostly narrowed and acute at tips, 1-3 mm. wide at base, the teeth ranging from short marginal ones 1-2 mm. long to linear divisions 2 mm. wide by 25 mm. long, the blades then truly pinnatisect; flower 2.5-4 cm. long, including hypanthium; corolla "red," "scarlet," or "crimson," puberulent without or nearly glabrous, glabrous within, the tube (17) 19-21 mm. long, the two upper lobes 3-4 mm. wide at base, 8-10 mm. long, the lower lobes 2-3.5 mm. wide, 7-10 (17) mm. long; filament-tube 19-22.5 mm. long, the distal quarter glabrous, the rest hairy; anther-tube 3.5-4 (5) mm. long, the three larger anthers with numerous ascending hairs near tip and appearing tufted.

TYPE LOCALITY: "St.-Domingue," *M. de l'Étang* (Paris, photo.).

DISTRIBUTION: Northwestern Hispaniola, chiefly in northern Haiti, at elevations up to 1000 m.

8b. *Siphocampylus sonchifolius* var. *sonchifolius* McVaugh, var. nov.

Lobelia sonchifolia Sw. loc. cit., as to type.

Rapuntium sonchifolium Presl, Prodr. Mon. Lob. 27. 1836.

Tupa sonchifolia Griseb. Fl. Brit. W. Ind. 388. 1861.

Dortmannia sonchifolia Kuntze, Rev. Gen. 973. 1891.

Divisions of principal leaves mostly rounded and mucronate at tip, 3-8 mm. wide at base; flower about 2.5 cm. long, including hypanthium; corolla cleft dorsally about half way, its two upper lobes not over 2 mm. wide, 7 mm. long, the lobes of the lower lip about 2 mm. wide, 5.5 mm. long; filament-tube 17 mm. long, glabrous, protruding from the fissure in the corolla; anther-tube 3-3.5 mm. long, the larger anthers nearly glabrous.

DISTRIBUTION: Hispaniola (southern Haiti).

8c. *Siphocampylus sonchifolius* var. *Tuerckheimii* (Urban)
McVaugh, comb. nov.

Siphocampylus Tuerckheimii Urban, Symb. Ant. 7: 416. 1912.

Siphocampylus linearifolius Leonard, Jour. Wash. Acad. 14: 417. 1924. (Abbott 1903, US')

Leaf-blades 0.4-2.5 cm. broad, 5.5-13 cm. long, 5-7 (12) times as long as wide, elliptic to lanceolate or nearly linear, acuminate at tip, cuneate at base, the margins finely serrate with narrowly triangular teeth (these 5-7 per cm., with short slender spiny tips), or sometimes doubly serrate or deeply incised; petiole almost none; flower 28-30 mm. long, including hypanthium; corolla red, the lobes yellow, its outer surface puberulent, the tube 18-21 mm. long, the two upper lobes 2.5-3.5 mm. wide, 7.5-9 mm. long, the three lower lobes 1.5-2 mm. wide, 6-9 mm. long; filament-tube 19-23 mm. long, the basal third white-hairy; anther-tube 3.8-4 mm. long, the larger anthers sparsely hairy on backs.

TYPE LOCALITY: "Sto. Domingo prope Barahona ad Paradis 100 m. alt.," von Tuerckheim 2783 (isotype, NY!).

DISTRIBUTION: Provincia de Barahona, República Dominicana, Hispaniola, at elevations up to 1300 m.

9. *Siphocampylus decumbens* A. DC. in DC. Prodr. 7: 397. 1839.

Lobelia decumbens A. DC. in DC. Prodr. 7: 388, as syn. 1839.

Stem erect or decumbent, herbaceous or slightly woody at base, simple or with few subordinate branches, up to 3 mm. in diameter, up to 75 cm. high, green or straw-colored, glabrous; leaves cauline, about 15, spreading, thin-papery when dry, glabrous, or with a few hairs on the midrib above, the margins coarsely and sharply serrate, the principal teeth 2-4 per cm., 2-3 mm. high, usually with 1-3 intermediate smaller teeth between each pair, the blades elliptic to ovate, 2-4 cm. wide by 5-7.5 cm. long, 1.7-3.5 times as long as wide, the tip acute or somewhat acuminate, the base rounded, attenuate into a slender petiole 1.5-3 cm. long; inflorescence a terminal raceme 15 cm. long or less, loosely few-flowered; pedicels spreading-ascending, about 0.5 mm. in diameter, 10-12 mm. long, bristly-pubescent, each with a pair of filiform bracteoles about 2 mm. long, one-fourth to one-third the distance from the base to the apex of the pedicel; flower-bracts foliaceous, elliptic, toothed, the lowest as large as 1.5 cm. broad, 4.5 cm. long, on a petiole 1 cm. long, the upper bracts smaller, about 1 cm. long; flower about 3.5 cm. long, including hypanthium; corolla red, puberulent without, glabrous within except near base, the tube straight, slightly enlarged distally, 21-23 mm. long, fenestrate, the two upper lobes oblong, acute, not curved, about 3.5 mm. wide, 11 mm. long, the three lower lobes similar, slightly decurved; filament-tube about 22.5 mm. long, glabrous distally, the filaments free at base and there pubescent, free from the corolla; anther-tube about 4.5 mm. long, all the anthers densely white-hairy near tip, otherwise smooth; hypanthium in anthesis puberulent, depressed-hemispheric, rounded or somewhat flattened at base, red; fruit not seen; calyx-lobes subulate, puberulent, obscurely toothed, red, about 1 mm. broad at base, 6 mm. long; seeds not seen.

TYPE LOCALITY: "In Sancto-Domingo" (herb. Paris, Field Mus. Neg. 38197!).

DISTRIBUTION: Hispaniola (Haiti; "Santo Domingo").

10. *Siphocampylus domingensis* A. DC. in DC. Prodr. 7: 397. 1839.

Annual (?); stems herbaceous, erect, simple or with few ascending branches, up to about 5 mm. in diameter at base, green, or purplish at base, 50-70 cm. high or more, pubescent throughout with fine short whitish sharp hairs; cauline leaves 20 or fewer, spreading-ascending, thin-papery when dry, the blades lanceolate to elliptic or ovate, 1-3.5 cm. wide, 4-10 cm. long, often about 3 times as long as wide, the tip acute or short-acuminate, the base broadly acute or rounded, attenuate into a petiole about 1 cm. long or less, sparsely pubescent above, especially near base and margins, the lower surface pubescent, especially on the veins, the margins irregularly repand-dentate, the teeth usually dark-tipped, 6-13 per cm., often blunt, 1.5 mm. long or less; inflorescence a terminal raceme few-30 cm. long, not noticeably secund, closely 10-35-flowered; pedicels spreading-ascending, somewhat curved at maturity, about 0.5 mm. in diameter, 7-16 mm. long in fruit, closely pubescent, each with a pair of filiform bracteoles 1-2 mm. long, at the middle of the pedicel or below; flower-bracts foliaceous but usually distinctly set off from the foliage leaves in size, the lowest elliptic or lanceolate, up to 1 cm. wide, the upper linear, 2-5 mm. wide, 10-20 mm. long; flower 2-3 cm. long, including hypanthium; corolla red, pubescent without, glabrous within except near base, the tube straight, 16-20 mm. long, fenestrate at base and with a short dorsal fissure near base, nearly cylindrical, slightly enlarged distally, the lobes linear or very narrowly triangular, acute, not or scarcely curved, 1.5-2 mm. wide at base, 7-10 mm. long, the two upper ones slightly the largest; filament-tube 17-22 mm. long, glabrous distally, becoming increasingly pubescent toward the base, the filaments distinct at base, free from the corolla, strongly whitish-hairy; anther-tube 3.5-4.5 mm. long, the two shorter anthers white-tufted at tip, the three larger ones densely white-hairy near tip; hypanthium pubescent, in anthesis shallowly cup-shaped, the base flat or rounded, in fruit becoming more or less hemispheric, slightly broader than high, 4-5 mm. in diameter; capsule half inferior or less, 5-7.5 mm. long, the free part pubescent; calyx-lobes narrowly triangular or subulate, closely pubescent, prominently toothed, reddish, acute or acuminate, up to 1.8 mm. wide at base, 3-8 mm. long; seeds light-brown, ovoid or oblong, 0.6 mm. long, shining, the surface impressed-reticulate.

TYPE LOCALITY: "In Sancto-Domingo," Poiteau (herb. Paris, Field Mus. Neg. 38199f).

DISTRIBUTION: Southern and central Hispaniola, extending to northern Haiti; at elevations up to 1200 m.

11. *Siphocampylus caudatus* McVaugh, nom. nov.

Lobelia Ekmanii Urban, Ark. Bot. 20A³: 63. 1926. Not *Siphocampylus Ekmanii* Urban, 1925.

Stem shrubby, 1.5 m. high (according to Ekman), coarse, the branches up to 0.8 cm. in diameter just below the inflorescence, the thin brown bark smoothish, sparsely pubescent; cauline leaves numerous (often more than 20 in the space of 10 cm. just below the inflorescence), spreading, thickish (stiff in dried specimens), densely short-pubescent on both sides, subentire in outline, the margins very finely serrulate with 15-20 callose teeth per cm., the blades 2-3 cm. wide by 16-20 cm. long, usually 5-6 times as long as wide, elliptic or elliptic-oblong, the tip gradually long-acuminate, the base acute, cuneate; inflorescence a terminal raceme 14-20 cm. long, unbranched, not secund, loosely 10-20-flowered, the flowers in the axils of but little reduced leaves; pedicels loosely spreading, strongly upcurved in the distal third of their length, so that the flowers in anthesis are more or less erect; pedicels more than 1 mm. in diameter, 55-65 (90) mm. long in fruit, densely pubescent or tomentose, each with a pair of finely callose-toothed bracteoles about the middle or above, these pubescent, about 1 mm. wide by 5-6 mm. long; flower-bracts similar to the foliage leaves, but usually relatively shorter and broader, 1.5-2.5 cm. wide by 6-10 (13) cm. long; corolla 36-60 mm. long, purple-brown (according to Ekman), strongly pubescent without, the lobes smooth and glabrous within, the tube lined with long whitish matted hairs, entire for 10-11 mm. above base, gradually contracted above the base and reaching its minimum diameter of 3 mm. about 4-8 mm. above base, the lobes long-attenuate with caudate tips, the two upper ones (next the long anthers) 30-42 mm. long, 4-5 mm. wide at base, the three lower ones 15-20 mm. long, about 2.5 mm. wide at base (3 lobes fused at base for 15-17 mm., thus forming a "lower lip" and making the tips of all 5 lobes

approximate); all somewhat recurved in bud, but only slightly so after the bud opens; filament-tube 31–37.5 mm. long, about 1 mm. in diameter, appressed-pilose except near base, the filaments united except for a distance of 3–5 mm. at base, entirely free from corolla; anther-tube 14–17 mm. long, the two shorter anthers 11–12 mm. long, densely tufted at tips with yellow straight hairs 5–7 mm. long, the three longer anthers little curved at tip but straight, the apex not strongly tufted but the backs near apex sparsely to densely pilose with long yellow hairs; hypanthium in anthesis turbinate, 7–8 mm. high, tomentose; mature fruit not seen; immature capsule about 7.5 mm. across, slightly more than half inferior; calyx-lobes conspicuous on the flowers, lanceolate to ovate, acute, strongly pubescent, finely toothed, 8–11 (14) mm. long, 2–4.5 mm. wide; flower 52–70 mm. long, including hypanthium; seeds unknown.

TYPE LOCALITY: Morne Cabaio, Massif de la Selle, Haiti, at an elevation of 2200–2300 m., Ekman H1595 (Berlin!).

DISTRIBUTION: Massif de la Selle, Haiti.

Section 2. Eusiphocampylus A. DC. in DC. Prodr. 7: 398. 1839. Corolla-tube usually with a narrow cylindrical basal portion, usually not fenestrate; filaments adherent to the narrow basal portion of the corolla-tube; pedicels minutely bibracteolate at or about the base; numerous species in South America, and three in Central America.

12. *Siphocampylus Maxonis* F. E. Wimmer, Repert. Sp. Nov. 19: 259. 1924.

Stems simple or few-branched, erect, herbaceous or slightly woody at base, fistulous, up to about 4 mm. in diameter, green or purplish, 30–60 cm. high, glabrous below, the young growth sparsely pubescent with soft spreading hairs; cauline leaves 15 or fewer, spreading, membranous when dry, the blades glabrous above, sparsely hairy on the veins beneath, 2–4.5 cm. wide by 4–9.5 cm. long, mostly 2–2.5 times as long as wide, ovate, cordate at base with rounded lobes, gradually long-acuminate at tip, on slender hairy petioles 1.5–3 cm. long, the margins sharply serrate with 1–3 principal teeth per cm., these with 2–4 intermediate teeth, all the teeth with slender spine-like ascending tips; flowers 2–6 in the axils of the much-reduced upper leaves, the axis of the "inflorescence" thus 1–3 cm. long; pedicels spreading-ascending, about 0.4 mm. in diameter, 30–45 mm. long in fruit, sparsely hairy, each with a pair of filiform bracteoles, less than 1 mm. long, at or near the base; flower about 3.8 cm. long, including hypanthium; corolla red, sparsely chaffy-pubescent without, glabrous within, the tube straight, 25–28 mm. long, narrowly cylindrical for the basal 6 mm., this portion about 1 mm. in diameter, the upper part of the tube cylindrical or narrowed at the mouth, about 3–4 mm. in diameter, the lobes little or not at all recurved, the 2 upper lanceolate, about 1.5 mm. wide by 8 mm. long, the three lower about 2 mm. wide by 7 mm. long; filament-tube 30–32 mm. long, glabrous, adherent to the narrow basal portion of the corolla-tube, slightly exerted; anther-tube about 4–5 mm. long, bluish-gray, the two shorter anthers white-tufted at tip, the others glabrous or with a few hairs on the backs; hypanthium in anthesis short-campanulate, pubescent, slightly acute at base, in fruit enlarging, becoming about 4 mm. broad; capsule more than half inferior, about 7 mm. long; calyx-lobes narrowly subulate, somewhat hairy, with 2–4 slender teeth on each margin, reddish or green in color, up to 1 mm. wide at base, 4–7 mm. long; seeds not seen.

TYPE LOCALITY: Chiriquí, Panamá; southern slope of Cerro de la Horqueta, humid forest around Las Sigüas Camp, Maxon 5433 (US).

DISTRIBUTION: Known only from the type locality.

13. *Siphocampylus nematosepalus* (Donn. Smith) F. E. Wimmer, Repert. Sp. Nov. 38: 22. 1935.

Centropogon nematosepalus Donn. Smith, Bot. Gaz. 44: 114. 1907.

Stems nearly simple, erect or decumbent, slightly woody at base, up to about 3 mm. in diameter, green, 50 cm. or more in length, glabrous below, sparsely pubescent above; leaves cauline, 15 or fewer, spreading, membranous when dry, the blades pubescent above and beneath, 2.5–5 cm. broad, 5–10 cm. long, usually about twice as long as wide, the uppermost ones little

reduced in size, all ovate, cordate at base with rounded lobes, gradually long-acuminate at tip, on slender petioles 1-3.5 cm. long, the margins somewhat sinuate, sharply and finely serrate with 7-10 teeth per cm., the teeth subulate or filiform, spreading nearly at right-angles to the margin, often uncinuate, 1 mm. long or less; flowers about 5 in the axils of the upper leaves, the axis of the inflorescence 5 cm. long or less; pedicels ascending, lax, about 0.5 mm. in diameter, about 40 mm. long in flower, short-hirsute, each with a pair of filiform bracteoles at base; flower about 5.5 cm. long, including hypanthium; corolla dark red, hirsute without, glabrous within, the tube practically straight, 32 mm. long, the basal 8 mm. narrowly cylindrical, the upper part somewhat expanded, narrowly funnel-form, 3-5 mm. wide when pressed, the lobes little or not at all recurved, the 2 upper lobes lanceolate, acute, 2.5 mm. wide at base, 12-14 mm. long, the three lower lobes similar, shorter, about 3 mm. wide by 9 mm. long; filament-tube 42-44 mm. long, distally hirsute, adherent to the narrow basal portion of the corolla-tube, somewhat exerted; anther-tube 6.0-6.5 mm. long, the two shorter anthers white-tufted at tip, all the anthers with long white hairs on the backs; hypanthium in anthesis campanulate, subacute at base, hirsute; fruit not seen; calyx-lobes subulate, attenuate, more or less hirsute, denticulate, about 1.5 mm. wide at base, 9 mm. long; seeds not seen.

TYPE LOCALITY: Cuesta de los Borucas, Comarca de Puntarenas, Costa Rica, alt. 2300 m., Pittier, herb. nat. C. R. 10533 (US!).

DISTRIBUTION: Known only from the type locality.

14. *Siphocampylus albiguttur* McVaugh, sp. nov.*

Stems herbaceous, 40-70 cm. high, up to 0.4 cm. in diameter at base, purple, smooth and glabrous; leaves cauline, 10-25, spreading, stiff and somewhat leathery when dry, smooth and glabrous, green, the lower surface very light green, the margins serrate with 6-8 sharp purple teeth per cm., the teeth terminating the principal veins often larger than the others and incurved, the blades ovate, rounded or rarely subcordate at base or the extreme base attenuate, acute or somewhat acuminate at tip, 2-4 cm. wide, 4-8 cm. long, on slender purplish petioles 1-3.5 cm. long; flowers 6-8 in the axils of the little-reduced upper leaves, the "inflorescence" sometimes as much as 20 cm. long; pedicels spreading-ascending, stiff, nearly 1 mm. in diameter, 30-60 mm. long in fruit, usually with a few stiff hairs, each bilabrate, the bracteoles minute, filiform, at base of pedicel or sometimes just below the middle; flower about 4 cm. long, including hypanthium; corolla glabrous within, pubescent without with stiff straight hairs, the tube dark-pink (according to Allen) except for the distal 1-2 mm., which is white, the lobes white, the tube straight, 24-27 mm. long, fenestrate at base, cylindrical at base, the basal 7-8 mm. about 3 mm. wide when pressed, the distal portion somewhat expanded, about 5-7 mm. wide when pressed, the lobes oblong or narrowly triangular, long-attenuate to the tips, spreading or somewhat recurved, the two upper lobes 2-2.5 mm. wide, 7-9 mm. long, the three lower lobes similar, slightly shorter; filament-tube 30-32 mm. long, glabrous, the filaments distinct and adnate to the narrow basal portion of the corolla for about a third of their length; anther-tube 4.5-5 mm. long, the two shorter anthers white-tufted at tips, the others glabrous or with a few hairs on the back; hypanthium in anthesis obovate, acute at base, pubescent with stiff hairs, about as broad as high when pressed, in fruit becoming narrowly campanulate; capsule ellipsoid, about half inferior, about 3.5 mm. long by 3.5 mm. in diameter; calyx lobes oblong, entire, narrowed to the tip but blunt at very tip, 1.3-1.7 mm. wide, 4.5-5.5 mm. long, ciliate; seeds oval, dark brown, slightly flattened, shallowly but evidently pitted, about 0.5 mm. long.

TYPE LOCALITY: Hills north of El Valle de Antón, Prov. Coclé, Panama, at an elevation of 800 m., P. H. Allen 2237, Sept. 8, 1940 (US!).

DISTRIBUTION: Known only from the type locality.

DOUBTFUL AND EXCLUDED SPECIES.

SIPHOCAMPYLUS CANESCENS Presl & DC. in DC. Prodr. 7: 402. 1836. *Lobelia canescens* Presl, Prodr. Mon. Lob. 38. 1836. TYPE LOCALITY: Mexico. Presl's type specimen has not been seen by the writer, and the original description is not sufficiently diagnostic. Professor P. E. Wimmer of Vienna has recently given his opinion (in lit.) that *Lobelia canescens* Presl is identical with *Tupa-saricana* Planch. & Oerst. *Lobelia longiflora* var. *stricta* [Planch. & Oerst.] McVaugh.

* *Siphocampylus albiguttur*, sp. nov.: herba glabra, caulis purpureus, foliis ovatis, basi rotundatis; floribus axillaribus, corolla externe hirtella, tubo basi fenestrato, inferne rosea, superne albo, corollae lobis albis.

- SIPHOCAMPYLUS COMOSUS* (Cav.) G. Don, Gen. Hist. 3: 702. 1834; *Lobelia comosa* Cav. Ic. 6: 9, pl. 512, f. 2. 1800. TYPE LOCALITY: "Habitat haud procul a Queretaro in Nova-Hispania," Née. The species illustrated by Cavanilles is a South American one and was doubtless wrongly attributed to Mexico.
- SIPHOCAMPYLUS GLANDULOSUS* Lemaire, Herb. Gén. Amat. II. 3: pl. 56. 1843. This species is identical with *Siphocampylus rugosus* Lemaire, the name having been changed because of the earlier *S. rugosus* (Presl) A. DC.
- SIPHOCAMPYLUS RUGOSUS* Lemaire, Hort. Univ. 3: 311. 1842. TYPE LOCALITY: Described from a cultivated plant said to have been introduced from Mexico. The plate published by Lemaire (see Hort. Univ. 3: 369-372. 1842) indicates that the species is probably to be referred to *Siphocampylus reticulatus* (Willd.) Klotsch & Karst.; Vatke, a native of Venezuela.

13. *PRATIA* Gaud. in Freyc. Voy. 4: 456. 1826.

Our species shrubs or coarse herbs with red, roseate, purple, greenish-yellow, or white flowers. Corolla as in *Lobelia*, cleft dorsally to the base or nearly so, or, in one species, only about a third its length. Fruit indehiscent, somewhat fleshy. Hypanthium in our species produced into a rim above the inferior part of the ovary. Style jointed and dehiscent, with the corolla and stamens, from the fruit. Filaments distinct at base, free from the corolla or essentially so. Orifice of the anther-tube somewhat narrowed or closed by the incurved tips of the three longer anthers, the two shorter anthers with a tuft of stiff hairs at apex. Seeds (where known) ellipsoid-lenticular or nearly globular, pitted.

Type species, *Pratia repens* Gaud.

- Leaves fimbriate-dentate, the principal teeth produced into setaceous spines 3-15 mm. long; native of Jamaica. 1. *P. Harrisii*.
- Leaves crenate, serrate, or subentire, the teeth not produced into spines. Pedicels conspicuously bracteolate, the bracteoles 2-5 (15) mm. long, at or above the middle of the pedicel; natives of Jamaica.
- Leaf-blades elliptic to oblanceolate, long-attenuate to the base, the petioles not well defined or those of the lowest leaves 1-2 cm. long. Calyx-lobes 5-6 (10) mm. long; filament-tube 13-17 mm. long. 2. *P. innominata*
- Calyx-lobes 11-20 (28) mm. long; filament-tube 16-27 mm. long. Calyx-lobes and bracteoles of the pedicel entire or with inconspicuous callose teeth; plant entirely glabrous except the filament-tube. 3. *P. acuminata*.
- Calyx-lobes and bracteoles of the pedicel pectinate-serrate; plants pubescent, at least on the calyx-lobes. 4. *P. Fawcettii*.
- Leaf-blades elliptic, narrowed abruptly at base to definite slender petioles 3-6 cm. long. 5. *P. grandifolia*.
- Pedicels ebracteolate or inconspicuously bracteolate, the bracteoles, if present, 2 mm. long or less, at or near the base of the pedicel; natives of Central America.
- Calyx-lobes narrowly triangular, 5 mm. long; corolla-tube cleft to the base; corolla-lobes about 15 mm. long; pedicels ebracteolate. 6. *P. Tatea*.
- Calyx-lobes broadly triangular, 4 mm. or more in width at base, at least 5 mm. long; corolla-tube cleft to a point not less than 4 mm. from base; two upper corolla-lobes 18-27 mm. long; pedicels bracteolate.
- Calyx-lobes 11-18 mm. long, 5-12 mm. wide at base; corolla-tube cleft to a point 4-5.5 mm. from base. 7. *P. calochlamys*.
- Calyx-lobes 5-7 mm. long, 4-5 mm. wide at base; corolla-tube cleft to a point 15-20 mm. from base. 8. *P. guatemalensis*.

1. *Pratia Harrisii* (Urban) McVaugh, comb. nov.

Lobelia Harrisii Urban, Symb. Ant. 5: 520. 1908.

Stem erect or decumbent, suffrutescent, simple or with 2-3 branches from the base, where 3-4 mm. in diameter and covered with the corky scars of former leaves, glabrous, often roughened below, 12-45 cm. high; cauline leaves clustered about the upper 3-12 cm., borne 8-18 at a time, spreading, thin and papery, glabrous, 4-5.5 cm. wide (including spines), 12-15 cm. long, about 2.5-5 times as long as wide, the blades elliptic to oblanceolate, acute at tip, the base shortly attenuate to a fimbriate-margined petiole 5 mm. long or less, the margins coarsely but regularly fimbriate-dentate, the principal teeth 0.6-1.6 cm. apart, deltoid, 2-6 mm. high, produced into setaceous spines 3-15 mm. long, these teeth with 1-2 spines on each side and with 1-5 smaller setaceous-spiny teeth between each of the principal ones; flowers 3-7 in the axils of the reduced upper leaves, the axis of the inflorescence usually 1-2 cm. long, determinate as a result of the degeneration of the growing point (always?); pedicels slender, more or less upright, 10-15 mm. long, glabrous, each with a pair of subopposite linear-filiform bracteoles

1-3 mm. long, 2-5 mm. above the base; flower-bracts leafy, about 0.4 cm. wide by 2 cm. long or slightly larger; flower inverted (?), 28-34 mm. long, including hypanthium; corolla 28 mm. long (Harris 10665), yellow or orange-yellow (according to Harris), glabrous, the lobes ciliate at tip, the tube fenestrate (always?), arcuate, the two lobes next the dorsal fissure acute, about 2.5 mm. broad by 4.5 mm. long, the other three about 3 mm. wide, almost as long, fused at tip (?); filament-tube 14-17 mm. long, somewhat exerted, pubescent; anther-tube 3.5-4.0 mm. long, the 2 smaller anthers densely white-tufted at tip (tuft 0.8 mm. long), the 3 larger densely very short-tufted; hypanthium in anthesis hemispheric, glabrous, reddish, in fruit short-campanulate, forming a cup 1-2 mm. high above the ovary; fruit about 4.5 mm. across, 3-5 mm. high; calyx-lobes linear-subulate to lanceolate or narrowly deltoid, 1-3.5 mm. wide by 8-11 mm. long, pectinately toothed, prickly-ciliate on the teeth and near the tip; seeds nearly globular, smooth, shining, light brown, pitted, about 0.8 mm. long.

TYPE LOCALITY: Troy, Jamaica, at an elevation of 760 m., Harris 8695 (isotype, NY!).

DISTRIBUTION: Western Jamaica, in limestone regions at elevations of 600-760 m.

2. *Pratia innominata* (Rendle) McVaugh, comb. nov.

Lobelia innominata Rendle, Jour. Bot. 73: 274. f. 1B. 1935.

Stem erect (suffrutescent or herbaceous), coarse, 0.8-1.5 m. high, smooth and glabrous; cauline leaves few-10 (more?), spreading, thin and membranous, 3.5-8.5 cm. broad by 20-34 cm. long, usually 4-7 times as long as wide, the blades elliptic to oblanceolate, mostly broadest above the middle, narrowed rather abruptly to a short-acuminate apex about 1 cm. long, the bases mostly long-attenuate, those of the lower leaves prolonged into a definite petiole 1-2 cm. long, glabrous, lustrous in dried material, uniformly and finely serrate with 5-8 callose teeth per cm., the margin entire near base; inflorescence short-pedunculate (1-4 cm.), few-15 cm. long, closely 10-40-flowered; pedicels spreading-ascending in anthesis, early declining and the fruits usually pendent before maturity; pedicels 1 mm. in diameter (fleshy?), in fruit 25-30 mm. long, smooth, each with a pair of subopposite, green, acute, linear-subulate, decurrent bracteoles 2-3 mm. long at the base of the hypanthium or as much as 2 mm. (rarely 6 mm.) below it; flower-bracts green, narrowly linear-subulate, serrate, 5-10 mm. long, decurrent and adherent to the base of the pedicel for 1-3 mm.; flower not inverted, 35-41 mm. long, including hypanthium; corolla 21-26 mm. long, glabrous, greenish-yellow (according to Britton), the tube 15-18 mm. long, usually conspicuously fenestrate at base, rarely entire, much narrowed distally and curved, the lobes also curved, so that the corolla as a whole is strongly falcate-recurred, the lobes not spreading, those next to the dorsal fissure oblanceolate, 3 mm. wide by 9-10 mm. long, acute, the three shorter forming a lip 7-8 mm. long, its lobes free 2-4 mm.; filament-tube 13-17 mm. long, soft-pubescent, exerted nearly half its length, the filaments connate half their length or less, anther-tube 5.5-7.5 mm. long, pale, the two smaller anthers white-tufted at tip and all the anthers sometimes sparsely hairy at base; hypanthium in anthesis turbinate, attenuate at base, glabrous, somewhat inflated distally and forming a cup 2-4 mm. high above the ovary; hypanthium in fruit 8-10 mm. across by 13-15 mm. long; calyx-lobes subulate or narrowly triangular, glabrous, entire or obscurely toothed, 1.5-2 mm. wide at base, 5-6 mm. long; seeds nearly spherical, shining, deeply pitted-reticulate (alveolate) when young, pitted at maturity.

TYPE LOCALITY: "Woods of Portland" (Jamaica), Purdie (Kew!).

DISTRIBUTION: Mountains of eastern Jamaica.

3. *Pratia acuminata* (Sw.) McVaugh, comb. nov.

Lobelia acuminata Sw. Prodr. 117. 1788.

Rapuntium acuminatum Presl, Prodr. Mon. Lob. 24. 1836.

Tupa acuminata A. DC. in DC. Prodr. 7: 396, in part. 1839.

Lobelia alexis P. E. Wimmer, Repert. Sp. Nov. 38: 86. 1935. (Wulfschlägel 909.)

Closely similar to *P. innominata* in all characters of foliage and inflorescence, but easily separated by its larger flowers, smooth and glabrous throughout; stem shrubby, 0.6-1.2 m. high, often with conspicuous oval leaf scars below; leaves shining, the serrations often unequal, with large and small teeth interspersed or alternating, 4-8 per cm., the blades 3.5-8 cm. broad

by 19–35 cm. long; pedicels 25–50 mm. long in fruit; bracteoles 5–14 mm. long, at the middle of the pedicel or above, rarely within 3 mm. of the long-attenuate base of the hypanthium; flower-bracts linear, 13–20 mm. long, or the lowest wider and longer, up to 6 mm. wide by 60 mm. long; flower not inverted, 42–53 mm. long, including hypanthium; corolla 30–38 mm. long, white, yellowish-white or tinged with rose, the tube 18–20 mm. long, the lobes 11–14 mm. long; filament-tube 23–27 mm. long, exerted half its length or more, the filaments connate about two-thirds their length; anther-tube 8–9 mm. long, glabrous, the two smaller anthers with a white tuft, sometimes 2 mm. long, at tip; calyx-lobes slender-subulate, glabrous, sparsely callose-toothed or nearly entire, 1–3 mm. wide at base by 15–20 (28) mm. long; seeds as in *P. innominata*.

TYPE LOCALITY: Jamaica, *herb. Swartz* (Stockholm!).

DISTRIBUTION: Mountains of western Jamaica.

ILLUSTRATION: Fawcett & Rendle, *Fl. Jam.* 7: 143.

4. *Pratia Fawcettii* (Urban) McVaugh, comb. nov.

Lobelia Fawcettii Urban, *Symb. Ant.* 1: 452. 1900.

Stem erect, shrubby, 1–2.6 m. high, pubescent above (or the whole plant glabrous except the tips of the calyx-lobes), roughened below by the hoof-shaped leaf-scars; cauline leaves few (?), spreading-ascending, averaging 7–10.5 cm. broad by 30–40 cm. long, about 3.5–4 times as long as wide, the blades elliptic to oblanceolate, narrowed abruptly to a short-acuminate apex 1–2 cm. long, the bases attenuate (those of the lower leaves subpetiolate); blades glabrous, thin and membranous, rather coarsely serrate with 3–6 teeth per cm., the teeth often rounded, irregular, 2–3 mm. high, reduced in size near the base of the blade or the margin there entire; inflorescence pedunculate (8–13 cm.), 5–15 cm. long, densely 20–60-flowered, sometimes with 1–2 leafy bracts 3–5 cm. long on the peduncle; pedicels fleshy, ascending in anthesis, in age usually stiffly spreading, nearly perpendicular to the inflorescence axis, about 1 mm. in diameter, in fruit 10–25 mm. long, sparsely but continuously short-pubescent with whitish bristly hairs, each with a pair of subopposite green pubescent bracteoles decurrent at the base of the hypanthium or 1–3 mm. below it, these acute, serrate, 6–13 mm. long, 1.5 mm. or less in width; flower-bracts inconspicuous, greenish, broadly linear, acute, pubescent, serrate, 2 mm. wide or less, 10–20 mm. long, decurrent; flower not inverted, 35–50 mm. long, including hypanthium; corolla 26–39 mm. long, sparsely pubescent without, greenish-white or pale yellow, the tube about 22 mm. long or less, shortly fenestrate at base (always?), the tube and lobes nearly uniformly curved, so that corolla as a whole is truly falcate, the lobes never spreading, long coherent, the two next the dorsal fissure linear, about 8–11 mm. long, the three others shorter, free about 3–5 mm. at tip; filament-tube 16–24 mm. long, much exerted, the filaments pubescent, connate less than half their length; anther-tube (6) 10–11.5 mm. long, the two smaller anthers densely white-tufted at tip (hairs as much as 3 mm. long), the connectives of all 5 anthers appressed-hirsute; hypanthium in anthesis campanulate, obtusely rounded at base and merging gradually into the fleshy pedicel, sparsely pubescent, inflated and forming a cup 4–6 mm. deep around the fruit, which is 7–8 mm. across at widest part (somewhat more where inflated distally); and about 10 mm. high; calyx-lobes narrowly linear-attenuate, acute, conspicuously toothed, bristly and sometimes forked at tip, 1–1.5 mm. wide by 14–17 mm. long, somewhat dilated at base, deciduous in fruit; seeds lenticular-pyriform, alveolate-reticulate.

TYPE LOCALITY: Jamaica. Without locality, *R. C. Alexander* in 1850 (Kew, NY!); Tweedside, *Harris 6346* (isotype, NY!).

DISTRIBUTION: Mountains of western and central Jamaica.

NOTE: *Harris 9269* (*herb. NY!*, US!) differs by having the anther-tube 6–7 mm. long, and the plant practically glabrous except for the bristly-ciliate tips of the calyx-lobes.

5. *Pratia grandifolia* (Britton) McVaugh, comb. nov.

Lobelia grandifolia Britton, *Bull. Torrey Club* 37: 359. 1910.

Stem stout, herbaceous, 0.6–1.2 m. high, pubescent above, the leaves and stem densely granular-tomentose when young with sordid brownish hairlike projections; cauline leaves few (?), "flaccid," thin and membranous, the blades 7–12 cm. broad by 17–29 cm. long, about 2.5 times as long as wide, elliptic, narrowed abruptly at base to a pubescent petiole 3–6 cm. long

and narrowed abruptly to a short-acuminate tip, dull green above and rather bright green below (according to Britton), glabrous above, pubescent beneath with chafy hairs especially along the veins, which, especially the midvein, are prominent below, the margin somewhat sinuate, appearing subentire, finely crenate with 3-6 callose teeth per cm; inflorescence 7-15 cm. long, densely 20-50-flowered, pedunculate 11-18 cm., the peduncle 1-3-bracteate; pedicels fleshy, ascending (sometimes wide-spreading in fruit), very sparsely pubescent, 1 mm. in diameter, in fruit 21-26 mm. long; bracteoles linear, acute, 7-10 mm. long, serrate, sparsely pubescent, green, 1-5 mm. below the hypanthium; flower-bracts linear-oblong, 3 mm. broad by 15-25 mm. long, acute, serrate, nearly glabrous, decurrent; flower about 35 mm. long, including hypanthium; corolla about 25 mm. long, glabrous, "yellowish white," "greenish yellow," or "brownish" (all according to Britton), the tube and lobes strongly recurved, the corolla thus falcate-recurved; filament-tube exerted, 16-20 mm. long, the filaments pubescent, connate half their length or less; anther-tube about 9 mm. long, the two smaller anthers densely white-tufted at tip (tuft 2.5 mm. long), the connectives hirsute proximally; hypanthium in anthesis short-campanulate, obtusely rounded at base and merging gradually into the fleshy pedicel, nearly glabrous, inflated distally for over half its length; fruit about 7 mm. across at widest part (hypanthium somewhat wider where inflated above), about 10 mm. high; calyx-lobes linear or linear-lanceolate, about 2 mm. wide by 12-16 mm. long, acute and somewhat ciliate at tip, pectinately toothed, with about 10 teeth on each side, deciduous in fruit; seeds not seen.

TYPE LOCALITY: Woodlands, eastern slopes of the John Crow Mountains at about 400 m. elevation, *Britton 4194* (NY).

DISTRIBUTION: Jamaica (John Crow Mountains).

6. *Pratia Tatea* F. E. Wimmer, *Repert. Sp. Nov.* 29: 51.
pl. 115, f. 1. 1931.

Plants herbaceous, terrestrial, glabrous, erect; leaves a little fleshy, green, paler beneath, the blades elliptic to oblong-obovate, about 6 cm. broad by 18 cm. long, on a petiole 1-2 cm. long, short-acuminate at tip, narrowed at base and attenuate into the petiole, the margin closely denticulate, the teeth callose, about 0.75 mm. long, about 10 per cm., the veins prominent on the lower surface; inflorescence 20-30 cm. long, many-flowered, subsecund; pedicels spreading-ascending with the apex erect, 4-5 cm. long in flower, ebracteate; flower-bracts oblong to lanceolate, leafy, shortly petiolate, 2-4 cm. long; corolla 45 mm. long, roseate with purple lobes (when dry), the tube curved, cleft dorsally to the base, the limb 5-parted (not 2-lipped), the lobes sublinear from a broader base, cuspidate, scarcely 2 mm. wide, about 15 mm. long; filament-tube 4 cm. long, the filaments free from the corolla, distinct at base and there hairy; anther-tube 9 mm. long, beset with brownish hairs; hypanthium subglobose, 4 mm. high and 6 mm. broad (when pressed); mature fruit unknown; calyx-lobes narrowly triangular, erect, acute, denticulate, 5 mm. long; seeds unknown.

TYPE LOCALITY: Near Chontales, Nicaragua, *R. Tate 194* (Kew).

DISTRIBUTION: Known only from the type locality.

7. *Pratia calochlamys* (Donn. Smith) F. E. Wimmer, *Repert.*
Sp. Nov. 29: 50. 1931.

Centropogon calochlamys Donn. Smith, *Bot. Gaz.* 46: 112. 1908.

Plants terrestrial, herbaceous, entirely glabrous; stems simple, erect, up to 6 mm. in diameter, 20-40 cm. high; leaves entire, 20 or fewer, papery when dry, the blades elliptic or ovate, 2.5-4.5 cm. wide, 7-15 cm. long, 2-4 times as long as wide, on stout petioles 1-3 cm. long, the base of the blade acute, attenuate into the petiole, the apex abruptly or gradually acuminate, the margins evenly serrate with 2-10 sharp purplish teeth per cm.; inflorescence 10 cm. long or less, the bases of the pedicels often approximate; flowers 1-10, in the axils of the little-reduced upper leaves or the flower-bracts much reduced in size; pedicels slender, up to about 1 mm. in diameter, 35-77 mm. long in fruit, each with two inconspicuous fibrous bracteoles 1-2 mm. long, at the base of the pedicel or as much as 20 mm. above the base;

flower 4–5.5 cm. long, including hypanthium; corolla "bright red tinged with purple" (*Johnson 299*), glabrous without, clothed within with short colorless inflated hairs, the tube 22–26 mm. long, slightly curved, broadest at base and slightly contracted toward the apex, cleft dorsally to a point 4–5.5 mm. from the base, the lobes long-attenuate, the two upper ones erect, 3–4 mm. wide at base, 18–20 mm. long, the three lower lobes slightly recurved, fused into a distinct lower lip, the lobes 7–10 mm. long, the lip about 15 mm. long; filament-tube 25–31 mm. long, the filaments pubescent their whole length with stiff short whitish hairs, entirely free from the corolla; anther-tube 7–8 mm. long, bluish-gray, glabrous, the two shorter anthers densely white-tufted at apex; hypanthium in anthesis broadly campanulate or hemispheric, enlarging in fruit; fruit hemispheric, not inflated, about 8 mm. broad by 6 mm. high, the free purple rim of the hypanthium surpassing it by 1.5 mm.; calyx-lobes deltoid or ovate, acute or subacute at tip, conspicuously toothed, often purplish, 5–12 mm. broad at base, 11–18 mm. long, often overlapping at base; seeds light brown, ellipsoid or oblong, much flattened, shallowly pitted-reticulate, about 0.6–1.0 mm. long by 0.5–0.7 mm. wide.

TYPE LOCALITY: Mountain forests near Cobán, Guatemala, *von Türckheim II 1893* (US).
DISTRIBUTION: Central Guatemala (Alta Verapaz).

8. *Pratia guatemalensis* (Donn. Smith) F. E. Wimmer,
Repert. Sp. Nov. 29: 50. 1931.

Centropogon guatemalensis B. L. Robinson; Donn. Smith, Bot. Gaz. 20: 4. 1895.

Plants terrestrial, herbaceous, entirely glabrous except for a slight puberulence in the axils of the flower-bracts; stems mostly simple, erect, up to 5 mm. in diameter and at least 40 cm. high; leaves cauline, ascending, stiff-papery when dry, abruptly differentiated from the flower-bracts, the blades ovate or broadly elliptic, 4–9 cm. wide by 10–20 cm. long, usually 2–2.5 times as long as wide, on a stout, narrowly margined petiole 2–6 cm. long, the base of the blade acute, attenuate, the apex abruptly short-acuminate, the margins crenate with 3–4 low teeth per cm.; inflorescence 10–17 cm. long, densely 10–25-flowered; pedicels spreading, stiff, up to 1.5 mm. in diameter, 35–40 mm. long in fruit, sometimes purplish, each with 2 filiform bracteoles 1–2 mm. long, at or very near the base; flower-bracts linear or oblong (or the lowermost slightly broader, foliaceous), toothed, acute, 1–3 mm. wide, 10–15 mm. long; flower 5–7 cm. long, including hypanthium; corolla purplish-red when dry, glabrous without, puberulent within and at the base of the lower lip with colorless inflated hairs, the tube 23–30 mm. long, broadest at base, narrowed slightly to the apex, slightly falcate, the dorsal sinus deeper than the lateral ones, extending to a point about 2 cm. from the base or less, the two upper lobes subulate, erect, long-attenuate, 4–6 mm. wide at base, 20–27 mm. long, the three lower lobes united into a distinct lower lip, the lobes linear or narrowly elliptic, acute, 1–2.5 mm. wide, 8–18 mm. long; filament-tube 35–41 mm. long, the filaments densely clothed their whole length with inflated hairs like those of the corolla, distinct at base, entirely free from the corolla; anther-tube 7.5–8.5 mm. long, dark bluish-gray when dry, the two shorter anthers densely white-tufted at tips, the anthers otherwise glabrous, or sparsely tufted at base and near apex and occasionally with stiff hairs on the backs; hypanthium in anthesis short-campanulate, often purplish, in fruit enlarging slightly, about as wide as high, about 6 mm. in diameter, forming a rim about 2 mm. wide above the attachment of the ovary; mature fruit not seen; calyx-lobes deltoid or narrower, blunt or subacute, obscurely denticulate, 4–5 mm. broad at base, 5–7 mm. long; seeds not seen.

TYPE LOCALITY: "Pansamalá forest, Depart. Alta Verapaz, Guat.," *von Türckheim* (pl. guat. J. D. Sm. 728) (US).
DISTRIBUTION: Central Guatemala (Alta Verapaz, Baja Verapaz).

14. *CENTROPOGON* Presl, Prodr. Mon. Lob. 48. 1836.

Plants terrestrial, herbaceous, suffrutescent or shrubby. Leaves cauline. Flowers in the axils of the upper leaves or of much reduced bracts. Corolla usually red, varying to orange or pink, rarely yellow or greenish-yellow, the tube straight or curved, usually entire, contracted just above the base, narrowest in the proximal third and thence gradually enlarged to the apex, the distal part often much inflated. Filaments distinct at base for a distance about

equaling the length of the narrow basal portion of the corolla, and there adherent to the corolla. Orifice of anther-tube partially closed by the incurved tips of the longer anthers, the two shorter anthers white-tufted at tips with stiff hairs, or the hairs wholly or partially conerescent into a triangular cartilaginous appendage. Ovary bilocular, the placenta axile. Summit of ovary flat or nearly so. Style not jointed, withering-persistent, with the stamens and corolla, on the fruit. Fruit fleshy, often inflated at maturity, globose or nearly so, indehiscent. Seeds lenticular, slightly or not at all longer than wide, 0.5-0.7 mm. long, minutely foveate-reticulate, the reticulations little or not at all elongated.

Type species, *Lobelia surinamensis* L.

Two shorter anthers appendaged at tip with a triangular scale of conerescent hairs, this 1.5-3 mm. long.

Corolla smooth and glabrous without (rarely with soft white hairs on the principal veins) except near the tips of the lobes, where are borne stiff whitish marginal hairs 0.5-0.8 mm. long (these sometimes entirely wanting in South American plants); flowers borne in a loose raceme in the axils of the unchanged (or very slightly reduced) upper leaves; calyx-lobes linear-subulate, (8.5) 10-20 mm. long.

Corolla pubescent to papillose without, or nearly glabrous, at least the tips of the lobes bristly-pubescent with the hairs somewhat enlarged at base and not more than 0.3 mm. in length; flowers crowded in the axils of reduced foliaceous bracts much smaller than the sterile leaves (the very lowest bract sometimes larger); calyx-lobes various.

Inflorescence appearing pedunculate, the stem naked for a distance of (3) 5-18 cm. below the lowest fertile bract; raceme very densely crowded, usually pendent; pedicels deciduous from the axis at maturity, leaving conspicuous roundish scars at the base of the spike; lowermost bract usually much smaller than the foliage leaves; terminal appendage of anthers 2.5-3 mm. long.

Inflorescence not appearing pedunculate, the uppermost foliage leaves similar to the lowest bract or much surpassing the inflorescence; raceme erect, the pedicels and bracts persistent; terminal appendage of anthers 1.5-2 (rarely 2.5) mm. long.

Corolla-tube 25-30 (33) mm. long, abruptly bent about the middle and abruptly inflated above the bend; inflorescence usually much overtopped by the upper foliage leaves.

Corolla-tube (35) 40-50 mm. long, straight or somewhat curved, gradually enlarged from base to apex, usually not abruptly bent nor inflated; inflorescence equaling or exceeding the uppermost leaves.

Two shorter anthers white-tufted at tips, the hairs not conerescent into a triangular appendage.

Inflorescence and lower surface of leaves bearing yellowish or brownish, conspicuously several-branched hairs.

Plants glabrous or with simple hairs.

Corolla pale greenish-yellow or cream-colored; anther-tube 13-15 mm. long; corolla-tube 19-21 mm. long, broad, its minimum width when pressed about 7 mm.

Corolla scarlet, red, purplish-red or rose-color, sometimes with orange or yellow lobes; anther-tube 3.5-8.5 (11) mm. long; corolla-tube usually narrow and elongated.

Filament-tube 50-56 mm. long; two upper corolla-lobes erect or nearly so, their outer surface conspicuously fringed.

Filament-tube 45 mm. long or less, if longer the two upper corolla-lobes falcate and strongly recurved; outer surface of corolla-lobes glabrous or short-pubescent.

Plants conspicuously short-hirsute-pubescent at least above.

Hairs whitish or sordid; leaves sharply and finely serrate.

Hairs yellow or yellowish-brown; leaves inconspicuously impressed-crenate.

Plants glabrous or sparsely pubescent in the young growth and on the lower surfaces of the leaves, never hirsute.

Corolla-lobes strongly decurved-falcate, acuminate, the two upper ones much the longest, 11-14 mm. long; filament-tube mostly 40-45 mm. long, hairy nearly its entire length and especially distally; young growth densely covered with minute soft crisped light-brown hairs.

Corolla-lobes straight or slightly curved outward, never decurved-falcate, the two upper ones usually less than 10 mm. long; filament-tube glabrous, the length various; pubescence various.

Plants glabrous throughout; pedicels ebracteolate; calyx-lobes 2-4 mm. long, green; anther-tube 3.5-4.0 mm. long; native of the Lesser Antilles.

1. *C. cornutus*.

4. *C. granulosus*.

3. *C. macrophyllus*.

2. *C. solanifolius*.

14. *C. ferrugineus*.

5. *C. Smithii*.

11. *C. Gutierrezii*.

6. *C. palmanus*.

13. *C. Wimmerii*.

12. *C. grandidentatus*.

9. *C. Berlerianus*.

Plants usually slightly pubescent, at least on the corolla or the lower surface of the leaves; pedicels bibracteolate (rarely ebracteolate in *C. costaricae*); calyx-lobes 4 mm. long or more (if less than 5 mm. long, purplish); anther-tube 5.5 mm. long or more; natives of Mexico and Central America.

Hypanthium in anthesis turbinate or campanulate, acute at base; corolla-tube 40-48 mm. long.

Hypanthium in anthesis hemispheric or cylindrical, rounded at base; corolla-tube mostly 20-32 mm. long.

Hypanthium hemispheric, as wide as high or wider, when pressed (in bud and in anthesis), usually pubescent; calyx-lobes and hypanthium green; calyx-lobes (5) 7-13 mm. long, mostly appressed in flower, often loosely spreading at maturity, but never with symmetrically out-curved tips; corolla puberulent without; margins of leaves sinuate, subtentire to coarsely toothed, lacking slender sharp purplish spiny teeth.

Hypanthium cylindrical, rounded at base, about 1.5 times as high as wide when pressed (in bud and in anthesis), glabrous; calyx-lobes and hypanthium purplish; calyx-lobes 5-7 mm. long, appressed in flower and fruit, but with the tips usually curled outward into a ring; corolla glabrous; margins of leaves with 5-10 sharp slender purplish teeth per cm. and sometimes coarsely toothed in addition.

10. *C. radicans*.

8. *C. cordifolius*.

7. *C. costaricae*.

Section 1. Eucentropogon Benth. & Hook. Gen. Pl. 2: 547. 1876. The two shorter anthers appendaged at tip with a triangular scale of conerescent hairs.

**1. Centropogon cornutus (L.) Druce, Rep. Bot. Exch. Club
3: 416. 1914.**

Lobelia cornuta L. Sp. Pl. 930. 1753.

Lobelia surinamensis L. Sp. Pl. ed. 2. 1320. 1763. (Type from Surinam.)

Lobelia obscura L. Pl. Surin. 14. 1775. (Type from Surinam.)

Lobelia laevigata L. f. Suppl. 392. 1781. (Surinam, Dalberg.)

Lobelia Andropogon Cav. Anal. Hist. Nat. 2: 106. 1800. (Type from Ecuador, Née.)

Lobelia spectabilis H. B. K. Nov. Gen. & Sp. 3: 306. 1819. (Type from Venezuela.)

Lobelia purpurea Vell. Fl. Flum. Ic. 8: pl. 156. "1827." (Type from Brazil.)

Siphocampylus macranthus Pohl, Pl. Bras. Ic. 2: 105, pl. 168. 1831. (Type from Brazil.)

Siphocampylus spectabilis G. Don, Gen. Hist. 3: 702. 1834.

Siphocampylus surinamensis G. Don, Gen. Hist. 3: 702. 1834.

Siphocampylus Andropogon G. Don, Gen. Hist. 3: 703. 1834.

Centropogon surinamensis Presl, Prodr. Mon. Lob. 48. 1836.

?*Centropogon edulis* Presl, Prodr. Mon. Lob. 48. 1836. (Norren nudum.)

?*Lobelia edulis* L., ex Presl, Prodr. Mon. Lob. 48, as syn. 1836.

Centropogon laevigatus A. DC. in DC. Prodr. 7: 344. 1839.

Centropogon? *Andropogon* A. DC. in DC. Prodr. 7: 345. 1839.

Lobelia sphaerocarpa Juss.; A. DC. in DC. Prodr. 7: 345, as syn. 1839.

Centropogon fastuosum H. Jacq. Ann. Fl. Pom. II. 3: 118. 1845.

Terrestrial, herbaceous or slightly woody at base; stems simple or branched, erect or trailing, glabrous below, bristly-pubescent in the inflorescence, fistulous, coarse, up to 2.5 m. high; leaves 20 (?) or fewer, spreading, the upper ones usually plainly reduced in size; blades thin, papery or membranous when dry, glabrous above, glabrous or minutely scaberulent on the veins beneath, 2.5-6.5 cm. wide, 10-20 cm. long, usually 2-3 times as long as wide, the base rounded, abruptly narrowed and then attenuate into a stout petiole 0.5-2 cm. long, the apex acute or acuminate, the margins usually appearing subtentire, obscurely denticulate with 3-8 small sharp callose teeth per cm.; inflorescence few-15 (30) cm. long, the few-20 flowers in the axils of the upper leaves; inflorescence erect or essentially so, not pedunculate; pedicels spreading, weak, up to 1 mm. in diameter, (35) 45-70 (95) mm. long in fruit, sparsely or densely short-bristly-pubescent; bracteoles linear-filiform, glabrous or essentially so, 4-10 mm. long, at the base of the pedicel or as much as 6 mm. above it; flower 6-8 cm. long, including hypanthium and stamens; corolla odorless (according to Broadway), red or pink, the lobes often white (rarely the whole corolla white), glabrous within, glabrous without or with scattered stiff whitish

hairs along the principal veins, the margins of the lobes usually bearing prominent stiff whitish hairs 0.5-0.8 mm. long, the tube 35-41 mm. long, falcate, abruptly bent at or near the middle, narrowest near the base and very gradually enlarged upward, the lobes falcate, deltoid, 3-5 mm. wide at base, acuminate, the two upper ones curled outward into a ring, 7-9 (?) mm. long, the others slightly shorter; filament-tube 46-60 mm. long, white, distally pink, glabrous or sparsely pilose distally, the filaments distinct at base and united to the corolla-tube; anther-tube 7.5-9.5 mm. long, light gray to deep green, brown, or purplish, scarcely or not at all incurved, the anthers densely hirsute, especially along the connectives and at base and apex, with long (up to 3 mm.) white, pinkish, or purple hairs, the hairs at apex of the two shorter anthers crescent into a narrowly triangular scale-like process about 3 mm. long; hypanthium in anthesis hemispheric or flattened at base, glabrous to bristly pubescent, in fruit becoming a dry (?) berry, scarcely inflated, depressed-globose, slightly broader than high, 10-12 mm. in diameter; calyx-lobes lanceolate or linear-subulate, attenuate, toothed and usually bristly as well, 1-3 mm. wide at base, 8.5-20 mm. long; seeds flattened, with rounded edges, about 0.7 mm. in diameter, circular or nearly so in outline, foveate-reticulate.

TYPE LOCALITY: French Guiana (?) ("Habitat in Cayenna").

DISTRIBUTION: Zempoaltepetl, Oaxaca; Panama and the Lesser Antilles; throughout northern South America, especially in the lowlands, to Bolivia and southern Brazil.

ILLUSTRATIONS: Loisel. Herb. Gén. Amat. pl. 149; Rev. Hortie. IV. 2: pl. 10; Paxton's Mag. Bot. 13: 149; Bot. Mag. pl. 225; Ann. Soc. Agr. Bot. Gand 2: pl. 96; Bonpl. Descr. Pl. Rar. Malm. pl. 39.

2. *Centropogon solanifolius* Benth. Pl. Hartw. 139. 1844.

Centropogon prostratus Benth. Pl. Hartw. 212. 1845. (Hartweg, Kew!)

Centropogon discolor Kunth & Bouché; Kunth, Ann. Sci. Nat. III. 9: 316, ex char. 1848.

Centropogon speciosus Planch. Fl. Serres 6: 16. 1850.

Centropogon longipes Regel, Gartenfl. 3: 3, pl. 75. 1854. (Described from a cultivated plant.)

Centropogon solanifolius var. *hirtellus* F. E. Wimmer, Ann. Naturh. Mus. Wien 46: 241. 1933. (*Cufodontis* 285.)

Centropogon Austin-Smithii Standley, Field Mus. Publ. Bot. 18: 1409. 1938. (*Austin Smith* 437, Field!)

Terrestrial, herbaceous or slightly woody at base; stems weak, erect or suberect, glabrous, or prickly-pubescent in the inflorescence only, 0.6-1.5 m. high; leaves relatively few, the upper ones mostly slightly reduced in size; blades thin, green or purplish beneath, papery or membranaceous when dry, glabrous above, glabrous to minutely scaberulent or bristly-pubescent beneath (the latter especially on the veins), 2.5-6 cm. wide, 9-15 cm. long, usually 2.5-4 times as long as wide, on a stout petiole 1-3 cm. long, ovate or broadly elliptic, the apex acute, with a short deltoid-acuminate tip, the base varying from cuneate to obtuse, the margins obscurely serrate or crenate with 1-4 yellow or purplish callosities per cm., the callosities slightly depressed, or slightly projecting; inflorescence erect, 12 cm. long or less (rarely up to 35 cm. and if so the flower-bracts much smaller than the adjacent foliage leaves), often subcapitate, closely 5-15-flowered, not appearing pedunculate, the upper foliage-leaves usually gradually reduced in size up to the inflorescence; pedicels spreading, weak, 18-25 (50) mm. long in fruit, sparsely to densely short-bristly-pubescent, each with two filiform bracteoles 2-4 mm. long, 10 mm. or less above the base of the pedicel; flower-bracts foliaceous, the lowermost usually not distinguishable from a reduced foliage-leaf, the upper bracts ovate or broadly elliptic, 4-10 (25) mm. wide, 10-25 (50) mm. long, toothed; flower 4.5-7 cm. long, including hypanthium and stamens; corolla "scarlet-red" (according to Austin Smith), "scarlet" (Austin Smith, Standley), "bright red," "crimson" (Stork), the lobes "orange," "yellow," or "salmon chrome" (Austin Smith), glabrous within, the outer surface glabrous, puberulent, or sparingly bristly, the hairs usually little-enlarged at base, and nearly colorless, the lobes prickly near tips on margin, with conical hairs 0.3 mm. long or less, the tube 35-47 mm. long, slightly curved, narrowest in the proximal third and gradually enlarged to the base of the lobes, usually not abruptly enlarged nor bent, the lobes acute to acuminate, falcate, the two upper ones oblong, 2.5-5.0 mm. wide at base, 7-12 mm. long, conspicuously decurved near the apex, the lateral and lower lobes shorter, deltoid, 5-8 mm. long; filament-tube (3?) 43-56 mm. long, much exserted, yellowish, glabrous (rarely sparsely hirsute at the very base of the anther-tube), the filaments distinct below and fused to the corolla tube for about 10 mm. from the base, anther-tube 6.0-8.5 mm. long, violet-gray with darker stripes (according to Austin Smith) or lead

color (according to Penland), slightly or not at all incurved, the two shorter anthers densely white-tufted at tips, the hairs conerescent into a deltoid process 1.5–2 mm. long, the anthers glabrous on backs or sparsely hirsute on the connectives, especially near base and apex; hypanthium in anthesis hemispheric, the base usually flattened, glabrous to bristly-pubescent, in fruit becoming a (dry?) berry, scarcely inflated, broader than high, 7–12 mm. in diameter; calyx-lobes lanceolate or narrowly deltoid, rounded or somewhat dilated at base, tapering gradually to a long-acute tip, glabrous or bristly-pubescent, entire or sparingly denticulate, 1.5–2 mm. wide at base, 3.5–7.5 (9) mm. long; seeds about as long as wide, flattened, with obtusely rounded edges, pale brown, conspicuously foveate-reticulate, their greatest length about 0.7 mm.

TYPE LOCALITY: Ecuador ("In montibus Paccha"), *Hartweg 779* (Kew!).

DISTRIBUTION: Costa Rica, at elevations of 1300–3000 m.; in the Andes from Ecuador to Colombia and Venezuela.

3. *Centropogon macrophyllus* (G. Don) F. E. Wimmer, Notizbl.

Bot. Gart. Berlin 10: 733. 1929.

Siphocampylus macrophyllus G. Don, Gen. Hist. 3: 704. 1834.

Represented in North America by the following variety.

3a. *Centropogon macrophyllus* var. *congestus* (Gleason) McVaugh, Ann. Mo.

Bot. Gard. 27: 352. 1940.

Centropogon congestus Gleason, Bull. Torrey Club 52: 52. 1925.

Centropogon diocteus F. E. Wimmer, Ann. Mo. Bot. Gard. 24: 209. 1937. (*Seibert 166*, isotype, Mo. Bot. Gard.)

Terrestrial, herbaceous; stems fleshy, coarse, up to 7 mm. in diameter, glabrous below the inflorescence, (0.3) 1–2 m. high, green; cauline leaves large, spreading, papery when dry, green on both sides, glabrous above, pubescent beneath with minute sharp whitish hairs, especially on the veins, the blades broadly elliptic to ovate or obovate, (4.5) 7–11 cm. wide by 11–30 cm. long, mostly 1.5–2.5 (5) times as long as wide, the tip abruptly deltoid-acuminate, the base acute, long-attenuate, narrowed to a margined petiole 1–4 cm. long, the margins irregularly dentate, the teeth blunt or subacute, the callosities 4–7 per cm., terminating the teeth which vary in size; inflorescence 5–12 cm. long, rather densely few–25-flowered, terminal or subterminal; pedicels stout, up to 1.5 mm. in diameter, loose and spreading in fruit, minutely sharp-pubescent, 30–40 mm. long in fruit, each with a pair of linear bracteoles 1 mm. wide by 6–11 mm. long, 10–15 mm. above the base of the pedicel; flower bracts foliaceous, similar to the leaves in aspect but strikingly smaller, 2–4 cm. wide, 4–9 cm. long, petiolate; foliage leaves often in a terminal tuft above the inflorescence; flower about 5 cm. long, including hypanthium; corolla "scarlet," "pale cerise," or "pink," glabrous within, bristly-pubescent without, the tube 30–33 mm. long, abruptly bent just above the middle, cylindrical below the curve, 4–6 mm. wide when pressed, inflated and ellipsoid above the bend, the lobes attenuate, somewhat falcate, the two upper 3–4.5 mm. wide at base, 5–10 mm. long, the lateral and lower lobes similar, often deltoid, 3–4 mm. wide, 4–7.5 mm. long; filament-tube 35–38 mm. long, slightly hairy at apex, almost wholly included in the corolla-tube and abruptly curved with it, the filaments fused to the corolla-tube near base; anther-tube 6–7 mm. long, the anthers glabrous on backs or with a few stiff hairs, the two shorter anthers with terminal tufts all the hairs of which are conerescent into a narrowly triangular scale 1.5–2.5 mm. long; hypanthium pubescent, in anthesis cup-shaped, the base truncate; fruit subglobose (?), a dry (?) scarcely inflated berry 12–15 mm. in diameter; calyx-lobes narrowly triangular or oblong, acute, entire, bristly-pubescent, 3–3.5 mm. wide at base, 11–15 mm. long; seeds lenticular, slightly longer than wide, foveate-reticulate, about 0.6 mm. long, light-brown.

TYPE LOCALITY: Pereira, Departamento de Caldas, Colombia, altitude 1400–1500 m., *Pennell 10169* (NY).

DISTRIBUTION: Mountains of Colombia and western Panama.

NOTE: Typical *Centropogon macrophyllus* occurs in Peru and Bolivia and may be distinguished by the essentially glabrous hypanthium and corolla and by the smaller and more uniform teeth of the leaf-blades.

4. *Centropogon granulatus* Presl, Prodr. Mon. Lob. 49. 1836.

Centropogon cuspidatus A. DC. in DC. Prodr. 7: 346. 1839. (*Dombey*, herb. Paris.)

Centropogon densiflorus Benth. Pl. Hartw. 138. 1844. (*Hartweg* 775, Kew!)

Centropogon rubens Planch. & Oerst. Vidensk. Meddel. 1857: 186. 1857. (Type from Costa Rica.)

Siphocampylus corymbiferus K. Koch. Wochenchr. Gartn. 7: 60. 1864. (Type from Costa Rica.)

Centropogon Warszewiczii Vatke. Linnaea 38: 746. 1874. (Based on *Siphocampylus corymbiferus*

K. Koch.) Not *Centropogon Warszewiczii* Van Houtte; Regel, 1858.

Centropogon luteus F. E. Wimmer. Repert. Sp. Nov. 22: 217. 1926. (*Pittier* 16033, photo.)

Centropogon enavus F. E. Wimmer. Repert. Sp. Nov. 38: 8. 1935. (*Brade* 2395, photo.)

Centropogon angustatus F. E. Wimmer. Repert. Sp. Nov. 38: 9. 1935. (*Polakowsky* 431, herb.

Berlin.)

Terrestrial, herbaceous, or slightly woody at base; stems weak, reclining or scandent, glabrous, granular-scabrous above or pubescent in the inflorescence only, up to 2.5 m. high; leaves relatively low, large, the upper ones usually not reduced in size, the blades thin, papery when dry, green, or purple beneath, glabrous above, minutely scaberulent beneath, especially on the veins, (3) 5.5-13 cm. wide by 12-32 cm. long, usually about twice as long as wide, on distinct stout petioles 1-2.5 cm. long, varying from ovate, broadly elliptic or oblong to suborbicular, the apex acute, often short-acuminate, the base rounded, varying to cuneate or subcordate, the margins subentire, sinuate erenate, the yellowish callosities slightly projecting beyond the margins as teeth, or slightly depressed, 1-4 per cm.; inflorescence 15 cm. long or less, often subcapitate, densely few-25- (100-) flowered, the mature naked axis covered closely by the prominent roundish scars of the fallen flowers, appearing pedunculate, the stem naked below the lowest bract for a distance of 3-18 cm., the inflorescence often abruptly recurved and pendent, pedicels ascending-spreading, weak, 10-40 mm. long in fruit, short-bristly-pubescent, each normally with two short filiform bracteoles at or near the base; flower-bracts foliaceous but differing markedly in size from the foliage-leaves, oblong to ovate, 2-10 mm. wide, 10-24 mm. long, minutely toothed; flower 5.5-7 cm. long, including hypanthium and stamens; corolla "cardinal red," "orange red," "bright red," or "scarlet," the lobes usually yellow ("cadmium-orange") within?, glabrous within, thickly covered (rarely sparsely covered) without with short conic-inflated sharp hairs the same color as the corolla itself, the tube 2-30 mm. long, abruptly curved in bud, strongly curved to nearly straight in anthesis, narrowest in the proximal third and gradually enlarged to a point somewhat above the middle, where abruptly enlarged to its maximum width (when pressed, 8-15 mm.), the lobes deltoid-acuminate, falcate, the distal part of the corolla strongly curved so that the united tips of the lobes form, in the bud, a distinct curved beak, the two upper lobes 4-5 mm. wide at base, 8-12 mm. long, the lateral and lower lobes similar, shorter, 4-8 mm. long; filament-tube 40-55 mm. long, much exerted, hirsute near tip, glabrous below, the filaments distinct at base and united to the corolla-tube; anther-tube 7-10 mm. long, cream-yellow (according to Austin Smith), incurved, the anthers densely white-tufted at tips, the hairs of the terminal tufts of the two shorter anthers confluent into a deltoid scale 2.5-3 mm. long, the backs of the anthers sparsely to densely hirsute in lines with white or pinkish hairs which may be 4 mm. long; hypanthium in anthesis hemispheric, rough bristly or nearly smooth; fruit a depressed-globose, scarcely fleshy "berry," broader than high, up to about 12 mm. in diameter; calyx-lobes linear, bristly-pubescent, acute at tip, entire or minutely callose-denticulate, 1-2.5 mm. wide, (4) 6-16 mm. long; seeds lenticular, about 0.7 mm. in diameter, foveate-reticulate, nearly circular in outline.

TYPE LOCALITY: Peru.

DISTRIBUTION: Mountains from Costa Rica to Bolivia.

Section 2. *Siphocampylodes* Benth. & Hook. Gen. Pl. 2: 547. 1876. The two shorter anthers bearing a terminal tuft of white hairs, these not confluent into an appendage.

5. *Centropogon Smithii* F. E. Wimmer, Ann. Naturh. Mus.

Wien 46: 240. 1933.

Siphocampylus discolor Donn. Smith, Bot. Gaz. 23: 248. 1897. Not *Centropogon discolor* Kunth & Bouché, 1848.

Terrestrial, erect, herbaceous or very slightly woody at base from a thickened rhizome; stems mostly simple, glabrous except in the young growth, green or purplish, "shrunkened with

raised hardened longitudinal ridges" (according to Austin Smith), 1-3.5 m. high; leaves large, mostly in a terminal rosette (according to Austin Smith), only the very youngest ones smaller; blades "soft, somewhat thickened, not shining, much lighter green on under side" (Austin Smith), those of the upper leaves 4-18 cm. wide by 15-35 cm. long, usually 2-4 times as long as wide, on stout margined petioles 1-3.5 cm. long, in shape obovate or oblanceolate to broadly elliptic, the apex abruptly narrowed to a short deltoid-acuminate tip, the base cuneate or subacute, decurrent on the petiole, the upper surface glabrous or sparsely scurfy near base, the lower surface covered, especially when young, and particularly on the veins, with soft scurfy hair-like processes which give the veins and all the young growth a pale brown color, the margins somewhat sinuate, and varying from more or less entire to sharply denticulate, the callosities of the margins regularly spaced, obscure, or terminating the teeth, 2-5 per cm.; flowers 7 (more or less?) in the axils of the upper leaves; length of inflorescence unknown; pedicels spreading-ascending, in fruit 2 mm. in diameter, 115-200 mm. long, scurfy when young, glabrous or nearly so at maturity; bracteoles narrowly linear, scurfy, at or near the base of the pedicel, 10-20 mm. long, denticulate; flowers 6-8 cm. long (including hypanthium), with a skunk-like odor (according to Austin Smith); corolla "cream to pale greenish-yellow," "pale green," or "pale yellow green," glabrous within, scurfy-roughened without, the tube 19-21 mm. long, narrowest in the middle and gradually enlarged toward both ends, the minimum width when pressed about 7 mm., the lobes falcate, attenuate, strongly recurved, the two upper ones 4-8 mm. wide at base, 20-40 mm. long, the lateral and lower lobes similar, shorter, 5-7 mm. wide, 16-25 mm. long; filament-tube (31) 40-47 mm. long, the distal half soft-hairy, the filaments free near base and united, at very base, to the corolla-tube; anther-tube 13-15 mm. long, purplish (?), the anthers pilose near base, otherwise glabrous, the two shorter anthers with dense tufts of soft white hairs at tips; hypanthium in anthesis campanulate or turbinate, scurfy, somewhat longer than wide when pressed; fruit depressed-globose, little-inflated, about 17 mm. in diameter by 12 mm. high in the specimens seen, topped by the free rim of the hypanthium which is 3-6 mm. high; calyx-lobes linear-subulate to narrowly triangular, attenuate, scurfy or roughened without, denticulate, 2-4 mm. wide at base, 18-33 mm. long; seeds slightly longer than wide, light brown, flattened, foveate-reticulate.

TYPE LOCALITY: Forests of Rancho Flores, Volcán Barba, Costa Rica, at an elevation of 6700 ft., *Tondus* (herb. nat. C.R. 2149, USI).

DISTRIBUTION: Mountains of Costa Rica, in wet forests at elevations of 1300-2500 m.

6. *Centropogon palmanus* (Donn. Smith) F. E. Wimmer, Repert. Sp. Nov. 38: 7. 1935.

Centropogon nematosepalus var. *palmanus* Donn. Smith, Bot. Gaz. 44: 115. 1907.

Terrestrial, herbaceous; stems simple, procumbent or erect, green or dark purple, 2-4 mm. in diameter, 1 m. high or less, generally pubescent with sharp hollow light-colored jointed hairs; leaves cauline, up to about 25, spreading, papery-thin when dry and slightly lighter in color beneath, the youngest ones somewhat reduced in size; blades ovate, cordate or subcordate at base, abruptly or occasionally gradually acuminate, (1.5) 2-4 cm. broad, 3.5-6.5 cm. long, 1.5-2 times as long as broad, on a stout petiole (0.5) 1-2 cm. long, pubescent on both sides, especially when young, and on the veins beneath, the hairs whitish, often conspicuous, the margins sharply and evenly serrate with 9-12 sharp ascending or spreading teeth per cm., the teeth deltoid or narrower, pubescent; inflorescence few-50 cm. long, often interrupted, the few-15 flowers in the axils of the upper leaves, widely spaced; pedicels spreading and flexuous, up to about 1 mm. in diameter, mostly 60-90 mm. long in fruit, densely pubescent or in age glabrate, each with a pair of minute filiform bracteoles at base; flower 3.5-4.5 cm. long, including hypanthium; corolla "red," "dark red," "crimson," or "carmine," glabrous within, pubescent without with jointed, partially purplish hairs, the hairs particularly dense on the lobes, the tube 24-32 mm. long, straight or very slightly curved, narrowest just above the base, the distal portion very narrowly funnelliform, subcylindric, or fusiform, about 4-6 mm. wide when pressed, the lobes acute, narrow, little or not at all recurved, the two upper ones 1.5-2 mm. wide at base, erect, 6-9 mm. long, the lateral and lower lobes similar, deltoid or narrower, slightly shorter; filament-tube (24) 28-34 mm. long, glabrous, the filaments distinct at base and fused

to the narrow proximal portion of the corolla-tube; anther-tube 4.5-5.5 mm. long, bluish-gray, the two shorter anthers white-tufted at tip, the others with a few stiff hairs near tip; hypanthium in anthesis campanulate, somewhat pubescent, the base rounded or acute, the tube about 1.5 times as long as wide when pressed; fruit a broadly ellipsoid white berry, little or not at all inflated, 8-10 mm. in diameter by 10-12 mm. long; calyx-lobes triangular-subulate, pubescent, callose-denticulate, 1-2 mm. wide at base, 3.5-6 mm. long; seeds lenticular, slightly longer than wide, foveate-reticulate, about 0.6 mm. long.

TYPE LOCALITY: La Palma, Prov. San José, Costa Rica, at an elevation of 1500 m., *Pittier 271* (US!).

DISTRIBUTION: Mountain forests of Costa Rica, at elevations of 1300-1770 m.

7. *Centropogon costaricae* (Vatke) McVaugh, comb. nov.

Siphocampylus Costaricae Vatke, *Linnaea* 38: 730. 1874.

Centropogon porphyrodontus Donn. Smith, *Bot. Gaz.* 44: 114. 1907. (*Pittier*, herb. nat. C.R. 12307, US!)

Centropogon brumalis Standley, *Field Mus. Publ. Bot.* 18: 1410. 1938. (*Standley & Valerio 43984*, US!)

Terrestrial, herbaceous or suffrutescent, the stems weak, subscaudent or erect, often purple, simple or with few ascending branches, glabrous or minutely puberulent, up to about 5 mm. in diameter, about 1 m. high or less; cauline leaves 25(?) or fewer, spreading, stiff-papery when dry, dark green above, yellowish-green below (when dry), those in the young growth smaller; blades ovate, gradually narrowed to a long-acuminate tip, rounded to cordate at base, 2-7 cm. wide, 4-12 cm. long, usually 1.5-2 times as long as wide, on a stout petiole 1-2 cm. long, glabrous above, pubescent beneath with fine sordid hairs, especially on the veins (sometimes practically glabrous), the margins sharply and conspicuously toothed, with 5-10 slender purplish teeth per cm., the teeth at right-angles to the margins or nearly so, up to about 1 mm. long; inflorescence few-35 cm. long, sometimes interrupted, the few-10 flowers widely spaced, in the axils of the upper leaves; pedicels wide-spreading, usually rather stiff, up to about 0.8 mm. in diameter, 55-80 (100) mm. long in fruit, often purple, glabrous, ebracteolate or with two filiform bracteoles at base; flower 3.5-5 cm. long, including hypanthium; corolla purple-red (according to Standley), glabrous, the tube (23) 27-30 mm. long, narrowly cylindrical below, the proximal third about 1-1.5 mm. in diameter, the distal portion rather abruptly inflated, ellipsoid or funiform, varying to cylindrical, 6-8 mm. wide when pressed flat, the lobes linear or linear-subulate, scarcely curved, sharply acute, the upper ones 1.5-2.5 mm. wide at base, 6-11.5 mm. long, the lateral and lower lobes similar, slightly shorter; filament-tube 23-32 mm. long, glabrous, the filaments fused to the narrow basal portion of the corolla-tube; anther-tube 4.5-5.5-6.5 mm. long, light gray (when dry), the two shorter anthers rather sparsely white-tufted at tips, the others with a few hairs on the backs; hypanthium in anthesis campanulate, purplish, glabrous, the tube about 1.5 times as long as wide when pressed, usually rounded at base; fruit a little inflated, white, dry berry, subglobose, about 10 mm. in diameter; calyx-lobes subulate, glabrous, acute, entire or with a few teeth, 1-1.5 mm. wide at base, 4-7 mm. long; seeds oblong-lenticular, about 0.7 mm. long, dark brown, foveate-reticulate.

TYPE LOCALITY: Forests, Volcán de Barba, Costa Rica, *Dr. C. Hoffmann 60* (herb. Berlin, photo.).

DISTRIBUTION: Mountain forests of Costa Rica, at elevations of 1500-3000 m.

Centropogon costaricae forma *dentatus* (Standley) McVaugh, comb. nov. *Centropogon cordifolius* var. *dentatus* F. E. Wimmer, *Standley, Field Mus. Publ. Bot.* 18: 1410. 1938. Leaf blades coarsely and irregularly serrate. TYPE LOCALITY: Socorro de San Ramón, 1300-1400 meters, Costa Rica, *Brenes 4991* (Field!). DISTRIBUTION: Vicinity of San Ramón, Costa Rica.

8. *Centropogon cordifolius* Benth. *Pl. Hartw.* 77. 1841.

Centropogon cordatus Mart. & Gal, *Bull. Acad. Brux.* 9²: 40. 1842. (*Galeotti 1965*.)

Siphocampylus costaricensis Vatke, *Linnaea* 38: 730. 1874. (Based on *Centropogon cordifolius* Benth.)

Terrestrial, herbaceous or woody at base, the stems somewhat branched, straggling, glabrous except in the young growth, green or often dark red, tubulous, up to 5 mm. in diameter, 0.6-1.5 m. high, cauline leaves 20 or fewer, spreading, stiff and papery when dry, conspicuously

light-colored beneath, glabrous above or with a few hairs about the margins and on the veins near base, the lower surface puberulent, at least on the veins, the blades 3-9 cm. wide, 3.5-13 cm. long, 1-1.5 times as long as wide, on stout pubescent petioles 2-5 cm. long, broadly ovate, the tip broadly acuminate, the base cordate or subcordate, the margins irregularly repandentate with few coarse teeth, and lined with regularly spaced, minute callosities (about 5-7 per cm.); the upper leaves similar but smaller; inflorescence few-45 cm. long, sometimes interrupted; flowers few-13, widely spaced, in the axils of the upper leaves; pedicels spreading and flexuous, about 1 mm. in diameter, 40-75 (120) mm. long in fruit, puberulent just below the hypanthium, usually glabrous elsewhere; bracteoles linear, puberulent, 1-5 mm. long, at base of the pedicel or as much as 20 mm. above it; flower 3-5 cm. long, including hypanthium; corolla "rose," "rose-magenta, sometimes red or pink," "red," "deep red," or "scarlet," glabrous within, minutely puberulent without with short pointed erect hairs, these often dark-tipped, the tube 22-32 (40) mm. long, slightly curved near base, narrowest just above the base, where about 1.5 mm. in diameter, thence gradually enlarging, becoming funnel-shaped, the lobes little or not at all recurved, the two upper ones linear or narrowly elliptic, 1.5-3 mm. wide, 6-8 mm. long, the lateral and lower lobes deltoid, acute, 2-5 mm. wide at base, 6-8.5 mm. long; filament-tube (24) 30-35 mm. long, glabrous, the filaments fused to the corolla-tube near base; anther-tube 5.0-6.5 mm. long, bluish-gray, the anthers glabrous or sometimes sparsely hairy near base and along the connectives, the two shorter anthers white-tufted at tip, the hairs mostly about 1 mm. long; hypanthium in anthesis hemispheric, sparsely puberulent, in fruit enlarging, about as broad as high, 7-10 mm. in diameter; fruit a berry (dry?), little-inflated; calyx-lobes linear or subulate, puberulent and callose-denticulate, with blunt tips, 1-2 mm. wide at base, 5-13 mm. long; seeds light brown, flattened, with rounded edges, slightly longer than wide, minutely foveate-reticulate, about 0.6 mm. long.

TYPE LOCALITY: Guatemala ("In regione temperata ad Rancho del Palo hueco"), *Hartweg 539* (Kew!).

DISTRIBUTION: Mountains, Oaxaca to southern Guatemala, mostly at elevations of 1000-2000 m.

ILLUSTRATION: Fl. Serres 4: pl. 362.

9. *Centropogon Berterianus* (Spreng.) A. DC. in DC. Prodr.

7: 345. 1839.

Lobelia Berteriana Spreng. Syst. 1: 712. 1825.

Lobelia scandens Bert.; Spreng. Syst. 1: 712, as syn. 1825.

Siphocampylus Berterianus G. Don, Gen. Hist. 3: 703. 1834.

Terrestrial, glabrous throughout, herbaceous or slightly woody at base, the stems simple, erect or straggling, up to 5 mm. in diameter at base, up to 60 cm. high; leaves cauline, 25 or fewer, spreading, membranaceous, the blades ovate, rounded at base, gradually attenuate at tip, 2-5 cm. wide by 5-12 cm. long (the upper ones slightly smaller), usually 2-2.5 times as long as wide, on slender petioles 1-3 cm. long, the margins serrate or crenate (sometimes coarsely toothed), beset with 3-5 slender callose teeth per cm.; inflorescence few-27 cm. long, the few-12 flowers widely separated, in the axils of the upper leaves; pedicels spreading and flexuous, about 0.5 mm. in diameter, 20-53 mm. long in fruit, ebracteolate; flower 3-3.5 cm. long, including hypanthium; corolla (when dry) purplish-red, the tube 18-20 mm. long, straight and narrow, the proximal third (the part to which the filaments are fused) cylindrical, about 1 mm. in diameter, the remainder broader, narrowly funnel-form or cylindrical, its maximum diameter about 3 mm., the lobes linear or lanceolate, acute, scarcely curved, the two upper ones 1-2 mm. wide at base, 5-6 mm. long, the three other lobes similar, slightly shorter; filament-tube 18.5-21 mm. long, glabrous, the proximal third of the filaments distinct and fused to the corolla-tube; anther-tube 3.5-4.0 mm. long, the anthers glabrous or with a few stiff hairs on the backs, the two shorter anthers densely white-tufted at tips; hypanthium in anthesis campanulate, in fruit becoming subglobose; fruit a scarcely inflated, dry (?) berry 5-7 mm. in diameter; calyx-lobes narrowly triangular or subulate, somewhat dilated at base, obscurely toothed, acute to attenuate, 2-4 mm. long; seeds oblong, somewhat flattened, conspicuously foveate-reticulate, about 0.6 mm. long, little longer than broad.

TYPE LOCALITY: Guadeloupe.

DISTRIBUTION: Mountains of Dominica and Guadeloupe, mostly at elevations of 600-1100 m.

10. *Centropogon radicans* (Kuntze) McVaugh, Ann. Mo.

Bot. Gard. 27: 353. 1940.

Siphocampylus radicans Kuntze, Rev. Gen. 381. 1891.*Siphocampylus roseus* Donn. Smith, Bot. Gaz. 23: 249. 1897. (*Biolley*, herb. nat. C.R. 6922, US!)*Centropogon coccineus* Regel; F. E. Wimmer, Ann. Naturh. Mus. Wien 46: 241. 1933. Not *Siphocampylus coccineus* Hook., 1845.

Terrestrial, herbaceous, the stems trailing, rooting at the nodes, the branches simple, ascending; branches (erect "stems") up to 5 mm. in diameter, up to about 1 m. high, minutely crisp-puberulent except at the very base; cauline leaves up to about 25, spreading, thin-papery when dry, green on both sides, the blades minutely puberulent, especially on the veins beneath, 4.5-7 cm. wide by 7.5-10 cm. long (the upper smaller), usually 1.5-2 times as long as wide, on a stout petiole 2-3 cm. long, ovate, the base rounded and then abruptly attenuate, the apex acute or abruptly short-acuminate, the margins sharply and somewhat irregularly serrate, often doubly serrate, the larger teeth 2-4 per cm., with 1-4 smaller teeth intervening; inflorescence few-30 cm. long, the few-15 flowers in the axils of the gradually reduced upper leaves, widely spaced; pedicels ascending, stoutish, up to 1.5 mm. in diameter, 45-95 mm. long in fruit, puberulent, each with 2 filiform bracteoles 1-2.5 mm. long, at or near the base; flower 5-6.5 cm. long, including hypanthium; corolla red (or scarlet, according to P. H. Allen), glabrous within, puberulent without with minute shining colorless or red-tipped hairs, the tube 40-48 mm. long, straight or nearly so, narrowest just above the base and enlarging gradually into the much longer ellipsoid or fusiform portion, the mouth usually slightly narrowed, the lobes acute, the two upper ones elliptic, 2-3 mm. wide, 4.5-9 mm. long, slightly ascending and (in dried material) appearing as if arising from the dorsal margins of the lateral lobes, the lateral lobes triangular, often deltoid, mostly about 5 mm. long when measured from the lateral sinus, the ventral margins cut much more deeply, the ventral lobe separated from the others, forming a distinct "lip," 3-5 mm. wide, 7-10 mm. long; filament-tube (35) 40-43 mm. long, glabrous, included in the corolla-tube, the filaments distinct at base and fused with the narrow proximal portion of the corolla-tube; anther-tube 6.0-7.5 mm. long, the two shorter anthers densely tufted at apex, the others somewhat tufted near the tips, glabrous or sparsely hairy on backs; hypanthium in anthesis turbinate or campanulate, acute at base, puberulent, 2.5-6 mm. wide when pressed, in fruit enlarging, becoming subglobose; fruit a little-inflated, dry (?) berry, subglobose or broadly ellipsoid, 10-15 mm. long, as broad as long or slightly less than this; calyx-lobes linear-attenuate, puberulent, toothed, 1-1.5 mm. wide by 7-9 mm. long; seeds light-brown, lenticular, slightly longer than wide, plainly foveate-reticulate, about 0.6 mm. long.

TYPE LOCALITY: Eastern Costa Rica, at an elevation of 400 m., *Kuntze* (NY!).

DISTRIBUTION: Panama and Costa Rica, usually at elevations of 1000 m. or less.

11. *Centropogon Gutierrezii* (Planch. & Oerst.) F. E. Wimmer,

Repert. Sp. Nov. 22: 202. 1926.

Siphocampylus Gutierrezii Planch. & Oerst. Vidensk. Meddel. 1857: 155. 1857.*Siphocampylus thysanopetalus* Vatke, Linnaea 38: 731. 1874. (*Warszewicz* 13.)

Terrestrial, herbaceous; stems erect or procurrent, glabrous below the inflorescence, up to at least 1 m. high, fistulose, up to 6 mm. in diameter or more; leaves mostly 15-20, the upper little or not at all reduced in size, the blades thick, stiff and papery when dry, darker above than beneath, glabrous above, bearing numerous delicate sharp colorless hairs on the veins beneath, 2.5-4.5 cm. wide, 6-12 cm. long, usually 2.5-3 times as long as wide, on a distinct stout hairy petiole 1-2.3 cm. long; shape of blade ovate or less often oblong-ovate, the tip acute, sharp, the base conspicuously rounded or merely obtuse, the margins conspicuously serrate, with 5-10 slender spreading teeth per cm., the teeth very sharp, ascending to recurved; inflorescence up to 23 cm. long, sometimes interrupted, the flowers few-12, loosely spaced, in the axils of the upper leaves; pedicels ascending in anthesis, in fruit widely spreading, fleshy, up to 2 mm. in diameter, 60-120 mm. long, glabrous except just below the hypanthium, where pubescent; bracteoles linear, acutely pointed, at the base of the pedicel or 3/6 mm. above it, 1-2 mm. wide by 5-10 mm. long, obscurely toothed, bearing numerous hairs on the margins, flower 7.5-8.5 cm. long, including hypanthium; corolla rose (according to *Budley*) or deep lavender (according to P. H. Allen), glabrous within, sparsely hairy without except near the

tips of the lobes, where the hairs and enlarged hairlike processes are densely aggregated and form a conspicuous fringe, the tube 36–43 mm. long, practically straight, slightly contracted above the base and then gradually enlarged to the mouth (maximum width, when pressed flat, about 10 mm.), the lobes linear or nearly so, acute, not at all or but slightly curved, the two upper lobes 2–2.5 mm. wide, 20–30 mm. long, the three lower lobes similar, slightly shorter; filament-tube 50–56 mm. long, longer than the corolla-tube but scarcely appearing exerted because of the semi-erect corolla-lobes, glabrous, the filaments distinct at base and fused to the corolla-tube; anther-tube 8–11 mm. long, bluish-gray, the anthers glabrous, the two shorter anthers prominently white-tufted at tip, the hairs 2 mm. long or less; hypanthium in anthesis turbinate, obtuse at base, thence widened for about four-fifths of its length and then somewhat contracted to the base of the lobes, its outer surface sparsely hairy, the hairs like those of the leaves; fruit “bladdery” (according to H. E. Stork), not seen; calyx-lobes linear or linear-subulate, acute, obscurely or plainly toothed, hairy on the backs and margins, 1.5–3 mm. wide at base, 10–18 mm. long, fused at base, forming a rim 1–3 mm. wide above the free part of the ovary; seeds about as in *C. solanifolius*.

TYPE LOCALITY: Oak zone, at an elevation of 9000 ft., Volcán de Irazú, Costa Rica, *Oersted pl. centroam.* 9239 (Copenhagen!).

DISTRIBUTION: Mountain forests, Costa Rica, at elevations of 2500 m. and above.

12. *Centropogon grandidentatus* (Schlecht.) Zahlbr. Ann. Naturh. Mus. Wien 6: 439. 1891.

Lobelia grandidentata Schlecht. Linnaea 9: 262. 1834.

Terrestrial, herbaceous or suffrutescent, the stems simple, erect or decumbent, 0.9–1.2 (3) m. high, up to at least 5 mm. in diameter, glabrous below, the young growth densely covered with minute soft, crisped light-brown hairs; cauline leaves up to about 25, spreading, thin-papery or membranous when dry and slightly lighter green beneath, the blades sparsely puberulent above, the lower surface sparsely puberulent, the veins conspicuously so, especially in young leaves; inflorescence few–35 cm. long, the few–20 flowers in the axils of the upper leaves, widely spaced; pedicels spreading and flexuous, up to 1.5 mm. in diameter, in fruit (55) 60–80 (110) mm. long, pubescent at least distally; bracteoles at the base of the pedicel or as much as 10 mm. above it, linear-filiform, glabrate, 3 mm. long or less; flower 5–6 cm. long, including hypanthium; corolla “orange-red,” “red,” “pale red,” “dull red,” or “rose-red,” or the lobes yellow, “greenish-yellow,” or “paler orange,” glabrous within, sparingly puberulent without, the tube (19) 25–32 mm. long, straight or but slightly curved, narrowest just above the base (about 1.5–2 mm. in diameter), thence gradually enlarging to the mouth, becoming narrowly funnel-shaped, the lobes strongly recurved-falcate, acuminate, the two upper ones much longer than the others, 3–4 mm. wide at base, 11–14 mm. long, the lateral lobes similar, 5–10 mm. long; filament-tube (32) 40–45 (51) mm. long, hairy nearly its entire length, but especially distally, the filaments distinct at base for a distance equaling the narrow part of the corolla-tube, to which they are attached; anther-tube 6.5–8.0 mm. long, dull “bluish-black” or bluish-gray, the anthers glabrous except for a few coarse stiff hairs on the backs, or these wanting, the two shorter anthers densely white-tufted at tips; hypanthium puberulent, in anthesis hemispheric, varying to a form with truncate base, the mouth narrowed and the width greater than the depth; fruit a dry (?), little inflated berry 7–10 mm. in diameter; calyx-lobes deltoid or narrowly triangular, usually dilated at base and sparingly callose-denticulate, acute, pubescent or nearly glabrous, 1.5–5 mm. long; seeds oblong-ellipsoid, somewhat flattened, foveate-reticulate, 0.5–0.7 mm. long, light brown.

TYPE LOCALITY: “Mexico, Cuesta Grande de Chiconquiaco,” *Schiede 186* (isotype, Mo. Bot. Gard.).

12a. *Centropogon grandidentatus* var. *diversidens* F. E. Wimmer, Repert. Sp. Nov. 19: 244. 1924.

Lobelia grandidentata Schlecht. loc. cit., as to type.

Siphocampylus? grandidentatus A. DC. in DC. Prodr. 7: 407. 1839.

Centropogon affine Mart. & Gal. Bull. Acad. Brux. 92: 40. 1842. (*Galeotti 1966*, herb. Vienna, photo.)

Laurentia insignis Brand. Univ. Calif. Publ. Bot. 4: 388. 1913. (*Purpus* 6227, U. of Calif.!)
Centropogon grandidentatus f. *incisa* F. E. Wimmer, Repert. Sp. Nov. 19: 244. 1924. (*Pringle* 8399!)
Siphocampylus oaxacanus F. E. Wimmer, Repert. Sp. Nov. 19: 260. 1924. (*Galeotti* 1989A, herb. Delessert, photo.)

Margins of the leaves varying from subentire, with 3-5 minute sharp callose teeth per cm., to deeply incised-serrate, the principal serrations as much as 2.5 cm. long and 0.8 cm. wide at base, their margins coarsely toothed; blades 2-7 cm. wide, 6-20 cm. long, usually 2.5-3.5 times as long as wide, on a distinct, narrowly winged petiole 1-4 cm. long, elliptic to oblong or ovate, the base rounded to acute, the tip abruptly or gradually short-acuminate.

TYPE LOCALITY: Vicinity of Orizaba, Vera Cruz, *Bourgeau* 2503 (isotype, Gray!).

DISTRIBUTION: In the mountains from Vera Cruz and Hidalgo to Oaxaca and Guatemala, mostly at elevations of 1500-3000 m.; Venezuela.

12b. *Centropogon grandidentatus* var. *Valerii* (Standley)
 McVaugh, comb. nov.

Centropogon Valerii Standley, Field Mus. Publ. Bot. 18: 1413. 1938.

Apparently identical with var. *diversidens* except for the leaves; these narrowly elliptic, oblong or lanceolate, 0.7-1.5 cm. wide, mostly 5.5-12 times as long as wide; margins finely serrate with 4-9 sharp teeth per cm.; petiole 0.5-1 cm. long.

TYPE LOCALITY: Ojo de Agua, Costa Rica, at 2850 m., *Stork* 3022 (Field!).

DISTRIBUTION: Mountains of Costa Rica.

13. *Centropogon Wimmerii* Standley, Field Mus. Publ. Bot.
 18: 1414. 1938.

Terrestrial, herbaceous, erect, up to 4 mm. in diameter, 4 ft. high (according to Standley), the stems glabrous below, sparsely pilose above with several-celled brownish-yellow hairs 1-1.5 mm. long; lower leaves not seen; upper leaves spreading, membranaceous when dry, green above, "dark purple beneath," the blades ovate, 5-6 cm. broad, 8-9 cm. long, abruptly short-acuminate at tip, rounded at base, on narrowly winged petioles 1.5-3.5 cm. long, the margins inconspicuously crenate with 4-6 submarginal callose teeth per cm., the upper surface sparsely pilose on the veins with hairs like those of the stem, otherwise glabrous, the lower surface similarly but slightly more prominently pilose; young leaves densely pilose, the surface obscured by the yellow hairs; flowers about 10 in the axils of the upper leaves, on loose slender pedicels up to 9 cm. long in fruit; pedicels sparsely pilose, each with a pair of decurrent filiform pilose bracteoles just above the base, the bracteoles about 3-4 mm. long; flower 3.5-4 cm. long, including hypanthium; corolla scarlet, glabrous within, pilose without with hairs like those of the stem, the tube about 20 mm. long, straight or essentially so, narrowest just above the base and thence enlarged to the mouth, the lobes strongly recurved-falcate, acuminate, the two upper ones longer than the others, about 3.5 mm. wide at base, 11 mm. long, the lateral and lower lobes similar, up to 8 mm. long; filament-tube about 26 mm. long, clothed with fine white hairs (attached to the narrow basal part of the corolla?); anther-tube 6.5 mm. long, gray, glabrous, the two shorter anthers densely white-tufted at tips; hypanthium in anthesis hemispheric, about 5 mm. high by 6 mm. broad when pressed; fruit not seen; calyx-lobes narrowly triangular and somewhat dilated at base, 1.5 mm. wide at base, 4.5-5 mm. long, acute, pilose and with a few callose teeth along the margins; seeds not seen.

TYPE LOCALITY: Moist forests, at elevations of 1500-1900 m., Las Nubes, San José, Costa Rica *Standley* 38739 (US!).

DISTRIBUTION: Known only from the type locality.

14. *Centropogon ferrugineus* (L. f.) Gleason, Bull. Torrey
 Club 52: 11. 1925.

Lobelia ferruginea L. f. Suppl. 394. 1781.

Herbaceous, or woody at base, terrestrial (sometimes epiphytic?); stems straggling or erect, up to 5 mm. in diameter, fistulose, 1-2.4 m. long, glabrous below, often purple; leaves 20 or fewer, spreading, rugose veined, stiff papery when dry, green, lighter beneath, the margins

usually purple, the blades when mature glabrous or nearly so above except on the larger veins, their lower surface and all the young growth densely covered with branched hairs, these persisting on the veins even in age, the margins sharply denticulate with 6-10 narrow spreading teeth per cm., the teeth dark; upper leaves smaller but similar; inflorescence few-15 cm. long, the few-12 flowers in the axils of the upper leaves; pedicels wide-spreading, loose, about 1 mm. in diameter, in fruit 40-85 mm. long, pubescent, or in age glabrate; bracteoles linear-filiform, decurrent, at base of pedicel, about 2 mm. long; flower about 5 cm. long, including hypanthium and stamens; corolla glabrous within, somewhat pubescent without, reddish, with a tinge of orange, the lobes yellow (according to Standley) or orange, the tube 20-26 mm. long, slightly curved, contracted abruptly at base into a narrow cylindrical portion 7-10 mm. long and 1-2 mm. in diameter, this portion expanding abruptly into a wider cylindrical portion 7-8 mm. wide (pressed flat), the lobes falcate, acuminate, the upper ones about 2.5 mm. wide at base, 5-12 mm. long, the lower and lateral lobes similar, shorter; filament-tube 30-37 mm. long, prominently exerted, the filaments pubescent their whole length, distinct at base and adherent to the corolla-tube for the length of the narrow basal part; anther-tube 7-8 mm. long, bluish-gray, the anthers glabrous or with a few long white hairs on the connectives, the two shorter anthers prominently white-tufted at tip; hypanthium in anthesis hemispheric, rather densely pubescent, in fruit enlarging, about as broad as high, 7-8 mm. in diameter; fruit scarcely inflated, the free part rounded, surmounted by a rim 1-3 mm. high; calyx-lobes narrowly triangular, dilated at base, usually purple, sharply denticulate, acute, pubescent, 2.5-3 mm. long; seeds short-ellipsoid, flattened, about 0.5 mm. long, foveate-reticulate.

TYPE LOCALITY: Probably near Bogotá, Colombia ("in America"), *Mutis*.

Pubescence often sparse, light yellow or yellow-brown to gray-brown.

Pubescence light yellow or yellow-brown.

Pubescence light gray-brown.

Pubescence usually dense, at least in the inflorescence, and fluffy, consisting of rich dark brown hairs.

14a. *C. ferrugineus* var. *venezuelanus*.

14b. *C. ferrugineus* var. *costaricanus*.

14c. *C. ferrugineus* var. *tomentellus*.

14a. ***Centropogon ferrugineus* var. *venezuelanus*** (F. E. Wimmer)

McVaugh, *Ann. Mo. Bot. Gard.* 27: 351. 1940.

Centropogon affinis var. *venezuelanus* F. E. Wimmer, *Repert. Sp. Nov.* 19: 242. 1924.

Leaf-blades mostly 2-5 cm. wide, 5-15 cm. long, tapering from about the middle to the apex, not abruptly pointed.

TYPE LOCALITY: Venezuela.

DISTRIBUTION: Ecuador to Colombia, Venezuela, and western Panama.

14b. ***Centropogon ferrugineus* var. *costaricanus*** (Planch. & Oerst.)

McVaugh, *Ann. Mo. Bot. Gard.* 27: 352. 1940.

Centropogon costaricanus Planch. & Oerst. *Vidensk. Meddel.* 1857: 156. 1857.

Siphocampylus Regelii Vatke, *Linnaea* 38: 732. 1874. (*Wendland* 679.)

?*Siphocampylus Regelii* var. *umbrosus* Vatke, *Linnaea* 38: 733. 1874.

Centropogon affinis var. *costaricanus* Zahlbr. *Ann. Naturh. Mus. Wien* 6: 437. 1891.

Leaf-blades mostly 3-5 cm. wide, 10-15 cm. long, oblong to broadly elliptic, the tip usually narrowed abruptly to a short-acuminate point.

TYPE LOCALITY: Oak zone, Volcán de Irazú, Costa Rica, *Oersted pl. centroam.* 9240 (Copenhagen!).

DISTRIBUTION: Mountains of central Costa Rica and western Panama, mostly at elevations of 2100-3000 m.

14c. ***Centropogon ferrugineus* var. *tomentellus*** (F. E. Wimmer)

McVaugh, *comb. nov.*

Centropogon poasensis Gleason, *Torreyia* 25: 92. 1925. (*J. D. Smith* 6626, NY!)

Centropogon costaricanus var. *tomentellus* F. E. Wimmer, *Ann. Naturh. Mus. Wien* 46: 240. 1933.

Centropogon costaricanus var. *Cufodontidis* F. E. Wimmer, *Ann. Naturh. Mus. Wien* 46: 240. 1933.

(*Cufodontis* 541b, Vienna, photo.)

Leaf-blades oblong, usually about 3 cm. broad by 6 cm. long, abruptly short-pointed.

TYPE LOCALITY: Forests, 2200-2400 m. elevation, Volcán de Poas, Costa Rica, *Cufodontis 541a* (Vienna, photo.).

DISTRIBUTION: Volcán de Poas, Costa Rica, at elevations of 2100-2600 m.

NOTE: *Steyermark 32649*, from Dept. Jalapa, Guatemala, is doubtfully referred to this variety. The leaves are up to 6 cm. wide and the pubescence is less dense than in Costa Rican material.

DOUBTFUL SPECIES

CENTROPOGON FASTUOSUS Scheidw. Allg. Gart. 9: 396. 1841. TYPE LOCALITY: Mexico. The identity of this species cannot be determined from the original description, which is highly generalized.

15. *BURMEISTERA* Triana, Nuev. Jen. Esp. Neo-Gran. 13. 1854.

Plants epiphytic or terrestrial, woody at least at base. Leaves cauline. Flowers in the axils of the upper leaves, these little reduced in size or the uppermost smaller. Pedicels ebracteolate. Corolla green, yellow, or purplish to reddish-brown; tube entire, cylindraceous, usually broadest at base, slightly narrowed from base to the base of the lower lobes and there abruptly expanded; lobes falcate, all abruptly bent away from the dorsal side of the flower; two upper (dorsal) lobes much longer than the others, the ventral lobe usually shorter than the lateral ones. Filaments distinct at very base (mostly 2-3, rarely 5 mm.), adherent to corolla for the same distance or wholly free from it; anther-tube usually abruptly incurved at base, the terminal orifice oblique and enlarged; anthers separating at tips in age and the tips curling outward; two shorter anthers lacking a terminal tuft of stiff hairs, but all the anthers or merely the two shorter ones sometimes sparsely pilose at tip. Ovary bilocular. Summit of ovary flat or nearly so. Style jointed just above the ovary, breaking cleanly and deciduous, with the corolla and stamens, from the mature fruit. Fruit fleshy, globose or somewhat elongated, often much inflated at maturity, indehiscent. Seeds oblong, varying to ovoid or fusiform, often somewhat flattened, 0.7-1.3 mm. long, much longer than wide, minutely foveate-reticulate, the reticulations somewhat elongated parallel to the long axis of the seed.

Type species, *Burmeistera ibaguensis* Triana.

Leaf-blades cordate at base; calyx-lobes abruptly reflexed, covering the hypanthium in anthesis and in fruit.

Leaf-blades attenuate, acute or somewhat rounded at base, not cordate; calyx-lobes erect or somewhat spreading.

10. *B. obtusifolia*.

Larger anthers pilose on the backs with bright golden hairs; plants entirely glabrous.

7. *B. microphylla*.

Anthers glabrous on backs or pubescent with white or sordid grayish hairs; plants glabrous or pubescent.

Flower, including hypanthium, 2.5 cm. long or less; corolla yellow; leaf-blade with a prominent sub-marginal vein along each edge, the vein about as large as the lateral veins of the leaf.

9. *B. parviflora*.

Flower, including hypanthium, 3.0 cm. long or more; corolla green to greenish-yellow or purplish; lateral veins breaking up into finely anastomosing veinlets near margin, or joining a poorly defined sub-marginal vein which is much finer than the laterals.

Leaves numerous, 50 or somewhat fewer; blades lanceolate, gradually long-acuminate from below the middle, 2.5 cm. wide or less; plants entirely glabrous.

8. *B. glauca*.

Leaves fewer, larger, usually 25 or fewer; blades various, acute or abruptly short-acuminate, the principal ones (2) 3-6 (8) cm. wide; plants not perfectly glabrous, at least the filament-tube, the young growth or the lower surface of the leaf-blades pubescent or scaberulent.

Leaves puberulent above; corolla dark purple, puberulent without.

2. *B. dendrophila*.

Leaves glabrous above; corolla green or purple, mostly glabrous without.

Hypanthium in anthesis cylindrical to campanulate or urceolate, somewhat rounded at base, 1-1.5 times as long as broad when pressed, the sides more or less parallel.

Corolla green or bronzy; hypanthium and calyx-lobes green, drying green or stramineous, rarely purpletinged, fruit much inflated; seeds fusiform, dark-apiculate.

3. *B. vulgaris*.

Corolla predominantly brownish-purple, varying to greenish-purple or reddish-brown; hypanthium and calyx-lobes purplish-green, drying purplish, brownish or black; fruit little-inflated, the seeds practically filling it; seeds ellipsoid-oblong with blunt ends.

1. *B. cyclostigmata*.

Hypanthium in anthesis narrowly turbinate or obconic, acute and usually attenuate at base, the sides strongly divergent.

Stem, corolla, and calyx-lobes slightly tinged with purple; upper part of stem and lower surface of leaves distinctly soft-pubescent; calyx-lobes ovate, 1.8–2.8 mm. long.

Plants never purplish; stem and leaves glabrous or sparsely pubescent with stiff minute hairs; calyx-lobes narrowly triangular to linear, (3.5) 4.5–18 mm. long.

Calyx-lobes linear, 11–18 mm. long; leaf-blades glaucous beneath, with prominent stiff yellowish hairs on the veins.

Calyx-lobes narrowly triangular, (3.5) 4.5–8 mm. long; leaf-blades green beneath, glabrous (sometimes scaberulent or even strigose on the veins).

4. *B. estrellana*.5. *B. tenuiflora*.6. *B. virescens*.

1. *Burmeistera cyclostigmata* Donn. Smith, Bot. Gaz.

20: 291. 1895.

Burmeistera cyclostigmata var. *Suerrensis* Donn. Smith, Bot. Gaz. 24: 394. 1897. (Donn. Sm. pl. quat. etc. 6623, US!)

Burmeistera suerrensis F. E. Wimmer, Repert. Sp. Nov. 30: 14. 1932.

Burmeistera suerrensis var. *almirantensis* F. E. Wimmer, Repert. Sp. Nov. 30: 14, pl. 124, f. 26. 1932. (Cooper 234, Field!)

Burmeistera Millei F. E. Wimmer, Repert. Sp. Nov. 30: 15, pl. 123, f. 12. 1932. (Type from Ecuador.)

Stems herbaceous or woody at base, terrestrial or epiphytic, sometimes trailing and rooting at the nodes, green, usually 1–1.5 m. high, glabrous or minutely pubescent on the young growth, leafy nearly to the summit; cauline leaves spreading, papery or membranous when dry (fleshy and slightly stiffened when fresh, according to Austin Smith [*P.C.* 232]), glabrous or the veins on the lower surface minutely scaberulous, the blades varying from entire, with minute callosities along the margin, to repand-dentate with the callosities at the apices of low blunt teeth, 3–6 cm. wide by 7–12 cm. long, usually 2–2.5 times as long as wide, elliptic, varying to ovate or broadly lanceolate, narrowed abruptly to an acuminate tip which may be 1.5 cm. long, the base cuneate, with a definite slender petiole (1) 1.5–3 cm. long; inflorescence a short terminal raceme few–15 (25) cm. long, loosely few–15–(20-) flowered; pedicels ascending in flower, often stiffly spreading at maturity, up to 1.5 mm. in diameter, mostly 45–85 mm. long in fruit, smooth and glabrous; upper bracts often much reduced in size; flowers malodorous (according to Austin Smith), 4–5 cm. long, including hypanthium; corolla glabrous, in color "green," "green tinged maroon," "green and purplish," "dark reddish green," "greenish and dark red," "green and dark red-purple," "reddish-brown," or "2 center lobes dull maroon-purple, the others green;" the tube 11–16 mm. long, narrowed gradually from the base to a point about two-thirds its length from the base, then abruptly expanded, the minimum diameter about 2–2.5 mm., the corolla-lobes nearly linear (slightly broader near base), the two upper ones 2–5 mm. wide, 12–22 mm. long, the tips blunt, the two lateral lobes 2–4 mm. wide by 6–12 mm. long, the lower lobe similar to these but slightly shorter; filament-tube (25) 30–36 mm. long, pubescent or short-hirsute on the distal third or wholly glabrous, the filaments wholly free from the corolla-tube; three larger anthers 5–8 mm. long, glabrous; two shorter anthers about half as long, the apical margin glabrous or with a thin fringe of soft pilose hairs; hypanthium glabrous, in anthesis cylindric or campanulate, rounded at base, usually flaring at mouth, sometimes contracted just below the mouth, as long as broad or longer (in dried material), usually much darkened in drying; fruit a fleshy pod (according to Austin Smith) or a watery berry, (according to Skutch), varying from oval with flattened ends (Austin Smith) to ellipsoid, 6–14 mm. in diameter, 10–15 (30) mm. long, in color varying from "red and white" to "purple and white" or "white tinged with blue" or "varying from white to red;" calyx-lobes oblong or linguiform, rounded at tip and somewhat dilated at base, 2–3 mm. wide by 3–12 mm. long, entire or minutely dentate; seeds ellipsoid-oblong with rounded ends, about 0.75–1.0 mm. long.

TYPE LOCALITY: Estrella, Prov. Cartago, Costa Rica, *J. J. Cooper* 5845 (US!).

DISTRIBUTION: Central Costa Rica to western Panama, at elevations up to about 2500 m.; Colombia to Ecuador.

2. *Burmeistera dendrophila* F. E. Wimmer, *Repert. Sp. Nov.*
30: 23. *pl. 124, f. 18.* 1932.

Minutely puberulent nearly throughout, except for the older parts of the stem; stems woody at base, epiphytic, purple, up to 3 mm. in diameter, at least 30 cm. high; cauline leaves elliptic, papery when dry, rather densely puberulent above and on the veins beneath, the blades repand-denticulate, with about 3 obscure callosities per cm., 1.5-2.5 cm. wide, 4.0-8.5 cm. long, 3-4 times as long as wide, the apex acute, blunt or short-acuminate, the base acute, attenuate into a petiole 1.3 cm. long or less; inflorescence 3-4-flowered; pedicels ascending in flower, about 1 mm. in diameter, 40-45 mm. long in flower, nearly glabrous; flower 4.5-5 cm. long, including hypanthium; corolla puberulent without, dark purple (according to Pittier), the tube 18 mm. long, the lobes linear or oblong, acuminate, the two upper ones about 3.5 mm. wide, 18 mm. long, the three lower lobes about 3.5 mm. wide, 7-10 mm. long; filament-tube exerted, 35-38 mm. long, hirsute near apex, glabrous below; anther-tube about 5 mm. long, the anthers hairy on backs, the two shorter ones with a few white hairs at apex; hypanthium in anthesis campanulate, puberulent, acute or very slightly rounded at base, the sides divergent, often strongly so, its length 4-7 mm., its width (when pressed) 2.5-3.5 mm.; fruit not seen; calyx-lobes ovate, obtuse, widest just above the base, 2-2.5 mm. wide, 2.5-3.5 mm. long, entire; seeds not seen.

TYPE LOCALITY: Panama; humid forest between Alto de las Palmas and top of Cerro de la Horqueta, Chiriquí, at elevations of 2100-2268 m., *Pittier 3253* (US!).
DISTRIBUTION: Known only from the type locality.

3. *Burmeistera vulgaris* F. E. Wimmer, *Repert. Sp. Nov.* 30:
27. *pl. 123, f. 14.* 1932.

Burmeistera macrocalyx F. E. Wimmer, *Repert. Sp. Nov.* 30: 19. *pl. 124, f. 22.* 1932. (*Wendland 839*, Berlin.)

Burmeistera Pittieri F. E. Wimmer, *Repert. Sp. Nov.* 30: 19. *pl. 124, f. 20a.* 1932. (*Pittier*, herb. nat. C.R. 13073, isotype, Field!)

Burmeistera Pittieri var. *decorans* F. E. Wimmer, *Repert. Sp. Nov.* 30: 20. *pl. 124, f. 20b.* 1932. (*Tonduz*, herb. nat. C.R. 12522, US!)

Terrestrial, herbaceous, glabrous except for the petioles and the veins of the lower surfaces of the leaves, which are minutely scaberulous-puberulent; stems ascending, fistulose, green, 1.5-3 (4.5) m. high, up to 5 mm. in diameter; leaves stiff-papery to membranous when dry, darker green above, the margins somewhat sinuate, with low teeth and 3-5 regularly spaced callosities per cm., the blades 2-5 cm. wide, 5-15 cm. long, usually 2.5-4 times as long as wide, mostly elliptic, the base rounded and then narrowed into a slender petiole 1.3-2 (3.0) cm. long, the apex rather abruptly narrowed to a broad acuminate point; flowers few-10 in the axils of the upper leaves, the lowest flowers sometimes 25 cm. from the apex of the stem, with sterile leaves above them; pedicels appressed or wide-spreading, sometimes flexuous, up to 1.5 mm. in diameter, 70-80 (130) mm. long in fruit, glabrous; flower 4.5-5 cm. long, including hypanthium; corolla glabrous, green (according to Standley), the tube 12-16 mm. long, somewhat inflated at base, the lobes oblong-falcate, slightly broadened at base, the two upper ones 4-5 mm. wide at base, 10-15 mm. long, the lateral lobes 3.5 mm. wide, 11 mm. long, the lower lobe slightly smaller; filament-tube 26-32 mm. long, pubescent near distal end, glabrous below, the filaments united with the corolla-tube for a very short distance; anther-tube 8-9 mm. long, the orifice only very slightly flaring, the two shorter anthers 5 mm. long, all the anthers glabrous, naked at the orifice, or with a very few soft white hairs; hypanthium in anthesis cylindrical or slightly narrowed at mouth, the base rounded to subacute, the tube 1.5-2 times as long as wide when pressed; fruit a much-inflated bladderly berry, 20-25 mm. in diameter, 25-40 mm. long, subglobose or somewhat elongated, purplish (according to Standley) or green; calyx-lobes narrowly triangular, blunt, rounded or subacute at tip, varying from prominently crenate, or callosedenticulate, to almost entire, 1-2.5 mm. wide by 4.5-8 mm. long, sometimes foliaceous, elliptic, coarsely toothed, up to 6 mm. wide by 25 mm. long, with prominent or obscure veins, the lobes usually with 3 parallel nerves at base; seeds linear-filiform, light brown with darker tips, very minutely foveate-reticulate (this scarcely visible until magnified about 20 times), about 0.9 mm. long.

TYPE LOCALITY: Wet forest at an elevation of 2100-2400 m., near Finca La Cima above Los Lotes, north of El Copey, Prov. San José, Costa Rica, *Standley 42686* (Field!).

DISTRIBUTION: Forests, central Costa Rica to western Panama, mostly at elevations of 1200-2550 m.; Colombia to Ecuador.

4. *Burmeistera estrellana* F. E. Wimmer, *Repert. Sp. Nov.*

30: 24. *pl. 123, f. 8.* 1932.

Stems herbaceous, terrestrial, purple at base, glabrous below, somewhat pubescent above, up to 2.5 mm. in diameter at base, 30-60 cm. high; cauline leaves spreading-ascending, about 10, stiff-papery when dry, glabrous above, closely bristly-pubescent below, especially on the veins, with sharp, tubular hairs, the hairs somewhat enlarged at base, the blades shallowly crenate-serrate with 6-10 obscure teeth per cm., the teeth mostly tipped with dark callosities, the blades of the middle leaves elliptic, 1.6-4 cm. broad, 4.5-7.5 cm. long, mostly 2-3 times as long as broad, acute and rather abruptly short-acuminate at tip, rounded or cuneate at base, on distinct stout bristly marginless petioles 1 cm. long or less; flowers 1-3; pedicels in flower stiffly ascending, up to 1 mm. in diameter and 50 mm. in length, smooth and glabrous; flower about 4 cm. long, including hypanthium; corolla glabrous, greenish with a purple tinge, the tube 14-16 mm. long, about 2 mm. in diameter, the two upper lobes oblong-linear, 3 mm. wide by about 10 mm. long, the lateral and lower lobes 2.5-3 mm. wide, 6-7 mm. long; filament-tube about 23 mm. long, slightly pubescent at apex, otherwise glabrous, the filaments coherent except for about 2.5 mm. at base, distinct from the corolla; anther-tube about 6 mm. long, the two shorter anthers about 4.5 mm. long, all the anthers naked at apex or the short ones with a few cilia, all densely short-pubescent at base and on the backs; hypanthium in flower narrowly turbinate, acute and long-attenuate at base, glabrous or with a few tubular hairs, 4-8 mm. long, 3-4 mm. broad when pressed; fruit not seen; calyx-lobes ovate or linguiform, rounded at tip and somewhat dilated at base, glabrous, entire, purplish, 1.5-2 mm. wide at base, 1.8-2.8 mm. long; seeds not seen.

TYPE LOCALITY: La Estrella, Prov. Cartago, Costa Rica, *Stork 1537* (Field!).

DISTRIBUTION: Known only from the type locality.

5. *Burmeistera tenuiflora* Donn. Smith, *Bot. Gaz.* 25: 147. 1898.

Epiphytic (or terrestrial?), the stems woody below, green or straw-colored, 1-2.5 m. long, up to 5 mm. in diameter, glabrous or pubescent on the young growth; leaves 20 or more, the blades membranous when dry, subentire or the margins sinuate, obscurely denticulate, 2-5 cm. wide, 6.5-14 cm. long, elliptic, mostly about 3 times as long as wide, rounded or subacute at base, narrowly acuminate at tip, dark-green and glabrous above, glaucous below, with prominent stiff yellowish-brown hairs on the veins; petiole 0.5-1 cm. long, hairy; flowers about 5; pedicels glabrous, stout, 1-1.5 mm. in diameter, 45-70 mm. long in fruit, spreading-ascending; flower about 4 cm. long, including hypanthium; corolla glabrous or with a few hairs without, greenish- or yellowish-white, the tube 11-15 mm. long, somewhat dilated at base and apex, the lobes "falcate, broad, caescent and reticulate on face, the superior ones 9 x 4 mm., the inferior a third smaller" (Donnell Smith), the two upper lobes lanceolate, 3 mm. wide by 10 mm. long, the 3 lower ones shorter, about 7 mm. long; filament-tube about 2.2 cm. long, pubescent near apex, glabrous below, the filaments free from the corolla; anther-tube 5.5-6.0 mm. long, yellowish-green, the two smaller anthers 3.0-4.5 mm. long, very sparsely pilose at apex, all the anthers somewhat sparsely short-pubescent at base and on backs; hypanthium in anthesis narrowly turbinate, acute and long-attenuate at base, glabrous; fruit a little-inflated semifleshy obovoid "berry," green in color, about 5 mm. in diameter, 7-10 mm. long, acute at base; calyx-lobes linear, blunt at tip, entire or callose-denticulate near tip, 1-1.5 mm. wide, 11-18 mm. long; seeds oblong, about 0.8 mm. long.

TYPE LOCALITY: Forests of Alto del Roble, Volcán Barba, Costa Rica, at 2000 m., *Pittier*, herb. nat. C.R. 19 (US!).

DISTRIBUTION: Forests, central Costa Rica to western Panama, mostly at elevations of 1200-2000 m.

6. *Burmeistera virescens* (Benth.) Benth. & Hook.; Hemsl.
 Biol. Centr. Am. Bot. 2: 263. 1881.

Lobelia virescens Benth. Pl. Hartw. 77. 1841.

Centropogon virescens Planch. & Oerst. Vidensk. Meddel. 1857: 157. 1857.

Centropogon lignescens F. E. Wimmer, Repert. Sp. Nov. 19: 252. 1924. (*von Türrheim II 1743*, isotype, Gray!)

Burmeistera lignescens F. E. Wimmer, Repert. Sp. Nov. 30: 34. 1932.

Burmeistera lignescens var. *martialis* F. E. Wimmer, Repert. Sp. Nov. 30: 34. pl. 126, f. 53. 1932. (*Cook & Gilbert 234*, US!)

Terrestrial, shrubby or suffrutescent or coarsely herbaceous; stems fistulous, glabrous, up to about 5 mm. in diameter at base, 70-100 cm. high; leaves 20 or fewer, spreading, membranous or papery when dry, glabrous, or scaberrulent or even strigose on the veins beneath, the margins varying from subentire, with minute callosities at intervals of 1-2 mm., to coarsely and irregularly repand-dentate; blades 4-8 cm. wide by 7-16 cm. long, 2-3 times as long as wide, elliptic to ovate, the base rounded or cuneate and rather abruptly narrowed to a narrowly margined petiole 1-3 cm. long, the apex acute, with an acuminate or caudate tip which may be 1.3 cm. long or more; the upper ones similar but sometimes reduced in size; inflorescence mostly 10-16 cm. long, loosely few-15-flowered; pedicels wide-spreading, stiff, up to 1 mm. in diameter, in fruit 45-80 mm. long, smooth and glabrous; flowers 3-4 cm. long, including hypanthium; corolla glabrous or minutely puberulent without, glabrous within, green, the tube 16-19 mm. long, the two upper lobes lanceolate-falcate, 2.5-3.5 mm. wide at base, acute at tip, 10-13 mm. long, the two lateral lobes similar, shorter, 7-10 mm. long, the lowest lobe about 6-8 mm. long; filament-tube 20-25 mm. long, pubescent near apex, glabrous below, the filaments distinct at base for a distance of 4-5 mm. and entirely free from the corolla; anther-tube 4.5-6.0 mm. long, the anthers sparsely white-pilose with short hairs on the backs, the two lower anthers about 2-3 mm. long, naked at apex or with a sparse fringe of soft white hairs; hypanthium in anthesis obconic, acute at base, glabrous; fruit apparently a soft "berry," hardly at all inflated, 5-7.5 mm. in diameter by 7-10 mm. long, pink tipped with green (*Johnson 916*), or white (*Steyermark 37712*), ellipsoid or obovoid, somewhat flattened at apex, the free part tipped by the persistent style-base; calyx-lobes narrowly triangular, blunt at tip, with a few obscure callosities on each edge, 1.5-2.5 mm. wide at base, 3.5-8 mm. long; seeds oblong, flattened, with rounded ends and edges, about 1 mm. long.

TYPE LOCALITY: Rancho de Santa Rita near Quezaltenango, Guatemala, *Hartweg 540* (Kew!).

DISTRIBUTION: Mountains of central and southwestern Guatemala, mostly at elevations of 1000-2000 m.

7. *Burmeistera microphylla* Donn. Smith, Bot. Gaz. 25: 146. 1898.

Centropogon swartzianus Planch. & Oerst. Vidensk. Meddel. 1857: 157. 1857. (Type from western Costa Rica.)

Centropogon aurobarbata F. E. Wimmer, Repert. Sp. Nov. 19: 251. 1924. (*Blade 2315*, Berlin.)

Burmeistera aurobarbata F. E. Wimmer, Repert. Sp. Nov. 30: 35. 1932.

Epiphytic, entirely glabrous, the stems often numerous and pendent, woody but rather soft, fistulous, green or straw-colored, or mahogany-red on the young growth (according to Austin Smith), (0.3) 0.9-1.5 m. long, often 6 mm. in diameter at base; leaves 20-30 (35) the upper little-reduced and bearing flowers in the axils, the blades very variable in size and shape, thick and stiff, brittle and shining when fresh (according to Austin Smith), coriaceous when dry, flat or the margins somewhat revolute, (0.6) 2.5-4.0 cm. wide by (1.3) 6-10 cm. long, 2-3 times as long as broad, much darker green above than beneath (when dry), varying from elliptic to lanceolate, ovate or obovate, the base somewhat rounded and abruptly contracted to a stout petiole 0.5-1.3 cm. long, the apex blunt, acute, or abruptly or gradually narrowed to an acuminate tip which may be as much as 2.5 cm. long and only 1.0 mm. wide, the margin entire or subentire but usually with irregularly spaced callosities, these sometimes terminating low teeth, the veins often strongly impressed on the upper surface when dry; inflorescence few-22 cm. long, often interrupted by sterile nodes, loosely few-15-flowered; pedicels mahogany-red (according to Austin Smith), spreading, in fruit often standing stiffly at right angles to the stem or slightly deflexed, up to 1 mm. in diameter, in fruit (15) 25-40 (55) mm. long, smooth and glabrous; flower odorless (according to Austin Smith), (2.8) 3-4 cm. long, including hypanthium;

corolla glabrous, in color "russet to dull reddish, inside tube cream yellow," "inner side of lobes creamy yellow," "pale green tinged with russet red," the tube (12) 15-20 mm. long, cylindrical, the lobes lanceolate or broadly linear, the two upper lobes 2-3 mm. wide by 8-11 mm. long, the lower lobes similar, 6-8 mm. long, the lowest lobe about 4 mm. long; filament-tube 18-27 mm. long, glabrous, the filaments adherent to the corolla-tube at very base; anther-tube (3.0) 4.0-5.5 mm. long, the two shorter anthers with a conspicuous tuft of soft yellow or whitish hairs at apex, the three larger naked at apices, but with broad longitudinal lines of golden-yellow hairs, these occasionally continuing to the upper part of the filament-tube; hypanthium in anthesis campanulate or obconic, narrowed and often attenuate at base; fruit an ellipsoid, ovoid, or subglobose, little-inflated berry, "somewhat ridged, snow-white, with pale green sepals adhering, on cream-yellow pedicels" (Austin Smith), 5-7 mm. in diameter by 6-9 mm. long, the base rounded but the summit of the pedicel dilated; calyx-lobes linear or essentially so, blunt at tip, slightly widened at base, entire or obscurely callose-denticulate, about 1 mm. wide by (2) 7-15 mm. long; seeds oblong, flattened, with rounded ends and edges, about 1.3 mm. long.

TYPE LOCALITY: La Palma, Costa Rica, at an elevation of 1520 m., *C. Wercklé* in 1897 (US!).

DISTRIBUTION: Forests of the mountains of Costa Rica, at elevations of 1200-2400 m.

NOTE: A recent collection from Coelé, Panama (*P. H. Allen 2343*), made near La Mesa, at an elevation of 1000 meters, is apparently of this species. It differs from Costa Rican plants by the acute or slightly acuminate leaf-blades, which are entire or essentially so. The filament-tube is hairy distally and the hairs of the anther-tube are sparse and very pale yellow.

8. *Burmeistera glauca* (F. E. Wimmer) Gleason, Bull. Torrey Club 52: 98. 1925.

Centropogon glaucus F. E. Wimmer, Repert. Sp. Nov. 19: 251. 1924.

Epiphytic, vine-like, trailing, glabrous; stems very slender, woody at base, up to 2.5 mm. in diameter, fistulous, green or yellowish, narrowly wing-angled below the leaf-bases, up to 70 cm. long or more; leaves numerous, 50 or fewer, spreading, stiff-papery when dry, the blades glaucous-green on both sides, slightly darker above, lanceolate to narrowly ovate, narrowed gradually to a long-acuminate, often somewhat falcate tip, rounded at base, contracted abruptly to a slender petiole 0.4-0.7 mm. long, 1.2-2.4 cm. wide by 2.7-6.5 cm. long, mostly 2-4 times as long as wide, the lateral veins becoming very slender near the margin and anastomosing inconspicuously, the margins shallowly crenate-serrate with 2-4 callose-tipped teeth per cm.; flowers axillary, the lowest as much as 60 cm. below the apex of the stem, the fertile nodes often separated by several sterile nodes, the flower-bearing nodes not more than 5; pedicels spreading, usually stiff, up to 1 mm. in diameter and 50-80 mm. long in fruit, smooth and glabrous; flower 3-3.5 cm. long, including hypanthium; corolla glabrous, greenish, the tube 15-18 mm. long, scarcely dilated at base, the lobes lanceolate, the two upper lobes about 3.5 mm. wide by 10 mm. long, the lateral lobes about 7.5 mm. long; filament-tube 20 mm. long, glabrous, the filaments free below and fused to the corolla-tube for 2-3 mm.; anther-tube about 5.5 mm. long, the three larger anthers glabrous, the two smaller ones 3.5 mm. long, with a sparse fringe of soft white hairs along the apical margin; hypanthium in anthesis cylindrical, roundish at base, slightly dilated and flaring at summit, 1.5-2.5 times as long as wide when dry; fruit a much-inflated berry, 20-25 mm. in diameter by about 50 mm. long, magenta (*Davidson 383*), oblong-ovoid, the apex truncate, the base somewhat impressed, with sunken pedicel; calyx-lobes deltoid or ovate, blunt, 1-1.5 mm. wide at base, 1.5-2 mm. long, the margins callose-denticulate; seeds fusiform, light brown with darker apiculate tips, very minutely longitudinally foveate-reticulate, about 1.1 mm. long.

TYPE LOCALITY: Panama, humid forest of Cuesta de las Palmas, southern slope of Cerro de la Horqueta, Chiriquí, at an elevation of 1700-2100 m., *Pittier 3219* (US!).

DISTRIBUTION: Chiriquí, Panama.

9. *Burmeistera parviflora* F. E. Wimmer; Standl. Field Mus. Publ. Bot. 18: 1408. 1938.

Epiphytic, the stems woody at base, little branched, smooth and glabrous or sparingly strigose above, fistulous, up to 3 mm. in diameter, 30-50 cm. high; leaves up to about 20, the

upper somewhat reduced, with flowers in the axils; blades stiff-papery when dry, sparsely to densely strigose on the veins of the lower surface, or infrequently glabrous, 2-5 cm. wide by 6.5-12 cm. long, usually 2.5-3.5 times as long as wide, elliptic or oblong, cuneate or somewhat rounded at base, with a petiole 1-2 cm. long, narrowed rather abruptly at tip to a lance-acuminate point which may be 2 cm. long, the margins shallowly crenate-serrate with 4-6 regular teeth per cm., the teeth callose-tipped, the submarginal vein prominent, as large as the lateral veins of the leaf, extending the length of the blade; inflorescence 10 cm. long or less, loosely few-7-flowered; pedicels spreading-ascending, somewhat flexuous, slender, 50-90 mm. long in fruit, smooth and glabrous; flower 2.5 cm. long or less, including hypanthium; corolla glabrous, yellow, the tube 11-13 mm. long, the lobes lance-ovate, the two upper ones about 3 mm. wide by 8 mm. long, the lateral lobes about 2.5 mm. wide, 6-7 mm. long, the lower lobe about 2.5 mm. wide, 4 mm. long; filament-tube 14-19 mm. long, pubescent above, glabrous below, the filaments free from the corolla; anther-tube about 4 mm. long, the 2 shorter anthers about 2.5 mm. long, the anthers glabrous on backs, the three larger anthers naked at tips, the others with a scanty fringe of soft white hairs; hypanthium in anthesis glabrous, obconic, subacute at base, slightly longer than wide; fruit apparently a dry or somewhat fleshy berry, scarcely inflated, obovoid with the free part flattened, 5-6 mm. in diameter, about 5 mm. long; calyx-lobes bluntly triangular, 1.5-2 mm. wide at base, 2-2.7 mm. long, entire or with few obscure callosities on the margins; seeds oblong, somewhat flattened, rounded at ends and edges, about 0.75 mm. long.

TYPE LOCALITY: Costa Rica; in forests, Cerros de San Antonio de San Ramón, *Brenes 5636* (Field).

DISTRIBUTION: Mountain forests, Costa Rica, at elevations of 1100 to 2500 m.

10. *Burmeistera obtusifolia* F. E. Wimmer, *Repert. Sp. Nov.*

29: 58. 1931.

Terrestrial (according to Standley), densely or sparsely clothed (except for the upper surface of the leaves and the hypanthium) with sharp stiff tawny-yellow hairs which project in all directions, giving the stem a bristly appearance, the hairs with persistent and often somewhat enlarged bases; stems apparently woody at base, up to 4 mm. in diameter, up to 60 cm. high, green to yellowish; leaves 20-30, glabrous above with impressed veins, the hairs on the lower surface most numerous on the veins or almost wanting, the blades stiff and papery when dry, 1.0-3.5 cm. wide by 2.6-6 cm. long, mostly 2-2.5 times as long as wide, ovate, on a petiole 0.5-1 cm. long, the base cordate, the tip cuneate or acuminate, blunt, apiculate, the margins shallowly crenate-serrate with about 2 or 3 regular teeth per cm.; inflorescence (in specimens seen) interrupted, the lowest flowers borne in the axils of leaves about 20 cm. from the apex of the stem, with several sterile leaves above them; flowers few (not over 7?); pedicels spreading, stiff, in fruit up to 1 mm. in diameter, 25-40 mm. long, bristly or smooth; flower about 4.5 cm. long, including hypanthium; corolla glabrous, dark purple-red, the tube 19-20 mm. long, about 1.5 mm. in diameter, the lower third gradually enlarged and broadest at the base, the lobes falcate-acuminate, the two upper ones 3-3.5 mm. wide, 8-11 mm. long, acute, the lateral ones about 3 mm. wide, 6-7 mm. long, the central ones similar to the lateral; filament-tube 32-34 mm. long, pubescent near the summit, glabrous below; anther-tube 4.5-5.0 mm. long, the anthers sparsely pilose on the backs, the two shorter anthers with a sparse fringe of soft white hairs along the apical margin, the three larger anthers naked at apex; hypanthium in anthesis broadly obconic, about as broad as high, acute at base, with a few bristly hairs; fruit apparently a semi fleshy berry, scarcely or not at all inflated, subglobose (?), about 6 mm. in diameter; calyx-lobes foliaceous, ovate-lanceolate, blunt or rounded at tip, apparently reflexed in flower and fruit, glabrous, entire, about 2-3 mm. broad by 5-8 mm. long; seeds oblong, slightly flattened, about 0.7 mm. long.

TYPE LOCALITY: Three miles northeast of El Copey, Costa Rica, at an elevation of 7500 feet, *Stork 1633* (Field).

DISTRIBUTION: Moist forests of the type region, at elevations of 2000-2400 m.

DOUBTFUL AND EXCLUDED SPECIES

- BURMEISTERA COLEOIDES** (Vatke) F. E. Wimmer, *Repert. Sp. Nov.* 30: 35. 1932. *Siphocampylus coleoides* Vatke, *Linnaea* 38: 733. 1874; *Centropogon coleoides* Zahlbr. *Ann. Naturh. Mus. Wien* 6: 439. 1891. TYPE LOCALITY: "In America australi, verisimiliter etiam in Costarica," *De Warscewicz no. 1* (Berlin). The writer has not seen the type, but from the description and figure published by Wimmer (*Rep. Sp. Nov.* 30: 35, *pl. 125, f. 46*. 1932) it seems probable that it is the plant here called *Burmeistera parviflora*.
- BURMEISTERA MARGINATA** Karst. *Linnaea* 28: 445. 1857, which was reported from Costa Rica by Standley (*Field Mus. Publ. Bot.* 18: 1407. 1938), is a Colombian species which probably does not occur in North America. The Costa Rican material cited by Standley was actually *Burmeistera parviflora*.



3 5185 0027

