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VOLUME 34

PART I

NORTH AMERICAN FLORA

(CARDUALES)

CARDUACEAE

HELENIEAE

PER AXEL RYDBERG

BAERIA, LASTHENIA

HARVEY MONROE HALL



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Family 2. CARDUACEAE

Tribe 10. HELENIEAE

PER AXEL RYDBERG

Heads radiate or discoid. Ray-flowers, when present, pistillate and usually fertile (except in *Gaillardia* and *Helenium*); corollas usually ligulate (in *Amblyopappus* tubular, in *Lembertia* and *Microspermum* irregularly 3-5-toothed, in *Blennosperma* and *Baeria* sometimes wanting). Disk-flowers hermaphrodite, mostly fertile or rarely sterile, with actinomorphic, 5- or more rarely 3- or 4-toothed corollas (in *Chaenactis* the marginal ones sometimes enlarged and irregular). Involucral bracts mostly herbaceous and green, rarely with dry scarios margins, except in the first subtribe mostly in 1 or 2 series or subtended by an external calyculum of smaller bracts. Receptacle without paleae (except in *Leucampyx*, and sometimes a few between the rays and the disk in *Helenium*), but in *Gaillardia* and *Clappia* and in species of *Chaenactis* and *Flaveria* bristly, in *Whitneya* woolly, and in *Baeria* pilose. Style-branches mostly flattened, more or less hispidulous and often appendaged. Pappus of scales (squamellae) or stiff awns, or wanting.

Involucral bracts usually broad, in 3-5 series, imbricate, the outer shorter; ray-corollas deciduous or none.

Involucral bracts in 1-2 series, nearly equal in length, or rarely with 1-3 small outer calyculate bracts.

Ray-corollas persistent on the achenes and falling off with them, marcescent.

Ray-corollas deciduous from the achenes or none.

Achenes flat with only marginal ribs or veins.

Achenes distinctly 3-5-angled, or if less distinctly so, then obconic.

Style-branches either short or with a distinct appendage, not hispidulous to or below the fork; either disk- or ray-corollas or both yellow, if purple the involucre not narrow.

Bracts of the involucre wholly herbaceous or somewhat chartaceous at the base, without scarios margins.

Achenes either prismatic, or clavate-obpyramidal, *i. e.*, long and slender, several times as long as broad, but gradually tapering to the base; throat of the disk-corollas mostly campanulate or funnelform, rarely much longer than the tube; bracts appressed, usually broad.

Receptacle flat or convex and rounded at the apex.

Achenes prismatic; pappus partly or wholly of awns or in *Amauria* a callous crown.

Achenes clavate-obpyramidal; pappus squamellate or rarely wanting.

Involucral bracts distinct, not at all enclosing the ray-achenes; plant rarely floccose (except *Hulsea*).

Involucral bracts either united below or very concave and partly enclosing the ray-achenes; plants more or less floccose.

Subtribe 1. JAUMEANAE.

Subtribe 2. RIDDELLIANAE.

Subtribe 3. PERITYLANAE.

Subtribe 4. AMAURIANAE.

Subtribe 5. BAHIANAE.

Subtribe 11. ERIOPHYLLANAE.

- Receptacle conic, acute, usually with evident raised points on which the individual flowers are borne.
Plants not floccose. Subtribe 10. BAERIANAE.
Plants floccose. Subtribe 11. ERIOPHYLLANAE.
- Achenes obpyramidal, only 2-3 times as long as broad; throat of the disk-corollas elongate-funnel-form, trumpet-shaped, or cylindric, many times as long as the tube; bracts usually narrow (except in *Plateilema*). Subtribe 12. TETRANEURANAE.
- Involucre campanulate to hemispheric; bracts erect or ascending, not reflexed. Involucre rotate; bracts spreading, wholly or at least the tips reflexed in age. Subtribe 13. GAILLARDIANAE.
- Bracts of the involucre with thin, more or less scarious and colored margins. Subtribe 6. HYMENOPAPPANAE.
- Style-branches long and filiform, stigmatose to near the apex, hispidulous down to the fork or below; both disk- and ray-corollas rose-purple; involucre from elongate-turbinate to almost cylindric. Subtribe 7. PALAFOXIANAE.
- Achenes linear or oblong, not distinctly angled, terete or oval in cross section, 8-20-ribbed or -striate, or rarely nerveless.
- Receptacle flat or merely convex.
- Disk-flowers fertile.
- Heads usually many-flowered; bracts many or, if few, not subtended by a few small calyculate ones; achenes linear. Subtribe 8. CHAENACTIDANAE.
- Heads few-flowered; bracts few, subtended by 1-3 small calyculate ones; achenes elliptic. Subtribe 14. FLAVERIANAE.
- Disk-flowers neutral.
- Heads many-flowered and many-bracted; leaves alternate. Subtribe 9. BLENNOSPERMATANAE.
- Heads few-flowered and few-bracted; leaves opposite or basal (several genera in the tribe MILLERIEAE).
- Receptacle conic or dome-shaped. Subtribe 10. BAERIANAE.

Subtribe 1. **JAUMEANAE**. Heads usually radiate, sometimes discoid. Ray-flowers pistillate and disk-flowers hermaphrodite; all fertile. Corollas yellow, those of the rays deciduous. Involucre of usually broad bracts in 3-5 series, imbricate and the outer usually successively shorter.

Receptacle not bristly; herbs.

Leaves opposite, sessile.

Pappus wanting; heads radiate.

Pappus present.

Pappus of short squamellae; heads discoid.

Pappus of plumose bristles; heads radiate.

Achenes 5-angled; pappus-bristles broadened and paleaceous at the base; bracts firm.

Achenes flattened; pappus-bristles not dilated at the base; bracts herbaceous.

Leaves alternate.

Pappus of plumose bristles; leaves sessile, lanceolate.

Pappus wanting; leaves petioled, with cordate blades.

Receptacle bristly; undershrubs.

1. COINOGYNE.

2. ESPEJOA.

3. CHAETYMENIA.

4. ARNICASTRUM.

5. OLIVAEA.

6. VENEGAZIA.

7. CLAPPYA.

1. COINOGYNE Less. Linnaea 6: 520. 1831.

Perennial herbs with creeping branched rootstocks and narrow, entire, opposite, sessile, fleshy leaves. Heads solitary, radiate. Involucre campanulate-turbinate; bracts rather few, broad, in 3-4 irregular series, herbaceous but rather firm, many-striate, rounded at the apex. Receptacle conic, alveolate, naked. Ray-flowers pistillate, fertile, in a single series; ligules short, 3-nerved and 3-toothed at the apex, ascending, glabrous, yellow. Disk-flowers many; corollas glabrous, regular; tube short, slightly enlarged at the base; throat slightly dilated; limb 5-cleft. Anthers elongate, obtuse at the base. Style-branches with short

obtusish tips. Achenes oblong, 10-ridged, glabrous. Pappus wanting, represented by a callous margin.

Type species, *Coinogyne carnosa* Less.

1. *Coinogyne carnosa* Less. *Linnaea* 6: 521. 1831.

Jaumea carnosa A. Gray, in Torr. U. S. Expl. Exp. 17: 360. 1874.

A perennial, with a creeping rootstock; stem procumbent or ascending, glabrous, striate; leaves fleshy, decussately opposite, linear-oblongate, 2-4 cm. long, 2-5 mm. wide, sessile, connate at the base; involucre about 1.5 cm. high and 1 cm. broad; bracts oval, rounded at the apex, successively shorter; ligules yellow, 6-7 mm. long, 1 mm. wide; achenes oblong, 3 mm. long.

TYPE LOCALITY: California.

DISTRIBUTION: Ocean beaches from Puget Sound, Washington, to San Diego, California.

2. *ESPEJOA* DC. Prodr. 5: 660. 1836.

Erect dichotomously branched herbs with entire opposite leaves. Heads discoid, peduncled, solitary in the forks. Involucre hemispheric; bracts 8-12, in 4 series, herbaceous, broad, striate. Receptacle alveolate. Flowers fertile; corollas glabrous with slightly pubescent lobes; tube short and swollen at the base; throat funnelform; teeth lanceolate. Anthers linear, slightly cordate at the base and with lanceolate tips. Style-branches sparingly hispidulous, with obtuse tips. Achenes cuneate, somewhat dorso-ventrally compressed, pubescent, truncate at the apex. Pappus of about 16 ovate-oblong, 1-nerved, mucronate squamellae.

Type species, *Espejoa mexicana* DC.

1. *Espejoa mexicana* DC. Prodr. 5: 660. 1836.

Jaumea mexicana Benth. & Hook.; Hemsl. Biol. Centr. Am. Bot. 2: 209. 1881.

A dichotomously branched herb; stem glabrous or sparingly pilose above, somewhat angled; leaves sessile, opposite, elliptic, rounded at the base, acute at the apex, entire, glabrous, pinnately veined; peduncles 5-8 cm. long; bracts ovate or oval, striate, imbricate, successively shorter; achenes elongate, cuneate, reddish-sericeous; pappus-squamellae ovate, serrulate on the margin.

TYPE LOCALITY: San Dionisio [Oaxaca?].

DISTRIBUTION: Mexico to Nicaragua and Costa Rica.

ILLUSTRATION: Deless. Ic. Sel. 4: pl. 41.

3. *CHAETYMENIA* H. & A. Bot. Beech. Voy. 298. 1837.

More or less shrubby plants with narrow, entire, opposite leaves. Heads long-peduncled, radiate, many-flowered. Involucre broadly turbinate-complanate; bracts broad, rather firm, striate, imbricate in 3-4 series, ovate. Receptacle naked, alveolate. Ray-flowers in a single series; ligules broad, many-nerved, 3-lobed. Disk-flowers very numerous; corollas glabrous or nearly so, tubular, scarcely at all dilated at the throat, not dilated at the base, deeply 5-lobed. Achenes linear-oblong, 5-angled, pilose. Pappus of about 20 rigid plumose bristles, somewhat dilated-paleaceous and serrate at the base.

Type species, *Chaetymenia peduncularis* H. & A.

1. *Chaetymenia peduncularis* H. & A. Bot. Beech. Voy. 298. 1837.

Jaumea peduncularis Benth. & Hook.; Oliver, Fl. Trop. Afr. 3: 395. 1877.

A somewhat shrubby and branched plant; stem striate, glabrous and somewhat purplish above; leaves opposite, sessile, linear-lanceolate, glabrous, firm, with rather prominent midrib, 5-10 cm. long, 5-15 mm. broad, tapering at each end; peduncles 1-2.5 dm. long, purplish; involucre 2-2.5 cm. high and about as broad; bracts broadly ovate, striate, often tinged with purple; ligules about 15, broadly obovate-cuneate, 3-lobed, many-nerved, about 1 cm. long and

6-7 mm. broad; disk-corollas about 8 mm. long, slightly longer than the achene and surpassed by the pappus-bristles.

TYPE LOCALITY: Jalisco.

DISTRIBUTION: Jalisco and Tepic.

ILLUSTRATION: H. & A. Bot. Beech. Voy. *pl.* 62.

4. *ARNICASTRUM* Greenman, Proc. Am. Acad. **39**: 115. 1903.

Perennial herbs with opposite leaves and dichotomously branched stem. Heads radiate, on elongate peduncles from the forks or at the ends of the stem. Involucre hemispheric; bracts herbaceous, broad, imbricate in 3-4 series, few-veined. Receptacle naked, faveolate. Ray-flowers in a single series, fertile; ligules several-nerved, indistinctly 2-3-toothed. Disk-flowers numerous, fertile; corollas tubular, scarcely at all dilated at the throat, 5-lobed, sparingly pubescent, not dilated at the base. Anthers linear-oblong, obtuse at the base, with lanceolate tips. Style-branches hispidulous, with short triangular tips. Achenes flattened dorso-ventrally, pubescent, about 20-nerved. Pappus of about 30 barbellate bristles not dilated at the base.

Type species, *Arnicastrum glandulosum* Greenman.

1. *Arnicastrum glandulosum* Greenman, Proc. Am. Acad. **39**: 115. 1903.

Arnicastrum glandulosum vestitum Greenman, Proc. Am. Acad. **39**: 115. 1903.

A perennial herb; stem about 3 dm. high, scabrous-puberulent below, glandular above, striate, at first simple, later dichotomously branched; leaves sessile, opposite, lanceolate, 5-8 cm. long, entire or slightly sinuate-denticulate, rather firm, with 5-7 almost parallel ribs, scabrous-puberulent on both sides; involucre hemispheric, about 1 cm. high and 1.5 cm. broad; bracts ovate, well imbricate, puberulent, with 3-5 faint veins; ligules 12-14 mm. long, 3-4 mm. wide, about 7-nerved; disk-corollas about 7 mm. long; achenes cuneate-oblongate; pappus surpassing the corolla.

TYPE LOCALITY: Sierra Madre, Chihuahua.

DISTRIBUTION: Chihuahua and Durango.

5. *OLIVAEA* Schultz-Bip.; Benth. in Hook. Ic. III. **2**: 2. 1872.

Herbs with alternate, sessile leaves. Heads solitary at the ends of the branches, radiate. Involucre hemispheric; bracts in 3 or 4 series, lanceolate, herbaceous, unequal. Receptacle naked, flat. Ray-flowers in a single series, fertile; ligules oblong, scarcely dentate at the apex. Disk-flowers hermaphrodite, fertile; corolla-tube short, glandular-hispid, enlarged into a cylindro-campanulate throat; limb 5-cleft. Anthers linear, obtuse at the base, with lanceolate tips. Style-branches flattened, with lanceolate, hispidulous appendages. Achenes compressed, oval, 2-winged or those of the ray-flowers 3-winged. Pappus of about 10 shortly plumose bristles.

Type species, *Olivaea tricuspis* Schultz-Bip.

1. *Olivaea tricuspis* Schultz-Bip.; Benth. in Hook. Ic. III. **2**: 3. 1872.

An herb, probably paludose; stem 3 dm. high or more, erect, glabrous or papillose-puberulent above; leaves sessile, cordate-amplexicaul at the base, narrowly lanceolate, entire, or few-toothed towards the base, and sometimes 3-cleft or 3-toothed at the apex, 5-7 cm. long, glabrous on both sides, 1-ribbed; heads short-peduncled; involucre about 18 mm. broad; bracts narrowly lanceolate, the inner more scarious; ray-flowers about 30; ligules about 12 mm. long; disk-flowers numerous; achenes oval, flattened, glabrous, winged.

TYPE LOCALITY: Guadalajara, Mexico.

DISTRIBUTION: Southern Mexico.

ILLUSTRATION: Hook. Ic. Pl. *pl.* 1103.

6. **VENEGAZIA** DC. Prodr. 6: 43. 1837.

Parthenopsis Kellogg, Proc. Calif. Acad. 5: 100. 1873.

Perennial herbs with tall leafy stems, somewhat woody at the base, and petioled, alternate leaves with broad blades. Heads large, terminal or in the upper axils, radiate. Involucre hemispheric; bracts in 3 or 4 series, broadly oval, or the intermediate ones suborbicular, puberulent, faintly nerved. Receptacle flat, naked, slightly alveolate. Ray-flowers ligulate, fertile; ligules spreading, entire or 2- or 3-toothed at the apex, 7-9-nerved. Disk-flowers hermaphrodite, perfect; tube glandular-hispid, very short; throat elongate, cylindro-campanulate; limb 5-toothed. Anthers obtuse at the base. Style-branches thick, hispidulous, truncate at the apex. Achenes short-linear, angled, striate, muricate, not hairy; pappus wanting.

Type species, *Venegazia carpesioides* DC.

Leaf-blades cordate, crenate; peduncles seldom more than 5 cm. long.

Leaf-blades deltoid-lanceolate, dentate with triangular teeth; peduncles about 1 dm. long.

1. *V. carpesioides*.

2. *V. deltoidea*.

1. **Venegazia carpesioides** DC. Prodr. 6: 43. 1837.

Parthenopsis maritimus Kellogg, Proc. Calif. Acad. 5: 101. 1873.

An erect sparingly branched herb; stem 1-2.5 m. high, often woody at the base; leaves alternate, petioled; blades thin, 5-15 cm. long, 3-12 cm. broad, cordate, crenate-dentate, minutely puberulent, more or less 3-5-ribbed; outer involucre bracts ovate, entire, herbaceous, the intermediate ones suborbicular, the inner rounded, oval, more membranous and erose on the margin, all indistinctly veined and puberulent; ligules 13-20, about 2 cm. long, normally entire and acute but often irregularly toothed at the apex; achenes angled, about 12-nerved, papillose-roughened.

TYPE LOCALITY: California.

DISTRIBUTION: Southern California.

2. **Venegazia deltoidea** Rydberg, sp. nov.

An erect slender branched herb; stem 5 dm. high or more, somewhat woody at the base, terete, purplish, sparingly puberulent; leaves alternate; petioles 2-3 cm. long; blades deltoid-lanceolate, 5-7 cm. long, 2-3 cm. broad, thin, puberulent on both sides, dentate with broadly triangular acute spreading teeth, except at the entire acute apex; peduncles slender, about 1 dm. long; involucre hemispheric, about 1 cm. high, 1.5 cm. broad; outer bracts ovate with oblong reflexed foliaceous tips, the intermediate and inner ones broadly oval, puberulent, more membranous than in the preceding species, the innermost delicate and cream-colored; ligules 15-18, about 15 mm. long and 5-6 mm. broad, entire at the apex; achenes linear-oblong, 12-ribbed, papillose.

Type collected at Sangal, northern Lower California, April 7, 1886, *Orcutt* (herb. Columb. Univ.).

DISTRIBUTION: Lower California.

7. **CLAPPIA** A. Gray, in Torr. Bot. Mex. Bound. Surv. 93. 1859.

Low undershrubs with alternate fleshy leaves. Heads radiate, solitary, peduncled at the ends of the branches; peduncles slightly thickened below the head. Involucre campanulate; bracts impressed-striate, obtuse, in 3-4 series, those of the inner two subequal, of the outer much shorter. Receptacle convex, setose-fimbriate, alveolate. Ray-flowers pistillate, fertile; ligules linear, 3-dentate at the apex. Disk-corollas numerous, fertile; corollas glabrous; tube cylindrical; throat campanulate; limb with 5 oblong lanceolate teeth. Anthers linear, obtuse at the base, with lanceolate tips. Style-branches hispidulous, with ovate tips. Achenes oblong, obscurely 6-10-costate, hirtellous. Pappus of 15-25 barbellate bristles, somewhat squamellate below.

Type species, *Clappia suaedaefolia* A. Gray.

1. **Clappia suaedaefolia** A. Gray, in Torr. Bot. Mex. Bound. Surv. 93. 1859.

A perennial, shrubby at the base; stem branched, striate, 3-4 dm. high; leaves fleshy, 1-3 cm. long, linear, or the lower pinnately dissected into 3-5 similar lobes; involucre cam-

panulate, about 1 cm. high; bracts obtuse, elliptic, or the outer oval and much shorter; ray-flowers 10-15; achenes about 3 mm. long, somewhat angled; pappus-bristles tawny, about 5 mm. long.

TYPE LOCALITY: Laredo, Texas.
DISTRIBUTION: Southern Texas.
ILLUSTRATION: Hook. Ic. *pl.* 1105.

EXCLUDED SPECIES

CLAPPIA AURANTIACA Benth. in Hook. Ic. III. 2: 3. *pl.* 1104 (1876) is *Clomenocoma aurantia* (L.) Cass.

JAUMEA TENUIFOLIA Klatt, Leopoldina 23: 146. 1887. (*Neurolaena tenuifolia* Schultz-Bip.; Klatt, Leopoldina 23: 146, as synonym. 1887.) This has capillary pappus and oblong striate bracts, and is apparently rayless. It belongs probably to the *Eupatorieae*.

Subtribe 2. RIDDELLIANAE. Heads radiate. Ray-flowers pistillate and fertile, the disk-flowers hermaphrodite and fertile or in *Whitneya* sterile. Ligules becoming papery, persistent on the achenes, falling off with them. Involucre of 1-2 series of nearly equal bracts. Receptacle alveolate. Achenes many-striate. Plants more or less woolly, without oil-glands.

Pappus paleaceous; ligules broad and few, mostly 3-5, rarely more; receptacle naked.

8. PSILOSTROPHE.

Pappus wanting; ligules usually numerous.

Involucre hemispheric; receptacle naked; leaves alternate.
Involucre campanulate; receptacle villous; leaves opposite.

9. BAILEYA.

10. WHITNEYA.

8. PSILOSTROPHE DC. Prodr. 7: 261. 1838.

Riddellia Nutt. Trans. Am. Phil. Soc. II. 7: 371. 1841.

Perennial herbs or low shrubs, more or less tomentose or woolly. Leaves alternate, entire or slightly lobed. Heads radiate, usually short-peduncled, corymbosely arranged. Involucre cylindraceous, campanulate, or rarely turbinate, of a single series of equal, lanate, more or less connivent bracts, and sometimes 1-4 scarious within and one small calyculate one below. Receptacle small, naked. Ray-flowers pistillate, in a single series; ligules broad, 3-lobed, 4-nerved, yellow, becoming papery in age and persistent on the achenes. Disk-flowers hermaphrodite, fertile, regular; tube very short; throat cylindrical; limb with 5 short, glandular lobes. Anthers obtuse at the base, with lanceolate tips. Style-branches truncate-capitellate at the apex. Achenes linear, obtusely angled, striate, either glabrous or nearly so, or long-villous. Pappus of acute or obtuse, unequal, lacerate or ciliate squamellae.

Type species, *Psilostrophe gnaphalodes* DC.

Pubescence of the stem villous or villous-hirsute.

Achenes long-villous.

1. *P. gnaphalodes*.

Achenes glabrous or nearly so.

Squamellae of the pappus lanceolate to subulate, acute.

Stem loosely white-villous.

Ligules 3-4 mm. long.

Ligules 5-7 mm. long.

Stem green, sparingly pilose and glandular-granuliferous.

Branches long, as well as leaves strongly ascending.

Branches short, more or less spreading; leaves divaricate.

Squamellae ovate to lance-elliptic, obtuse.

Shrub 3-6 dm. high; ligules about 3 mm. long.

Undershrubs 1-4 dm. high; ligules 6-12 mm. long.

Plant about 3 dm. high; involucre 5-6 mm. high, 3-4 mm. broad; squamellae lance-elliptic.

Plant green, short-villous; leaves entire; ligules 8-10 cm. long.

Plant grayish, densely long-villous; some of the lower stem-leaves usually lobed; ligules 6-8 mm. long.

Plant 1-2 dm. high; involucre 6-8 mm. high, 4-5 mm. broad; squamellae ovate.

7. *P. grandiflora*.8. *P. lanata*.9. *P. Bakeri*.10. *P. Cooperi*.

Pubescence of the stem densely white-pannose.

1. *Psilostrophe gnaphalodes* DC. Prodr. 7: 261. 1838.

Riddellia arachnoidea A. Gray, Mem. Am. Acad. II. 4: 94. 1849.
Riddellia gnaphalioides O. Hoffm. Bull. Herb. Boiss. 3: 628. 1895.

A biennial with a taproot; stem sparingly branched, 3–5 dm. high, loosely villous; basal leaves rather many, oblanceolate or linear-oblanceolate, 5–8 cm. long, loosely long-villous, rarely lobed; stem-leaves oblong or linear, sessile; heads in congested corymbs, short-peduncled; involucre densely woolly, 6 mm. high and 3 mm. broad; ligules 3–4, bright-yellow, about 6 mm. long, 3-cleft about three fourths their length; disk-flowers 8–12; achenes long-villous; squamellae of the pappus lanceolate, acute.

TYPE LOCALITY: San Luis Potosi.

DISTRIBUTION: Texas to San Luis Potosi and Zacatecas.

2. *Psilostrophe villosa* Rydb.; Britton, Man. 1006. 1901.

Psilostrophe cerifera A. Nelson, Proc. Biol. Soc. Wash. 16: 21. 1903.
Psilostrophe cerifera biennis A. Nelson, Proc. Biol. Soc. Wash. 16: 21. 1903.
Psilostrophe biennis Hay, Miller & White, Proc. Biol. Soc. Wash. 16: 186. 1903.

A biennial or short-lived perennial, scarcely woody at the base; stem 2–4 dm. high, loosely woolly, corymbosely branched; lower leaves oblanceolate, entire, or some pinnately 3–5-lobed, 2–10 cm. long, short-petioled, loosely villous, the upper ones smaller and sessile; heads several, corymbosely clustered; involucre about 5 mm. high, 3 mm. broad; ligules 3–4, light-yellow, turning darker or buff, 3–4 mm. long, 3-cleft about one third their length; disk-corollas 5–8, more or less ceriferous; achenes glabrous, linear; squamellae lanceolate, about half to two thirds as long as the disk-corollas.

TYPE LOCALITY: Kansas.

DISTRIBUTION: Kansas to Texas and eastern New Mexico.

ILLUSTRATIONS: Britt. & Brown, Ill. Fl. f. 3958 (as *P. Tagetinae*); ed. 2. f. 4527.

3. *Psilostrophe Tagetinae* (Nutt.) Britt. & Brown, Ill. Fl. 3: 444. 1898.

Riddellia Tagetinae Nutt. Trans. Am. Phil. Soc. II. 7: 371. 1841.
Riddellia tagetina T. & G. Fl. N. Am. 2: 362. 1842.
Psilostrophe tagetina Greene, Pittonia 2: 176. 1891.

A perennial with a thick taproot; stems 2–3 dm. (rarely 4 dm.) high, woody at the base, loosely white-villous, much branched; lower leaves spatulate, 2–5 cm. long, densely villous; upper leaves linear or linear-oblanceolate, greener; heads in rather open corymbs, short-peduncled; involucre about 6 mm. high, 3 mm. broad; ligules 3–5, bright-yellow, 5–7 mm. long, 3-lobed about one fourth their length; disk-flowers 7–10; achenes glabrous; squamellae lanceolate, acute, from one half to two thirds as long as the disk-corollas.

TYPE LOCALITY: Southern range of the Rocky Mountains toward the sources of the Platte [Colorado].

DISTRIBUTION: From western Texas to Colorado, Arizona, and Chihuahua.

ILLUSTRATION: Emory, Notes Mil. Recon. Bot. pl. 5.

4. *Psilostrophe sparsiflora* (A. Gray) A. Nelson, Proc. Biol. Soc. Wash. 16: 23. 1903.

Riddellia tagetina sparsiflora A. Gray, Syn. Fl. N. Am. 1²: 318. 1886.
Psilostrophe tagetina sparsiflora Greene, Pittonia 2: 176. 1891.

A perennial with thick taproot and woody caudex; stems usually several, 2–4 dm. high, angled and striate, sparingly pilose and glandular-granuliferous, sparingly branched; branches strongly ascending; basal leaves spatulate, 5–8 cm. long, loosely villous; upper leaves linear or linear-oblanceolate; heads comparatively few; involucre about 5 mm. high, 3 mm. broad, villous; ligules usually 3, bright-yellow, 6–8 mm. long, shallowly 3-lobed; disk-corollas about 10, glabrous; achenes angled, glabrous; squamellae unequal, lanceolate, scarcely half as long as the disk-corollas.

TYPE LOCALITY: Southern Utah.

DISTRIBUTION: Southern Utah and Arizona.

5. *Psilostrophe divaricata* Rydberg, sp. nov.

A low perennial with woody caudex; stems about 2 dm. high, green, sparingly pilose and glandular-granuliferous, angled and striate, much branched; branches ascending-spreading; basal leaves linear-oblongate, 3–5 cm. long, loosely villous, with tufts of hairs at their bases; stem-leaves linear, entire or some of them with a few short lobes; heads rather numerous, corymbose; involucre 4 mm. high and 2 mm. broad; ligules mostly 3, about 4 mm. long, shallowly 3-cleft; disk-corollas 4–7; achenes glabrous, angled; squamellae lanceolate, acute, about half as long as the disk-corollas.

TYPE LOCALITY: Type collected in the Grand Canyon of the Colorado, Arizona, 1897, *D. T. Allen* (herb. N. Y. Bot. Gard.).

DISTRIBUTION: Arizona and Chihuahua.

6. *Psilostrophe Hartmanii* Rydberg, sp. nov.

A low shrub, 3–6 dm. high; stem rather densely woolly below, less so above; branches ascending, 2–4 cm. long, villous; leaves linear or linear-oblongate, 2–4 cm. long, 2–4 mm. wide; heads numerous; peduncles less than 1 cm. long; involucre 5 mm. high, 3–4 mm. broad; ligules 3, orange, 2–3 mm. long, shallowly 3-lobed; disk-flowers 6–8; achenes glabrous, striate; squamellae lance-elliptic, obtuse.

TYPE LOCALITY: Type collected near Laguna de Guzman, Chihuahua, July 16, 1891, *C. V. Hartman 726* (herb. N. Y. Bot. Gard.).

7. *Psilostrophe grandiflora* Rydberg, sp. nov.

A green perennial, woody at the base; stems sparingly villous with ascending branches; leaves entire, spatulate or the upper linear-oblongate, the lower 3–6 cm. long, green, sparingly villous; heads corymbose, rather numerous; peduncles slender, 2–4 cm. long; involucre about 6 mm. long, 3–4 mm. broad; ligules mostly 3, bright-yellow, 8–10 mm. long, rather shallowly 3- or 4-toothed; disk-corollas 7–10, glabrous; achenes 5-angled, glabrous, striate; squamellae ovate- or lance-oblong, obtuse, less than half as long as the disk-corollas.

TYPE LOCALITY: Type collected near Cedar Gulch, Paradise, Arizona, *Blumer 1709* (herb. N. Y. Bot. Gard.).

DISTRIBUTION: Arizona, New Mexico, and Sonora (?).

8. *Psilostrophe lanata* (A. Nelson) Hay, Miller & White, Proc. Biol. Soc. Wash. 16: 186. 1903.

Psilostrophe tagetina lanata A. Nelson, Proc. Biol. Soc. Wash. 16: 21. 1903.

A perennial, woody only at the base, which is densely woolly; stems 3–4 dm. high, long-villous, angled and striate, usually with strongly ascending branches; basal leaves spatulate, petioled, 5–10 cm. long, rather densely long-woolly, at least when young; lower stem-leaves often toothed or lobed, with oblong divisions; upper stem-leaves linear or linear-oblongate; heads rather numerous; peduncles mostly short, 1–2 cm. long; involucre about 6 mm. long, 3 mm. broad; ligules 3–5, orange or bright-yellow, 6–8 mm. long, shallowly 3-lobed; disk-corollas 7–10; achenes glabrous, striate; squamellae lance-elliptic, about half as long as the disk-corollas.

TYPE LOCALITY: Texas.

DISTRIBUTION: Western Texas to New Mexico and Chihuahua.

9. *Psilostrophe Bakeri* Greene, Pl. Baker. 3: 29. 1901.

Riddellia tagetina pumila M. E. Jones, Proc. Calif. Acad. II. 5: 700. 1895.

Psilostrophe pumila A. Nelson, Proc. Biol. Soc. Wash. 16: 22. 1903.

A perennial with taproot and branched woody caudex; stems long-villous, 1–2 dm. high, branched above; lower leaves broadly spatulate, 5–10 cm. long, densely long-villous, entire, the upper linear-oblongate or oblong; heads corymbose; involucre 6–8 mm. long, 4–5 mm. broad; ligules 4–6, shallowly 3-lobed, 8–12 mm. long; disk-flowers 8–10; achenes glabrous, striate; squamellae ovate, obtuse, denticulate, less than half as long as the disk-corollas.

TYPE LOCALITY: Montrose, Colorado.

DISTRIBUTION: Western Colorado.

10. *Psilostrophe Cooperi* (A. Gray) Greene, *Pittonia* 2: 176. 1891.*Riddellia Cooperi* A. Gray, *Proc. Am. Acad.* 7: 358. 1868.

A perennial, shrubby at the base; stems in clumps, branched, 3-5 dm. high, densely white-pannose when young; leaves narrowly linear, 3-7 cm. long, 1-2 mm. broad, or the lower ones broader, green and glabrate in age; heads scattered; peduncles 3-8 cm. long; involucre campanulate, about 8 mm. long, 5 mm. broad; bracts 15-20, oblong; ligules 4 or 5, rarely 6-8, broadly oval, 10-12 mm. long and nearly as wide, broadly 3-toothed; disk-corollas slightly glandular-granuliferous; achenes glabrous; squamellae oblong or lanceolate, entire or erose.

TYPE LOCALITY: Fort Mojave.

DISTRIBUTION: Southern California, Nevada, Utah, Arizona, and Lower California.

9. *BAILEYA* Harv. & Gray; Torr. in Emory, *Notes Mil.*

Rec. 144. 1848.

Annual or perennial floccose herbs. Leaves alternate, once or twice pinnatifid or the upper entire. Heads radiate, several- or many-flowered, on long peduncles. Involucre hemispheric, of many nearly equal herbaceous woolly bracts in two series. Receptacle flat or convex, naked, alveolate. Ray-flowers 5-50, in a single series, pistillate, fertile; ligules oval or oblong, broadly 3-toothed at the apex, 7-nerved, becoming scarious-papery, persistent. Disk-flowers many, hermaphrodite, fertile; corolla-tube short; throat tubular-funnelform; limb 5-toothed; teeth glandular-bearded. Anthers linear, minutely sagittate at the base. Style-branches short, with truncate-capitate ends. Achenes oblong-linear, truncate at the apex, somewhat angled, many-ribbed or many-striate, those of the rays callous-thickened at the apex. Pappus none.

Type species, *Baileya multiradiata* Harv. & Gray.

Ray-flowers 5-6, indistinctly 3-toothed; slender, annual.

1. *B. pauciradiata*.

Ray-flowers 20-50, distinctly 3-toothed.

Ligules 8-12 mm. long, oblong or cuneate-oblong; intermediate ribs of the achenes rather prominent, although often not so strong as those of the angles.

Stem erect, branched, leafy for more than half its height; peduncles 5-10 cm. long.

Annual; stem erect, branched; branches ascending; ligules 8-9 mm. long; leaf-segments linear or oblong.

2. *B. pleniradiata*.

Perennial or biennial.

Leaf-segments obovate, short; stem branched above with ascending branches; achenes with the principal ribs slightly stronger than the intermediate ones; ligules about 8 mm. long.

3. *B. Thurberi*.

Leaf-segments linear, oblong, or lanceolate; stem branched at the base with erect branches; achenes with the principal ribs much stronger; ligules 10-12 mm. long.

4. *B. perennis*.

Stem decumbent and branched at base; leaves numerous, clustered at the base or on the lower half of the stem; peduncles 1-2 dm. long; leaf-segments broad, obovate.

5. *B. multiradiata*.

Ligules about 15 mm. long, linear; intermediate ribs of the achenes obsolete.

6. *B. australis*.1. *Baileya pauciradiata* Harv. & Gray; A. Gray, *Mem. Am. Acad.* II.

4: 105. 1849.

A floccose annual; stem 2-3 dm. high, loosely and densely villous, with ascending branches; lower leaves oblanceolate in outline, 5-10 cm. long, densely villous, more or less pinnatifid with linear or oblong divisions; upper leaves usually entire and linear; heads corymbiform-cymose; peduncles 2-5 cm. long; involucre about 6 mm. high; bracts 8-10; ligules 5-6, oval, truncate, rather indistinctly 3-toothed, 6-8 mm. long, 5-6 mm. broad; disk-flowers 10-20; corollas 3 mm. long, glandular-granuliferous; achenes about 5 mm. long, linear, slightly clavate, truncate at the apex, indistinctly angled and striate-ribbed, scabrous-hispidulous and somewhat glandular-granuliferous.

TYPE LOCALITY: California.

DISTRIBUTION: Southern California, adjacent Arizona and Sonora, and Lower California.

2. *Baileya pleniradiata* Harv. & Gray; A. Gray, Mem. Am. Acad. II.
4: 105. 1849.

Baileya multiradiata pleniradiata Coville, Contr. U. S. Nat. Herb. 4: 133. 1893.
Baileya nervosa M. E. Jones, Contr. W. Bot. 8: 34. 1898.

A floccose annual; stem 2–3 dm. high, leafy, branched from the base, loosely woolly; lower leaves oblanceolate in outline, densely villous, 5–8 cm. long, more or less pinnatifid with linear or oblong divisions, the uppermost usually entire and linear; heads at the ends of the branches; peduncles 3–8 (rarely 9–10) cm. long; involucre hemispheric, about 8 mm. high and 10 mm. broad; bracts 20–30; ligules 20–35 (rarely 40), obovate-oval, 8–9 mm. long and about 6 mm. broad, undulately 3-toothed at the apex; disk-flowers 40–50; corollas 4 mm. long, glandular-granuliferous; achenes tapering downward from the truncate apex, 4 mm. long, glandular-scabrous, angled, some of the ribs being stronger.

TYPE LOCALITY: California.

DISTRIBUTION: Southern part of California, Nevada, and Utah, western Arizona, and northern Sonora.

3. *Baileya Thurberi* Rydberg, sp. nov.

A biennial or perennial; stem 2–4 dm. high, erect, simple at the base, much branched and leafy above, rather loosely floccose; branches ascending; leaves, except the uppermost, spatulate or cuneate in outline, 1–3 cm. long, lobed or divided into obovate divisions, densely floccose; peduncles terminating the branches, 5–10 cm. long; involucre hemispheric, 5–6 mm. high, about 1 cm. broad; bracts about 40, linear-lanceolate; ligules 30–40, oblong, abruptly tapering at the base, with 3 rounded-ovate teeth at the apex, about 8 mm. long and 4 mm. wide; disk-flowers numerous; corollas about 3 mm. long, glandular-granuliferous; achenes about 3 mm. long, scabrous-hispidulous as well as glandular-granuliferous, tapering downwards, the ribs on the angles slightly stronger than the rest.

Type collected along the Pecos [Texas] 1850, *Thurber* 132 (herb. N. Y. Bot. Gard.).

DISTRIBUTION: Western Texas, New Mexico, and Coahuila.

4. *Baileya perennis* (A. Nelson) Rydberg, sp. nov.

Baileya pleniradiata perennis A. Nelson, Bot. Gaz. 47: 431. 1909.

A floccose perennial; stem branched at or near the base, floccose; branches erect, simple, leafy, about 3 dm. high; leaves 4–6 cm. long, nearly all pinnatifid with oblong or linear divisions, only the uppermost entire and linear; peduncles terminal, 5–15 cm. long; involucre hemispheric, 5–6 mm. high, 12–14 mm. broad; bracts 30 or more, linear-lanceolate; ligules 30–40, cuneate-oblong, 10–12 mm. long, 4 mm. wide, tapering at the base, with 3 broadly ovate teeth; disk-flowers numerous; corollas 4 mm. long, glandular-granuliferous; achenes 3.5 mm. long, glandular-granuliferous, tapering downward from the truncate summit, angled, the ribs of the angles next stronger than the rest. Forms intermediate between this and the next preceding and next following species are sometimes found.

TYPE LOCALITY: Moapa, Nevada.

DISTRIBUTION: Southern Nevada to Arizona and Chihuahua.

5. *Baileya multiradiata* Harv. & Gray; Torr. in Emory,
Notes Mil. Recon. 144. 1848.

Baileya multiradiata nudicaulis A. Gray, Syn. Fl. N. Am. 1^o: 318. 1884.

Baileya pleniradiata multiradiata Kearney, Trans. N. Y. Acad. Sci. 14: 42. 1894.

A floccose biennial; stem 2–3 dm. high, decumbent and branched at the base, leafy only below, densely white-floccose; basal leaves numerous, spatulate, 3–5 cm. long, the earlier 3-lobed and crenate, the later deeply 3-cleft and lobed, densely white-floccose; lower stem-leaves similar or more pinnatifid with obovate divisions, the uppermost entire; heads solitary on long terminal peduncles, which are 1–2 dm. long; involucre hemispheric, 7–8 mm. high, 12–15 mm. broad; bracts 25–35, linear-lanceolate; ligules 35–50, cuneate-oblong, tapering at the base, about 1 cm. long, with 3 broadly ovate teeth at the end, orange, turning pale-yellow in age; disk-flowers very numerous, glandular-granuliferous, about 4 mm. long; achenes

somewhat angled at the truncate apex, tapering gradually downwards, glandular-granuliferous, almost equally striate-ribbed.

TYPE LOCALITY: Along the [Rio Grande] Del Norte [New Mexico].

DISTRIBUTION: Western Texas to Nevada and Chihuahua.

ILLUSTRATION: Emory, Notes Mil. Recon. Bot. *pl.* 6.

6. *Baileya australis* Rydberg, sp. nov.

A floccose biennial or perennial; stem ascending, branched at the base, floccose; leafy only towards the base; basal leaves cuneate or spatulate, 3-lobed, densely floccose, lower stem-leaves 5–10 cm. long, pinnately cleft into long linear-oblong divisions; peduncles about 1 dm. long; involucre 8–10 mm. high, 15–18 mm. broad; ligules 40–50, linear, about 15 mm. long, 3–4 mm. wide, with 3 lanceolate teeth; disk-flowers very numerous; corollas 3 mm. long, puberulent; achenes 4 mm. long, tapering from the truncate summit, 5-angled, the ribs on the angles prominent and produced into blunt callous teeth at the apex, the intermediate ribs obsolete.

Type collected at Santiago Papasquiaro, Durango, 1896, *E. Palmer* 50 (herb. N. Y. Bot. Gard.).

DISTRIBUTION: Durango and Aguascalientes.

10. *WHITNEYA* A. Gray, Proc. Am. Acad. 6: 549. 1865.

Low tomentose perennials of the habit of *Arnica*, with rootstocks. Stem simple, bearing 2–3 pairs of opposite, entire, or denticulate leaves. Heads radiate, many-flowered. Involucre campanulate; bracts 9–12, herbaceous, lanceolate-oblong, equal, only slightly overlapping. Receptacle conic, faveolate, villous. Ray-flowers 7–9, pistillate, fertile; ligules oblong, obscurely 3-toothed at the apex, 9–16-nerved, becoming papery, and persistent. Disk flowers numerous, sterile. Corollas pubescent; tube very short; throat tubular-funnelform; limb obtusely 5-toothed. Anthers linear. Style-branches of the disk-flowers linear, hirsute pubescent, with obtusish appendages. Achenes of the rays oblong, somewhat compressed, with several faint nerves, hirsute; pappus none.

Type species, *Whitneya dealbata* A. Gray.

1. *Whitneya dealbata* A. Gray, Proc. Am. Acad. 6: 550. 1865.

A low perennial with slender rootstock; stem 2–3 dm. high; leaves opposite, the lower ones spatulate or elliptic, petioled, the upper lanceolate, all entire or denticulate, acute at each end, densely canescent, mostly 3-ribbed; inflorescence cymose; heads 1–5; involucre about 8 mm. high and 10–12 mm. broad; ligules oblong, 1–1.5 cm. long, 6–7 mm. wide; achenes oblong, 4 mm. long.

TYPE LOCALITY: California.

DISTRIBUTION: Sierra Nevada, California.

Subtribe 3. **PERITYLANAE.** Heads radiate or discoid. Ray-flowers, if present, pistillate. Ligules deciduous. Disk-flowers hermaphrodite, mostly 4-toothed, all fertile. Achenes flat, with only marginal callous nerves, these usually ciliate. Style-branches and their appendages slender. Receptacle flat or convex. Involucre of narrow erect bracts in one or sometimes two subequal series.

Bracts of the involucre distinct, mostly in 2 equal series.

Bracts of the involucre more or less boat-shaped, partly surrounding the marginal achenes and double-ribbed on the back?

Throat of the disk-corollas campanulate or funnelform, not much if at all exceeding the tube.

Pappus of a crown of small squamellae and 0–2 awns; margins of the achenes ciliate; appendages of the style-branches short.

Tomentose shrubs; heads in naked corymbs, discoid; pappus-bristles absent.

Glandular or cinereous herbs or low undershrubs; heads solitary or few on long peduncles, usually radiate; pappus-bristles 1 or 2, in one species sometimes wanting.

11. NESOTHAMNUS.

12. PERITYLE.

- Pappus of 1 awn but no crown of squamellae; margins of the achenes not ciliate; undershrubs; appendages of the style-branches subulate. 13. MONOTHRIX.
- Throat of the disk-corollas cylindrical; much exceeding the tube in length; appendages of the style-branches subulate-filiform; perennials woody at the base. 14. LEPTOPHARYNX.
- Bracts of the involucre not boat-shaped, neither enclosing the achenes nor double-ribbed on the back.
- Plant not floccose.
- Pappus absent or of 1 or 2 awns on the angles; heads in naked panicles (except one species). 15. LAPHAMIA.
- Pappus of a crown of many bristle-like squamellae; heads solitary, terminating leafy branches. 16. PAPPOTHRIX.
- Plant white-floccose.
- Ray-flowers ligulate; plant subcaulescent. 17. EATONELLA.
- Ray-flowers wanting or with oblique campanulate throat and 3-toothed; plant caulescent. 18. LEMBERZIA.
- Bracts in a single series, more or less united.
- Pappus present, of a crown of squamellae and 1 or 2 awns; leaves petioled with broad blades. 19. PERICOME.
- Pappus wanting; leaves sessile, linear. 20. CROCKERIA.

11. NESOTHAMNUS Rydberg, gen. nov.

Low white-tomentose shrubs. Leaves alternate, 3-divided and cleft. Heads discoid, numerous in naked corymbs. Involucre hemispheric; bracts oblanceolate in two equal series, boat-shaped, double-ribbed on the back. Flowers all tubular, hermaphrodite and fertile, densely glandular; tube slender, about equaling the deeply campanulate throat; lobes 4, ovate. Style-appendages short, acute. Achenes 2-edged, sub-turgid, silky-villous. Pappus of a crown of united squamellae; awns wanting.

Type species, *Perityle incana* A. Gray.

1. *Nesothamnus incanus* (A. Gray) Rydberg.

Perityle incana A. Gray, Proc. Am. Acad. 11: 78. 1876.

A low shrub, 5-10 dm. high; branches densely white-tomentose; leaves alternate; petioles 2-4 cm. long; blades 3-5 cm. long, densely white-tomentose, 3-divided, the divisions cuneate, 2-3-cleft, lobed and incised; heads numerous, corymbose, involucre hemispheric, 5 mm. high and about 6 mm. broad; bracts oblanceolate, acute, puberulent; disk-corollas 2 mm. long, densely glandular; achenes oblong, about 3 mm. long, sub-turgid, hirsute throughout; pappus scarcely 0.5 mm. long.

TYPE LOCALITY: Guadalupe Island, off Lower California.

DISTRIBUTION: Guadalupe Island.

12. PERITYLE Benth. Bot. Voy. Sulph. 23. 1844.

Galinsogopsis Schultz-Bip. in Seem. Bot. Voy. Herald 306. 1856.

Glandular or viscid-puberulent herbs or cinereous slender undershrubs. Leaves opposite or alternate, usually both, petioled; blades mostly ovate or cordate in outline, from nearly entire to deeply dissected. Heads most commonly solitary, peduncled, terminating the branches or rarely few in small corymbs, usually radiate. Involucre hemispheric; bracts narrow in a single or in two subequal series, more or less boat-shaped, somewhat enclosing the marginal achenes, double-ribbed. Receptacle naked, alveolate, flat. Ray-flowers pistillate, fertile; ligules white or yellow, 3-toothed at the apex, deciduous. Disk-flowers numerous, yellow; tube slender, glandular-puberulent; throat campanulate or funnelliform, not much, if any, exceeding the tube in length; limb 4-toothed. Achenes oblong or elliptic, strongly compressed, the margins strongly ciliate, often more or less callous-thickened. Pappus of a small crown of erose or lacinate squamellae and 1 or 2 (rarely 0) barbellate bristles at the summit of one or both edges.

Type species, *Perityle californica* Benth.

Herbaceous glandular- or arachnoid-pubescent perennials or annuals. (EUPERITYLE.)

Slender annuals with rather thin leaves.

Margins of the achenes with distinctly callous margins; ligules yellow or in *P. microglossa* often white. (*Californicae*.)

Bristle 1, longer than the achene.

- Involucre about 6 mm. high and 7-8 mm. broad; achenes oblong.
 Leaf-blades more or less deeply lobed.
 Leaf-blades merely dentate.
- Involucre about 4 mm. high and 5-6 mm. broad; achenes oval.
 Bristles 2, shorter than the achene.
 Callous margin of the achenes broad, about half as broad as the body.
 Callous margin of the achenes narrow.
- Involucre 6-8 mm. high, 10-11 mm. broad; achenes oblanceolate-cuneate.
 Involucre 3-5 mm. high, 4-7 mm. broad; achenes oblong.
 Leaves more or less lobed; ligules 2 mm. long, with short rounded teeth.
 Leaves merely dentate; ligules 4 mm. long, deeply toothed.
- Margins of the achenes not callous; ligules white except in the first species; awn solitary or wanting. (*Emoryanae*.)
- Ligules bright-yellow; plant low.
 Ligules white or cream-colored.
 Leaves not deeply divided, merely lobed.
 Achenes 2 mm. long, short-hispid on the margins.
 Achenes 3 mm. long, long-hirsute on the margins.
 Leaves deeply divided, more than halfway to the midrib.
- Perennials, or if annuals with thick fleshy leaves. (*Crassifoliae*.)
- Low decumbent plant; involucre 5 mm. high and 6-7 mm. broad; awns 2.
 Tall erect plants; involucre 6-7 mm. high, 10-12 mm. broad; awn 1.
 Densely arachnoid even as to the involucre; awn equaling the achene.
 Glandular-puberulent plant, arachnoid only at the base; awn shorter than the achene.
- Suffruticose grayish-puberulent perennials, slightly if at all glandular; stems woody at least at the base. (*GALINSOGEOPSIS*.)
 Leaves not deeply dissected.
 Heads radiate; achenes not keeled on the faces.
 Leaf-blades 1-3 cm. long.
 Leaf-blades acuminate.
 Leaf-blades acute.
 Leaf-blades dentate; achenes pubescent.
 Leaves not punctate beneath.
 Leaves decidedly impressed-punctate beneath.
 Leaf-blades entire or nearly so; achenes glabrous.
 Leaf-blades less than 1 cm. long.
 Heads discoid; achenes slightly keeled on the faces.
- Leaves deeply dissected.
 Ultimate lobes of the leaves cuneate; involucre 8-10 mm. high, 10-12 mm. broad.
 Ultimate lobes of the leaves linear or oblanceolate; involucre 4-5 mm. high, 6-8 mm. broad.
 Leaf-blades 2-3 cm. long; plant slender, decumbent.
 Leaves not impressed-punctate; awn minute, much shorter than the achene.
 Leaves impressed-punctate; awns about as long as the achene.
 Leaf-blades 0.5-2.5 cm. long; plant erect, low.
1. *P. californica*.
 2. *P. deltoidea*.
 3. *P. plumigera*.
 4. *P. marginata*.
 5. *P. cuneata*.
 6. *P. microglossa*.
 7. *P. urticifolia*.
 8. *P. aurea*.
 9. *P. Grayi*.
 10. *P. Emoryi*.
 11. *P. Greenei*.
 12. *P. socorrensis*.
 13. *P. crassifolia*.
 14. *P. robusta*.
 15. *P. saxosa*.
 16. *P. spilanthoides*.
 17. *P. ciliata*.
 18. *P. Rosei*.
 19. *P. Hojmeisteria*.
 20. *P. jaliscana*.
 21. *P. Vaseyi*.
 22. *P. lineariloba*.
 23. *P. gracilis*.
 24. *P. coronopifolia*.

1. *Perityle californica* Benth. Bot. Voy. Sulph. 23. 1844.

A divaricately branched viscid-pubescent annual; stem 1-2 dm. high; leaves petioled, opposite or alternate; petioles 2-4 cm. long; leaf-blades rhombic-ovate or the upper suborbicular in outline, triple-ribbed, cuneate or truncate at the base, sparingly pubescent on both sides, somewhat lobed and coarsely dentate, the lower 3-5 cm. long; peduncles axillary, 1-3 cm. long; involucre hemispheric, 7-8 mm. broad; bracts oblanceolate, striate, hispid, the inner ones with scarious margins; ray-flowers 12-15; ligules light-yellow, broadly oblong, 3-toothed, 3 mm. long; disk-flowers numerous, yellow, glandular-puberulent; achenes barely 2 mm. long, oblong, hirsute on the callous margins, pubescent on the faces; pappus of a crown of erose lanceolate squamellae one fourth as long as the achene and a single awn barbellate throughout.

TYPE LOCALITY: Bay of Magdalena, Lower California.

DISTRIBUTION: Lower California.

ILLUSTRATIONS: Benth. Bot. Voy. Sulph. *pl.* 15; Bot. Gaz. 15: *pl.* 13, *f.* 3.

2. *Perityle deltoidea* S. Wats. Proc. Am. Acad. 24: 57. 1889.

A low annual; stem 1-3 dm. high, diffusely branched, glandular-puberulent; leaves petioled, opposite or the upper alternate; petioles 1-3 cm. long; blades ovate-deltoid or subcordate,

2-3 cm. long, glandular-puberulent, dentate or crenate-dentate; peduncles 3-5 cm. long; involucre hemispheric, about 6 mm. high and 8 mm. broad; bracts linear or linear-lanceolate, acuminate, ciliate; ligules yellow, becoming pale, linear-oblong, 4 mm. long, 3-toothed; style-appendages linear, obtuse, not hispidulous; disk-corollas about as long as the achenes, glandular-puberulent; achenes oblong, short-hispid on the margins, 2 mm. long; pappus of a crown of short bristle-like squamellae and a single plumose awn as long as the achene.

TYPE LOCALITY: Los Angeles Bay, Lower California.
DISTRIBUTION: Lower California.

3. *Perityle plumigera* Harv. & Gray; A. Gray, Mem. Am. Acad. II. 4: 77. 1849.

A slender annual; stem glandular-puberulent, 1-2 dm. high, with strongly ascending branches; leaves mostly alternate; petioles less than 1 cm. long; blades ovate or the upper oblong-lanceolate, glandular-puberulent, rarely more than 1 cm. long, coarsely toothed and sometimes hastately lobed; peduncles 2-4 cm. long; involucre hemispheric, about 4 mm. high and 5-6 mm. broad; bracts oblanceolate, glandular-puberulent and ciliolate, short-acuminate; ray-flowers 10-12; ligules yellow, oval, 3 mm. long, crenulate at the apex; corolla of the disk-flowers longer than the achenes; appendages of the style-branches obtuse; achenes oval, 2 mm. long, densely hirsute on the callous margin, the hairs longer than the crown of squamellae of the pappus; awn solitary, longer than the achene and equaling the corolla, plumose.

TYPE LOCALITY: "California," but probably now within Arizona or Sonora.
DISTRIBUTION: Sonora and Sinaloa.

4. *Perityle marginata* Rydberg, sp. nov.

A glandular-puberulent annual; stem diffusely branched, 1-2 dm. high, leafy; leaves mostly opposite, only the uppermost alternate; petioles short, usually less than 1 cm. long; blades cordate, glandular-puberulent, 1-2 cm. long, acute, crenate-dentate; peduncles 2-3 cm. long; involucre hemispheric, about 5 mm. high and 8 mm. broad; bracts oblanceolate, acute, glandular-puberulent and ciliate towards the apex; ray-flowers 10-15; ligules yellow, oblong-oblanceolate, 5 mm. long, slightly 3-toothed; disk-corollas 2.5 mm. long, glandular-puberulent; style-appendages obtuse; achenes obovate, 2 mm. long and more than 1 mm. broad, with broad callous margin, slightly hirsute on the faces; pappus of a small crown of squamellae and 2 short awns.

Type collected at San José del Cabo, Lower California, March 25, 1911, *Rose 16459* (herb. N. Y. Bot. Gard.).
DISTRIBUTION: Lower California and Sinaloa.

5. *Perityle cuneata* Brand. Zoe 1: 54. 1890.

An erect annual; stem 4-7 dm. high, glandular-pubescent; leaves petioled, the lower opposite, the upper alternate; petioles 1-2 cm. long; blades broadly ovate, truncate or subcordate at the base, irregularly serrate, glandular-puberulent, comparatively thick, 2-4 cm. long; peduncles 1-5 cm. long; involucre hemispheric, 6-8 mm. high, 10-11 mm. broad; ray-flowers 12-15; ligules yellow, oblong, 3-crenate, 6-8 mm. long; disk-corollas glandular-puberulent, shorter than the achenes; achenes oblanceolate-cuneate, short-hirsute on the callous margin; pappus of 2 broad lacerate squamellae about one fifth, and two scabrous awns scarcely half as long as the achene.

TYPE LOCALITY: Sierra de Laguna, near Todos Santos, Lower California.
DISTRIBUTION: Lower California.

6. *Perityle microglossa* Benth. Bot. Voy. Sulph. 119. 1844.

Perityle Acmeila Harv. & Gray; A. Gray, Mem. Am. Acad. II. 4: 77. 1849.
Perityle microglossa effusa A. Gray, Syn. Fl. N. Am. 1²: 322. 1884.
Perityle effusa Rose, Contr. U. S. Nat. Herb. 1: 104. 1891.

An annual, often much branched; stem 2-5 dm. high, glabrate below, glandular-puberulent above; lower leaves usually opposite, the upper alternate, petioled; petioles 1-3 cm. long; blades ovate or cordate, 2-4 cm. long, mostly 3-5-cleft or the earlier not cleft, 3-ribbed, dentate;

the upper ones often hastately lobed and narrower; peduncles 1-3 cm. long, glandular-puberulent; involucre hemispheric, about 5 mm. high and 7 mm. broad; bracts narrowly oblanceolate, acuminate, glandular-puberulent; ray-flowers 10-12; ligules light-yellow or white, 2 mm. long, with 3 rounded teeth; disk-corollas glandular-puberulent, about as long as the achenes; achenes oblong, hirsute on the callous margins; faces slightly hirsute; pappus of a small crown of lanceolate squamellae, rather shorter than the hairs, and 2 unequal awns scarcely half as long as the achene.

TYPE LOCALITY: Realejo, Nicaragua.

DISTRIBUTION: Southern California and Arizona to Tepic and San Luis Potosi; Nicaragua.

ILLUSTRATION: Bot. Gaz. 15: pl. 13, f. 5.

7. *Perityle urticifolia* Rydberg, sp. nov.

A slender annual; stem 2-4 dm. high, puberulent; leaves opposite, only the uppermost alternate; petioles 1-2 cm. long; blades cordate, thin, 2-5 cm. long, crenate-dentate, sparingly puberulent; peduncles 1-3 cm. long; involucre 3-4 mm. high, 3-5 mm. broad; bracts linear-oblanceolate, puberulent; ray-flowers 6-8; ligules 4 mm. long, deeply 3-toothed, yellow; disk-flowers 1.5 mm. long; achenes broadly oblong, glabrous on the faces, hirsute on the narrow callous margins, 1.5 mm. long; pappus of a minute crown and 2 very short awns.

Type collected at Tepic, Mexico, 1892, *Edward Palmer 1960* (herb. N. Y. Bot. Gard.).

DISTRIBUTION: Tepic, Sinaloa; and Zacatecas.

8. *Perityle aurea* Rose, Contr. U. S. Nat. Herb. 1: 84. 1890.

A low annual; stem 1-2 dm. high, much branched, hirsutulous and glandular-puberulent; leaves short-petioled; blades cordate or reniform, irregularly lobed and serrate, glandular-puberulent; peduncles short; involucre about 5 mm. high, 7-8 mm. broad; bracts oblanceolate, acute; ligules yellow, less than 2 mm. long; disk-corollas with slender tube; throat campanulate; style-branches with acuminate appendages; achenes 2 mm. long, linear, ciliate on the margins, pubescent on the face; pappus of a crown of united squamellae, fimbriate; awns solitary, short.

TYPE LOCALITY: Santa Rosalia, Lower California.

DISTRIBUTION: Lower California.

9. *Perityle Grayi* Rose, Bot. Gaz. 15: 118. 1890.

Perityle Emoryi S. Wats. Proc. Am. Acad. 11: 116. 1876. Not *P. Emoryi* Torr. 1848.
Perityle Fitchii Palmeri A. Gray, Syn. Fl. N. Am. 1²: 321. 1884.

A low winter annual; stem branched, sparingly hirsute and slightly glandular-puberulent above, 1-2 dm. high; leaves mostly alternate; petioles 1-3 cm. long; blades thin, sparingly pubescent, ovate in outline, 1-3 cm. long, deeply lobed with sinuately toothed lobes; peduncles 1-5 cm. long; involucre hemispheric, 5 mm. high, 7-8 mm. broad; bracts oblanceolate, acuminate, sparingly puberulent; ray-flowers about 10; ligules white, broadly rectangular, 3-crenate, 2.5-3 mm. long; disk-corollas about as long as the achenes; achenes barely 2 mm. long, oblong, sometimes somewhat falcate, short-hispid on the margins; pappus of many small squamellae united into an erose crown; awn usually wanting.

TYPE LOCALITY: Guadalupe Island, Lower California.

DISTRIBUTION: Islands of Lower California.

10. *Perityle Emoryi* Torr. in Emory, Notes Mil. Recon. 142.

1848.

Perityle nuda Torr. Pacif. R. R. Rep. 4: 100. 1857.
Perityle Emoryi nuda A. Gray, Bot. Calif. 1: 397. 1876.
Perityle californica A. Gray, Syn. Fl. N. Am. 1²: 321. 1884. Not *P. californica* Benth. 1844.
Perityle californica nuda A. Gray, Syn. Fl. N. Am. 1²: 321. 1884.
Perityle Rothrockii Rose, Bot. Gaz. 15: 114. 1890.
Perityle Emoryi Ocruttii Rose, Bot. Gaz. 15: 117. 1890.
Laphamia nuda Benth. & Hook.; Jacks. Ind. Kew. 3: 30. 1894.
Laphamia Emoryi Benth. & Hook.; Jacks. Ind. Kew. 3: 30. 1894.

A winter annual, sparingly hirsute as well as glandular-puberulent; stem branched, 1-3 dm. high; leaves petioled, the lower opposite, the upper alternate; petioles 1-3 cm. long; blades cordate, reniform, or flabelliform, palmately lobed and incised, 1-3 cm. long; peduncles 1-3

cm. long; involucre hemispheric, 5 mm. high, 5–7 mm. broad; bracts oblanceolate, acute, glandular-puberulent; ligules about 10, white, 2–3 mm. long, 3-crenate; disk-corollas glandular-puberulent, nearly as long as the achenes; style-appendages oblong, obtuse; achenes short-hirsute on the margins, linear or linear-oblanceolate, 3 mm. long, with some deciduous hairs on the faces; pappus of a crown of small lanceolate squamellae and a single awn 2 mm. long, or bristle wanting (var. *nuda*).

TYPE LOCALITY: Cordilleras of California.

DISTRIBUTION: Southern California, Arizona, Sonora, and Lower California.

ILLUSTRATION: Bot. Gaz. 15: *pl. 13, f. 6*.

11. *Perityle Greenei* Rose, Bot. Gaz. 15: 117. 1890.

Perityle Fitchii Greene, Bull. Calif. Acad. 2: 403. 1887. Not *P. Fitchii* Torr. 1857.

Perityle californica Vasey, Proc. U. S. Nat. Mus. 11: 368. 1889. Not *P. californica* Benth. 1844.

A glandular-puberulent and slightly hirsute winter annual; stem 1–3 dm. high, more or less branched; leaves petioled, opposite or alternate; petioles 1–2 cm. long; blades ovate, cordate or suborbicular in outline, 1–2 cm. long, deeply palmately cleft and serrate; peduncles 1–4 cm. long; involucre 5 mm. high, 5–6 mm. broad; bracts oblanceolate; ray-flowers 10–12; ligules white, broadly oval-oblong, 2 mm. long, sinuately 3-toothed; disk-corollas slightly shorter than the achenes; style-appendages acute; achenes linear-oblong, 2.5 mm. long, short-hirsute on the margins; pappus of a short crown of united lacerate squamellae, and a single awn half as long as the achene or wanting.

TYPE LOCALITY: Santa Cruz Island, California.

DISTRIBUTION: Islands off Southern California and Lower California.

ILLUSTRATION: Bot. Gaz. 15: *pl. 13, f. 7*.

12. *Perityle socorrensis* Rose, Bot. Gaz. 15: 118. 1890.

Originally described as apparently annual, but more likely perennial; stem densely hispidulous and glandular-puberulent; leaves short-petioled; blades ovate or deltoid, 1–2 cm. long, thick, densely glandular-hispidulous, crenate; peduncles 2–5 cm. long; involucre about 5 mm. high, 6–7 mm. broad; bracts linear-lanceolate, glandular-hispidulous; ligules 3-toothed, white, 3 mm. long; disk-flowers slender, 3 mm. long; style-branches with broad and acute tips; achenes oblong, 3 mm. long, ciliate on the margin, hispidulous on the faces; pappus of a crown of minute bristle-like squamellae, and 2 unequal awns scarcely half as long as the achene.

TYPE LOCALITY: Socorro Island.

DISTRIBUTION: Revillagigedo Islands.

ILLUSTRATION: Bot. Gaz. 15: *pl. 13, f. 9*.

13. *Perityle crassifolia* Brand. Proc. Calif. Acad. II. 3: 147. 1891.

Perennial, somewhat woody at the base; stem striate, 3–5 dm. high, densely arachnoid-villous and glandular-puberulent; leaves mostly alternate; petioles about 1 cm. long; blades reniform or cordate-ovate, crenate, 1–2 cm. long, densely arachnoid-villous; peduncles 1–4 cm. long; involucre 6–7 mm. high, 10–12 mm. broad; bracts lanceolate, arachnoid-villous; ray-flowers 15 or more; ligules white, spatulate, 6–7 mm. long; disk-corollas glandular-puberulent, about as long as the achenes; throat about equaling the tube; achenes somewhat curved, pubescent on the faces, ciliate on the margins; pappus of a short lacerate crown of squamellae, and a single retrorsely barbed awn about equaling the achene.

TYPE LOCALITY: San José del Cabo, Lower California.

DISTRIBUTION: Southern Lower California.

14. *Perityle robusta* Rydberg, sp. nov.

Apparently perennial with a taproot; stem striate, 3–5 dm. high, somewhat arachnoid-pubescent at the base, glandular and viscid above; leaves mostly alternate; petioles 1–2.5 cm. long; leaf-blades cordate or reniform in outline, 1–2.5 cm. broad, thick, somewhat arachnoid viscid-pubescent and glandular-puberulent, more or less deeply lobed and crenate; heads in leafy panicles; peduncles 1–5 cm. long, glandular-pubescent; involucre about 8 mm. high and

12 mm. broad, glandular-puberulent and sparingly viscid-villous; bracts lanceolate, acute; ray-flowers 12-15; ligules white, 5 mm. long and 3 mm. broad, 3-toothed; disk-corollas fully 2 cm. long; tube fully equaling the throat; achenes oblong, 2 mm. long, hispidulous on the faces, ciliate on the margins; pappus-crown of minute squamellae; awn solitary, barbellate, shorter than the achene.

Type collected at Cerralvo, Lower California, 1911, *J. N. Rose 16880* (herb. N. Y. Bot. Gard.).
DISTRIBUTION: Lower California.

15. *Perityle saxosa* Brand. *Zoe* 5: 225. 1905.

Galinsogopsis spilanthoides Schultz-Bip. in Seem. Bot. Voy. Herald 307, in part. 1856.

Perennial with many stems, 4-5 dm. high, puberulent; leaves opposite; petioles 1-2 cm. long; blades thin, elongate-deltoid, acuminate, coarsely dentate, truncate at the base, 2-5 cm. long, grayish-puberulent; heads cymose-paniculate; peduncles 2-6 cm. long; involucre 4 mm. high, 5 mm. broad; bracts oblanceolate, puberulent, acute; ligules white, 2-3 mm. long, 1-1.5 mm. broad; disk-flowers 1 mm. long; tube about equaling the campanulate throat; achenes pubescent, short-ciliate on the mostly callous margins, 2 mm. long; pappus of a short crown of fimbriate squamellae and usually two unequal awns, the longer half as long as the achene, the other much shorter, or the latter or both wanting.

TYPE LOCALITY: Cerro Colorado, Sinaloa.
DISTRIBUTION: Sinaloa.

16. *Perityle spilanthoides* (Schultz-Bip.) Rydberg.

Galinsogopsis spilanthoides Schultz-Bip. in Seem. Bot. Voy. Herald 307. 1856.

Pericome spilanthoides Benth. & Hook.; Hemsl. Biol. Centr. Am. Bot. 2: 215. 1881.

Perityle microcephala A. Gray, Proc. Am. Acad. 21: 391. 1886.

A suffruticose perennial; stems 2-4 dm. long, slender, grayish-puberulent, diffusely branched, decumbent; leaves opposite; petioles 1-2 cm. long; blades deltoid or deltoid-ovate, truncate or cuneate at the base, 1-3 cm. long, coarsely dentate, puberulent; heads corymbose; peduncles 1-5 cm. long; involucre about 4 mm. high and 5 mm. wide; bracts oblanceolate, puberulent; ray-flowers 10-12; ligules white, broadly oblong, or almost rectangular, 2 mm. long, coarsely 3-toothed; disk-corollas 1.5-2 mm. long; style-appendages subulate; achenes oblong, densely ciliate on the margins, pubescent on the faces, barely 2 mm. long; pappus of a small crown of squamellae and 1 or 2 awns shorter than the achene.

TYPE LOCALITY: Sierra Madre, northwestern Mexico [Sinaloa].
DISTRIBUTION: Arizona to Chihuahua, Durango, and Sinaloa.

17. *Perityle ciliata* (L. H. Dewey) Rydberg.

Laphamia ciliata L. H. Dewey, Bot. Gaz. 20: 425. 1895.

A suffruticose perennial; stems 1-3 dm. high, slender, erect, grayish-puberulent; leaves opposite; petioles about 1 cm. long; leaf-blades deltoid-ovate, 1-1.5 cm. long, puberulent, mostly truncate at the base, acute at the apex, coarsely dentate; heads 2-3 in small corymbs; peduncles 1-5 cm. long; involucre about 5 mm. high and 7-8 mm. broad; bracts oblanceolate, acute, puberulent-canescens; ray-flowers 10-12; ligules white, about 3 mm. long; disk-corollas glandular-puberulent, nearly 3 mm. long; tube equaling the funnelform throat; achenes 2.5 mm. long, oblong, densely hirsute-ciliate on the margins, sparingly so on the faces; pappus of a short crown of squamellae, and 2 awns nearly equaling the achene in length.

TYPE LOCALITY: Tucson Mountains, Arizona.
DISTRIBUTION: Arizona.

18. *Perityle Rosei* Greenman, Proc. Am. Acad. 40: 45. 1905.

A perennial with a woody base; stem striate, puberulent, 1-2 dm. high; leaves opposite or the uppermost alternate; petioles about 1 cm. long; blades ovate-triangular or somewhat hastate, 1-3 cm. long, acute or rounded at the apex, entire or slightly sinuate, puberulent on both sides; peduncles 1-3 cm. long; involucre about 5 mm. high; bracts oblanceolate, acute, pubescent; ray-flowers 10-12; ligules white, oblong, 2 mm. long; disk-corollas about 2 mm. long;

achenes oblong, about 2.5 mm. long, ciliate on the callous margins, glabrous on the faces; pappus of a crown of united erose squamellae and 2 awns nearly as long as the achene.

TYPE LOCALITY: Sierra Madre, west of Bolaños, Jalisco, Mexico.
DISTRIBUTION: Jalisco.

19. *Perityle Hofmeisteria* Rydberg, sp. nov.

A low perennial with woody caudex; stems slender, about 1 dm. high; leaves mostly opposite; petioles about 5 mm. long; blades minute, rhomboid, entire or often with 1 tooth on each side, 3–6 mm. long, grayish-puberulent and somewhat impressed-punctate; peduncles slender, about 1 cm. long; involucre turbinate, 5 mm. high, 5–6 mm. broad; bracts puberulent, oblanceolate, acute; ray-flowers 10–12; ligules white, oblong, 3–4 mm. long, deeply 3-toothed; disk-corollas glandular-puberulent, nearly 3 mm. long, the tube equaling the narrowly funnelliform throat; achenes 3 mm. long, linear-oblong, densely hirsute on the callous margins and slightly so on the faces; pappus of a short crown of lanceolate squamellae and 2 awns about as long as the achene.

Type collected at the City of Durango, 1896, *Edward Palmer 28* (herb. N. Y. Bot. Gard.).

20. *Perityle jaliscana* A. Gray, in S. Wats. Proc. Am. Acad. 22: 431. 1887.

A low perennial with a woody caudex; stem puberulent, branched at the base, 5–15 cm. high; leaves opposite; petioles 1–1.5 cm. long; blades deltoid or rhombic, 5–15 mm. long, 3-ribbed, angularly toothed, puberulent and impressed-punctate; heads corymbose; peduncles slender, 1 cm. long or less; involucre turbinate, 4–5 mm. high and fully as broad; rays none; disk-corollas whitish, glandular-puberulent, 2 mm. long, the tube about equaling the throat; achenes linear-oblong, 2 mm. long, hirsute on the faces as well as on the margins, slightly carinate on the faces; pappus of a crown of short squamellae and two awns one half to one third as long as the achene.

TYPE LOCALITY: Rio Blanco, Jalisco.
DISTRIBUTION: Jalisco.

21. *Perityle Vaseyi* Coult. Contr. U. S. Nat. Herb. 1: 42. 1890.

Perennial with a woody base; stem 2–3 dm. high, glandular-pubescent; leaves mostly alternate; petioles 1–2 cm. long; blades triangular in outline, 2–4 cm. long, pinnately or palmately divided into long divisions which are again cleft and lobed, the ultimate lobes being cuneate; peduncles 3–7 cm. long; involucre 8–10 mm. high, 10–12 mm. broad; bracts linear-oblong, acute or acuminate, ciliate, especially at the tips; ligules deep-yellow, 4–6 mm. long, oblong, 3-toothed; disk-corollas funnelliform, 5.5 mm. long; style-appendages filiform-subulate, hirsute; achenes oblong, pubescent on the faces, hispid-ciliate on the margins, 3.5 mm. long; pappus of a crown of bristle-like squamellae and a single barbellate awn as long as the achene.

TYPE LOCALITY: Chisos Mountains, Texas.
DISTRIBUTION: Known only from the type locality.
ILLUSTRATION: Contr. U. S. Nat. Herb. 2: *pl.* 3.

22. *Perityle lineariloba* Rydberg, sp. nov.

A suffruticose perennial; stems decumbent, about 3 dm. long; branches grayish-puberulent; leaves mostly opposite; petioles slender, 1–2 cm. long; blades 2–3 cm. long, very thin, triangular in outline, pinnately 3–5-divided, finely puberulent and slightly glandular-granuliferous; divisions entire, linear or nearly so, or cleft into linear divisions; peduncles slender, 5–10 cm. long; involucre hemispheric or slightly turbinate, 4 mm. high, 5–7 mm. broad; bracts puberulent, lanceolate, acute; ray-flowers 10–15; ligules white, oblong, 4 mm. long; disk-corollas 2 mm. long; tube slightly shorter than the cylindro-campanulate throat; style-appendages short-subulate; achenes oblong-obovate, 1.5 mm. long, pubescent on the faces and the callous margins; pappus of a crown of lanceolate squamellae and one minute awn not more than twice as long as the hairs.

Type collected at San Ramon, Durango, April 21–May 18, 1906, *Edward Palmer 89* (herb. N. Y. Bot. Gard.).

23. *Perityle gracilis* (M. E. Jones) Rydberg.

Laphamia gracilis M. E. Jones, Proc. Calif. Acad. II. 5: 703. 1895.

A suffruticose perennial; stems decumbent or pendent from overhanging rocks, 2-3 dm. long, grayish-puberulent; leaves alternate; petioles 1-2 cm. long; blades 1.5-3 cm. long, broadly ovate in outline, pedately dissected, with the divisions again cleft into oblong or oblanceolate mostly obtuse lobes, puberulent and impressed-punctate; peduncles 3-5 cm. long; involucre turbinate, about 5 mm. high and 8 mm. broad; bracts puberulent, oblanceolate, short-acuminate; ray-flowers 10-12; ligules light-yellow, oblong, 7-8 mm. long, rather deeply 3-toothed; disk-corollas 2.5 mm. long, the tube about equaling the throat; achenes linear-oblong, 2 mm. long, sparingly ciliate on the slightly callous margin; pappus of a crown of short squamellae and 2 scabrous awns about as long as the achenes.

TYPE LOCALITY: Below Nagle's Ranch, Buckskin Mountains, Arizona.

DISTRIBUTION: Arizona.

24. *Perityle coronopifolia* A. Gray, Pl. Wright. 2: 82. 1853.

Laphamia coronopifolia Hemsl. Biol. Centr. Am. Bot. 2: 210. 1881.

? *Laphamia scopulorum* M. E. Jones, Contr. W. Bot. 12: 48. 1908.

A low suffruticose perennial; stems branched from the woody base, 1-2 dm. high, slender, canescent-puberulent; leaves small, the lower opposite, the upper alternate, short-petioled; blades ovate in outline, 3-7-divided, with linear-oblanceolate often again lobed divisions, puberulent and impressed-punctate; peduncles 1-2 cm. long; involucre turbinate, about 5 mm. high and 6 mm. broad; bracts oblanceolate, acuminate, puberulent; ray-flowers about 12; ligules white, oblong, 5-6 mm. long, 3-toothed; disk-corollas about 2 mm. long, the cylindro-campanulate throat about equaling the tube; style-appendages subulate; achenes broadly oblong, glabrous on the faces, hispid-ciliate on the slightly callous margins; pappus of a crown of numerous lanceolate squamellae and two awns shorter than the achenes.

TYPE LOCALITY: Copper Mines [Santa Rita del Cobre], New Mexico.

DISTRIBUTION: New Mexico, Arizona, Chihuahua, and Sonora.

13. *MONOTHRIX* Torr. in Stansb. Expl. Utah 389. 1852.

Low scabrous-puberulent corymbosely branched undershrubs. Leaves alternate, short-petioled, usually small and thick, scabrous-puberulent and somewhat punctate; blades mostly ovate in outline. Heads radiate or discoid, at the ends of the leafy branches. Involucre hemispheric; bracts in two subequal series, thick, boat-shaped, double-ribbed, partly enclosing the marginal achenes, rather broad. Receptacle nearly flat, strongly alveolate, naked. Ray-flowers, if present, pistillate and fertile. Disk-flowers numerous; tube of the corolla slender, glandular, slightly shorter than the narrowly funnelliform throat. Achenes flat, not ciliate on the margins. Pappus of 1 barbellate awn or wholly wanting.

Type species, *Monothrix Stansburyana* Torr.

Leaves small and thick; blades 1 cm. long or less; corollas yellow.

Heads radiate; pappus-awn present.

Heads discoid.

Pappus-awn wanting; plant tall, sparingly leafy.

Involucre 6 mm. high and 5-7 mm. broad.

Involucre 3 mm. high and 4-5 mm. broad.

Pappus usually of a single awn; plant low and very leafy.

Leaves spatulate or oblanceolate, entire or nearly so.

Leaves broadly ovate to rhombic, at least most of them toothed or lobed.

Leaves mostly broadly ovate, sinuately toothed.

Leaves rhombic, 3-lobed above the middle.

Leaves larger and thin; blades 1-1.5 cm. long; corollas cream-colored; pappus-awn present.

1. *M. Stansburii*.

2. *M. megacephala*.

3. *M. intricata*.

4. *M. Toumeyi*.

5. *M. congesta*.

6. *M. fastigiata*.

7. *M. Palmeri*.

1. *Monothrix Stansburii* (A. Gray) Rydberg.

Laphamia Stansburii A. Gray, Pl. Wright. 1: 101. 1852.

Monothrix Stansburyana Torr. in Stansb. Expl. Utah 390. 1852.

A somewhat fruticose perennial with a thick woody caudex; stems about 2 dm. high, branched, scabrous-puberulent; leaves mostly alternate; petioles about 0.5 cm. long; blades

suborbicular or broadly ovate, 5–10 mm. long, mostly sinuate-dentate, scabrous-puberulent and glandular-punctate; heads solitary at the ends of the branches, 30–40-flowered; involucre hemispheric, 5 mm. high and about 6 mm. broad; bracts oblanceolate, boat-shaped at the base, puberulent; ray-flowers 6–10; ligules yellow, broadly oval, 3 mm. long; disk-corollas nearly 4 mm. long; tube shorter than the tubular-funnelform throat; achenes oblong, 2.5 mm. long, hirsutulous; pappus of a single awn, longer than the achenes.

TYPE LOCALITY: Near Great Salt Lake, Utah [Stansbury Island].

DISTRIBUTION: Northern and central Utah.

ILLUSTRATION: Stansb. Expl. Utah Bot. *pl.* 7.

2. *Monothrix megacephala* (S. Wats.) Rydberg.

Laphamia megacephala S. Wats. Am. Nat. 7: 301. 1873.

A suffruticose perennial; stem scabrous-puberulent, diffusely branched, about 3 dm. high; leaves alternate, short-petioled; blades thick and firm, scabrous-ovate, 4–6 mm. long, entire or nearly so; heads at the ends of the branches; involucre 6 mm. high, 5–7 mm. broad; bracts lanceolate, puberulent; ray-flowers wanting; disk-corollas 3 mm. long; tube shorter than the cylindro-campanulate throat; achenes hispidulous; pappus wanting.

TYPE LOCALITY: Nevada.

DISTRIBUTION: Nevada.

3. *Monothrix intricata* (Brand.) Rydberg.

Laphamia intricata Brand. Bot. Gaz. 27: 450. 1899.

A suffruticose perennial, intricately branched from a woody base; stems numerous, 1.5–2 dm. high, scabrous-puberulent; leaves mostly alternate, linear-oblanceolate, about 5–8 mm. long, 1 mm. wide, obtuse, hispidulous-scabrous; heads terminating the branches; involucre about 3 mm. high and 5 mm. broad; bracts linear-oblanceolate, boat-shaped below, scabrous-puberulent, acute; ray-flowers none; disk-flowers about 30; corollas bright-yellow, 2 mm. long; tube glandular, slightly shorter than the campanulate throat; achenes oblong, hirsutulous; pappus wanting.

TYPE LOCALITY: Pahrump, Nevada.

DISTRIBUTION: Nevada.

4. *Monothrix Toumeyi* (Rob. & Greenm.) Rydberg.

Laphamia Toumeyi Rob. & Greenm. Am. Jour. Sci. III. 50: 176. 1895.

A suffruticose perennial, many-branched from a woody caudex, 1–2 dm. high; branches glandular-granuliferous, erect, terete, striate, rather cinereous, leafy; petioles 2–10 mm. long; blades spatulate or oblanceolate, 5–15 mm. long, entire or nearly so, obtuse, thickish, cinereous, scabrous-granuliferous; heads discoid, short-peduncled, ending the short branches; involucre campanulate, about 4 mm. high, 5–6 mm. broad; bracts about 15, linear, acute, densely puberulent; disk-flowers 25–35; tube glandular, equaling the throat; achenes oblong-linear, 2 mm. long, puberulent; awn solitary, 1.5 mm. long.

TYPE LOCALITY: Grand Cañon, Arizona.

DISTRIBUTION: Arizona.

5. *Monothrix congesta* (M. E. Jones) Rydberg.

Laphamia congesta M. E. Jones, Proc. Calif. Acad. II. 5: 703. 1895.

A suffruticose perennial, with a woody caudex; stems numerous, 1–2 dm. high, grayish-hispidulous, striate; leaves alternate; petioles about 2–5 mm. long; blades broadly lanceolate to broadly ovate or rhombic-ovate, 3–12 mm. long, sinuately toothed, scabrous-hispidulous; heads solitary at the ends of the branches, 15–20-flowered; involucre campanulate, 4–5 mm. high and 5–6 mm. broad, scabrous-puberulent; bracts linear-oblong, about 12, acute; rays none; disk-corollas 2.5–3 mm. long, cream-colored; tube about equaling the throat; achenes oblong, very scabrous-puberulent; awn solitary, equaling the achene.

TYPE LOCALITY: Mesa below Buckskin Mountains, Arizona.

DISTRIBUTION: Arizona.

6. *Monothrix fastigiata* (Brand.) Rydberg.

Laphamia fastigiata Brand. Bot. Gaz. 15: 451. 1899.

A suffruticose perennial with cespitose woody caudex; stems several, about 1 dm. high, scabrous-puberulent; lower leaves opposite, spatulate, petioled; stem-leaves rhombic-spatulate, 1-2 cm. long, trifid, or the upper smaller and entire; heads solitary at the ends of the stems, short-peduncled, discoid; involucre campanulate, 3-4 mm. high and nearly as broad; bracts about 15, linear, acute, hispidulous-puberulent; disk-flowers 30-40; corollas light-yellow, the tube puberulent; achenes 2 mm. long, slightly ciliate on the margins; awn solitary or sometimes wanting.

TYPE LOCALITY: Sheep Mountain, Nevada.

DISTRIBUTION: Known only from the type locality.

7. *Monothrix Palmeri* (A. Gray) Rydberg.

Laphamia Palmeri A. Gray, Proc. Am. Acad. 13: 372. 1878.

Laphamia Palmeri tenella M. E. Jones, Proc. Calif. Acad. II. 5: 703. 1895.

Laphamia tenella M. E. Jones, Proc. Calif. Acad. II. 5: 703. 1895.

A suffruticose perennial; stem, about 2 dm. high, scabrous-puberulent; leaves short-petioled; blades submembranaceous, deltoid or subcordate, 1-1.5 cm. long, sinuate-dentate, 3-ribbed, hispidulous; heads in leafy corymbs; peduncles 1-2 cm. long; involucre turbinate, 4-5 mm. high, 6-7 mm. broad; bracts oblanceolate, acute, boat-shaped at the base, puberulent; rays wanting; disk-flowers about 30 or more; corollas cream-colored, 3 mm. long; tube shorter than the cylindro-campanulate throat; achenes oblong, puberulent, 2.5 mm. long; pappus of a single scabrous awn, about as long as the achene.

TYPE LOCALITY: Beaverdam, northwest Arizona.

DISTRIBUTION: Arizona.

14. *LEPTOPHARYNX* Rydberg, gen. nov.

Low glandular or cinereous perennials with short woody caudex. Leaves alternate, or opposite, or both, petioled; blades mostly cordate or reniform in outline, from toothed to deeply dissected. Heads radiate or discoid, solitary, peduncled at the ends of the branches. Involucre hemispheric, of bracts in a single or two equal series; bracts narrow, with a double rib, more or less boat-shaped at least below. Receptacle flat or nearly so. Ray-flowers, if present, pistillate, fertile; ligules white or yellow. Disk-corollas yellow, numerous; tube short and slender, glandular-puberulent, much shorter than the cylindrical throat; limb 4-toothed. Style-branches with long, subulate or filiform appendages. Achenes flattened, with more or less callous and ciliate margins. Pappus normally of a minute crown of squamellae and 1 or 2 awns, but either or both in a few species wanting.

Type species, *Perityle Parryi* A. Gray.

Heads radiate.

Leaves not deeply divided.

Plant puberulent, not at all glandular.

Plant decidedly glandular.

Leaves not acutely lobed.

Plant finely glandular-puberulent; leaves mostly obtuse.

Plant more or less viscid-arachnoid-hairy.

Achenes strongly ciliate; pappus-crown prominent; involucre

10-15 mm. broad.

Achenes minutely ciliate; pappus-crown minute or none;

involucre 5-12 mm. broad.

Pappus of a minute crown of squamellae and a single awn;

leaf-blades with an open sinus.

Pappus wanting; leaf-blades with an acute narrow sinus.

Leaves very acutely lobed.

Leaves deeply 3-5-cleft.

Leaf-blades reniform in outline, mostly 5-cleft, with a few scattered long

hairs, or glabrate, very thin; achenes glabrous on the faces.

Leaf-blades ovate or cordate in outline, mostly 3-cleft, puberulent with

or without long hairs.

Pappus-crown of squamellae present; achenes densely ciliate on

the margins; leaves long-hairy as well as puberulent.

Pappus-crown represented by a callous margin; achenes sparingly

short-ciliate on the margins; leaves merely puberulent.

1. *L. leptoglossa*.

2. *L. Parryi*.

3. *L. cordifolia*.

4. *L. Lloydii*.

5. *L. grandifolia*.

6. *L. Palmeri*.

7. *L. lobata*.

8. *L. trisecta*.

9. *L. gilensis*.

Heads discoid.

Bracts narrowly linear; pappus-crown of squamellae present; awn as long as the corolla.

10. *L. aglossa*.

Bracts broadly linear; pappus-crown represented by a callous margin; awn very small or wanting.

Leaf-blades deeply dissected.

11. *L. dissecta*.

Leaf-blades merely crenate-dentate.

12. *L. Lemmoni*.

1. *Leptopharynx leptoglossa* (Harv. & Gray) Rydberg.

Perityle leptoglossa Harv. & Gray; A. Gray, Mem. Am. Acad. II. 4: 77. 1849.

A perennial, woody below; branches puberulent; leaves alternate; petioles 1–2 cm. long; blades cordate, puberulent, 3–5-ribbed, double-crenate, acute, 1–1.5 cm. long; peduncles 3–5 cm. long; involucre about 7 mm. high, 8–10 mm. broad; bracts linear, puberulent, acute; ligules yellow (?), 7–8 mm. long, linear; disk-flowers glandular-puberulent; tube 1.5 mm. long; throat almost tubular, 3 mm. long; style-appendages filiform; achenes oblong, densely ciliate on the margins; squamellae of the pappus very short; awn solitary, barbellate-hispidulous, about as long as the achene.

TYPE LOCALITY: "California."

DISTRIBUTION: Sonora.

2. *Leptopharynx Parryi* (A. Gray) Rydberg.

Perityle Parryi A. Gray, Pl. Wright. 2: 106. 1853.

Laphamia Parryi Benth. & Hook.; Hemsl. Biol. Centr. Am. Bot. 2: 210. 1881.

A perennial with a woody base; stems viscid-pilose and glandular-puberulent; leaves alternate; petioles 1–2 cm. long; blades reniform or broadly cordate, glandular-puberulent, 2–3 cm. broad, dentate with broad teeth and somewhat lobed, 3–5-ribbed; peduncles 2–5 cm. long; involucre about 8 mm. high, 8–10 mm. broad; bracts linear-oblancoolate, glandular-puberulent, acuminate; ligules yellow, 5–6 mm. long, linear-oblong; disk-corollas glandular-puberulent; tube 2 mm. long; throat trumpet-shaped, 3 mm. long; style-appendages attenuate-filiform; achenes linear-oblong, densely villous-ciliate; hairs equaling the squamellae of the pappus; awn solitary, barbellate-hispidulous, a little shorter than the disk-corolla.

TYPE LOCALITY: Cañon of the Rio Grande [Texas].

DISTRIBUTION: Texas and Chihuahua.

3. *Leptopharynx cordifolia* Rydberg, sp. nov.

A perennial with woody caudex; branches 1–2 dm. high, somewhat villous and glandular-puberulent, decumbent or ascending, terete; leaves mostly opposite; petioles 1–4 cm. long; leaf-blades broadly cordate, 3–5-ribbed, 1–4 cm. broad, doubly dentate, sparingly villous and glandular-puberulent; peduncles 4–7 cm. long; involucre hemispheric, 9–10 mm. high, 10–15 mm. broad; bracts narrowly caudate-attenuate, villous and glandular; ray-flowers 15–20; ligules yellow, linear-oblancoolate, 8–10 mm. long, 3-toothed; disk-corollas glandular-puberulent; tube 2 mm. long; throat tubular, 3.5 mm. long; achenes oblong, 3 mm. long, pubescent on the callous margins; pappus of a distinct crown of lanceolate squamellae, and a solitary, scabrous awn as long as the disk-corolla.

Type collected in the vicinity of Topolobampo, Sinaloa, *Rose, Standley & Russell 13294* (herb. N. Y. Bot. Gard.).

DISTRIBUTION: Sonora and Sinaloa.

4. *Leptopharynx Lloydii* (Rob. & Fern.) Rydberg.

Perityle Lloydii Rob. & Fern. Proc. Am. Acad. 30: 118. 1894.

A perennial; stem suffruticose at the base, 1–3 dm. high, cinereously viscid-villous and glandular-puberulent, branched; leaves opposite or the upper alternate; petioles 1–2 cm. long; blades ovate-deltoid, doubly dentate, truncate or subcordate at the base, 1.5–2.5 cm. long, villous on both sides; peduncles 3–5 cm. long, villous and glandular-pubescent; involucre 7–8 mm. high, 8–12 mm. broad; bracts narrowly linear, attenuate, villous and glandular; ray-flowers 18–20; ligules pale-yellow, 6 mm. long, 3-toothed; disk-flowers glandular-puberulent; tube slender, 2 mm. long; throat cylindric, 3–3.5 mm. long; style-branches with attenuate

appendages; achenes oblong with callous margins, puberulent, minutely or obscurely ciliate, 3 mm. long; pappus of a minute crown of squamellae and a single scabrous awn as long as the achene.

TYPE LOCALITY: Badehuache, Sonora.
DISTRIBUTION: Sonora.

5. *Leptopharynx grandifolia* (Brand.) Rydberg.

Perityle grandifolia Brand. Zoe 5: 224. 1905.

A perennial, branching from the suffrutescent base, 1–2 dm. high; branches sparingly viscid-villous; leaves opposite; petioles 3–5 cm. long, viscid-villous; blades broadly ovate, 4–7 cm. long, viscid-pubescent on both sides, 5–7-ribbed, coarsely crenate-serrate, cordate at base with acute sinus; peduncles 3–5 cm. long; involucre 5–6 mm. high and as broad; bracts linear, viscid-villous; ligules white, 5–6 mm. long; disk-flowers numerous; corolla-tube glandular-puberulent, 1–1.5 mm. long; throat cylindric, 2.5 mm. long; achenes oblong, 3 mm. long, without callous margins and pappus.

TYPE LOCALITY: Cerro Colorado, Sinaloa.
DISTRIBUTION: Sinaloa.

6. *Leptopharynx Palmeri* (S. Wats.) Rydberg.

Perityle Palmeri S. Wats. Proc. Am. Acad. 24: 57. 1889.

A low perennial, woody at the base; stems 1–2.5 dm. high, striate, glandular-villous when young; leaves opposite; petioles 3–5 cm. long, viscid-villous; blades thin, ovate-cordate, 3–5-ribbed, 3–5 cm. long, viscid-puberulent on both sides, acutely 7–9-lobed and sharply serrate, the lobes triangular, acute; peduncles 3–7 cm. long; involucre 7–8 mm. high and about 10 mm. broad; bracts narrowly linear, attenuate, viscid-villous; ray-flowers about 15; ligules yellow, 8 mm. long; disk-flowers numerous; corolla-tube glandular, 1.5 mm. long; throat 3 mm. long, subcylindric; achenes oblong, ciliate on the margins, 3 mm. long; pappus of a crown of squamellae slightly longer than the hairs, and a single barbellate awn equaling the disk-corolla.

TYPE LOCALITY: Guaymas, Sonora.
DISTRIBUTION: Guaymas and vicinity.

7. *Leptopharynx lobata* Rydberg, sp. nov.

A low perennial, woody at the base; stem scarcely 1 dm. high, sparingly viscid-villous; leaves opposite; petioles slender, 2–3 cm. long; blades very thin, reniform in outline, 1.5–2.5 cm. broad, nearly glabrous, 3–5-ribbed, usually 5-lobed, with rounded sinuses between the lobes; lobes obovate in outline, doubly dentate; peduncles 4–5 cm. long; involucre 8 mm. high and about as broad; bracts linear, acute, sparingly viscid-villous; ligules yellow, oblong, 8 mm. long, 2–2.5 mm. broad; disk-flowers many; corolla-tube nearly 2 mm. long, glandular-puberulent; throat subcylindric, 3 mm. long; achenes oblong, nearly 5 mm. long, short-ciliate on the callous margins; pappus of a small crown and a single barbellate awn as long as the disk-corolla.

Type collected at Coronado, Lower California, February 19, 1889, *T. S. Brandege* (Gray Herb.).

8. *Leptopharynx trisecta* Rydberg, sp. nov.

A suffruticose perennial; stems 1–3 dm. high, decumbent or ascending, arachnoid-villous and more or less glandular; leaves mostly opposite, the uppermost alternate; petioles 1–3 cm. long; blades deltoid or ovate in outline, deeply 3-cleft with rounded sinuses, the divisions usually again lobed and dentate, 1–3 cm. long, more or less viscid-villous and glandular-puberulent; heads corymbose; peduncles 1–3 cm. long; involucre 7–8 mm. high, 10–12 (rarely 13–15) mm. broad; bracts glandular-puberulent, linear-oblong, acute; ray-flowers 10–20; ligules pale-yellow, oblong, 6–8 mm. long; disk-corollas glandular-puberulent; tube 1.5–2 mm. long; throat fully 3 mm. long; achenes oblong, densely ciliate on the margins, which are scarcely callous, pubescent on the faces; pappus of a short crown of lanceolate squamellae; awn solitary, as long as the corolla, scabrous.

Type collected on dry cliffs, rocky hills near city of Chihuahua, March 20, 1885, *Pringle 183* (herb. N. Y. Bot. Gard.).

DISTRIBUTION: Chihuahua.

9. *Leptopharynx gilensis* (M. E. Jones) Rydberg.

Laphamia gilensis M. E. Jones, *Zoe* 2: 15. 1891.

A suffruticose perennial with shrubby base; stem 1–2.5 dm. high, glabrous, striate and erect; leaves mostly opposite; petioles 1.5–2 cm. long; blades about 1 cm. long, ovate or broadly ovate in outline, 3-ribbed, those of the lower leaves merely dentate, those of the rest 3-lobed and dentate, puberulent and somewhat glutinous; heads solitary at the ends of the branches; peduncles 1–3 cm. long; involucre hemispheric, about 6 mm. high and 1 cm. broad; bracts broadly oblanceolate, acute; ligules yellow, about 5 mm. long; disk-flowers many; corollas 5 mm. long; tube 1.5 mm. long, glandular, much shorter than the cylindrical throat; achenes 3.5 mm. long, slightly puberulent, sparingly short-ciliate on the margins; pappus of a callous margin and a single awn 3 mm. long.

TYPE LOCALITY: Putnam's Ranch, near Gila River, Arizona.
DISTRIBUTION: Known only from the type locality.

10. *Leptopharynx aglossa* (A. Gray) Rydberg.

Perityle aglossa A. Gray, *Pl. Wright*. 2: 107. 1853.

Laphamia aglossa Benth. & Hook.; *Hemsl. Biol. Centr. Am. Bot.* 2: 210. 1881.

A perennial with woody base; stem 1–1.5 dm. high, glandular-puberulent; leaves opposite and alternate; petioles 1–3 cm. long; blades rounded-cordate, deeply lobed and coarsely dentate, 2–5 cm. broad; peduncles 2–5 cm. long; involucre hemispheric, 8 mm. high, 9–13 mm. broad; bracts narrowly linear, attenuate; ray-flowers wanting; disk-corollas slender, glandular-puberulent; tube 1.5–2 mm. long; throat cylindrical, fully 3 mm. long; achenes linear-oblong, ciliate on the slightly callous margins, 3 mm. long; hairs nearly equaling the squamellae of the pappus; awn solitary, barbellate, equaling the corolla.

TYPE LOCALITY: Cañon of the Rio Grande [according to label Arroyo San Carlos], Texas.
DISTRIBUTION: Western Texas.

11. *Leptopharynx dissecta* (Torr.) Rydberg.

Laphamia dissecta Torr.; A. Gray, *Pl. Wright*. 2: 81. 1853.

Perityle dissecta A. Gray, *Syn. Fl. N. Am.* 1²: 320. 1884.

Laphamia Lemmoni pedata A. Gray, *Proc. Am. Acad.* 16: 101. 1880.

A low perennial with woody caudex; stem 1–2 dm. high, branched, villous and glandular-puberulent; leaves mostly alternate, suborbicular or cordate, twice pedately dissected into oblong-linear or oblong lobes, villous; heads short-peduncled at the ends of the branches; involucre campanulate, 5–6 mm. high, 4–5 mm. broad; bracts linear, boat-shaped, villous; rays none; disk-flowers about 20; corollas 3 mm. long; tube much shorter than the trumpet-shaped throat; achenes oblong, pubescent, with a callous border at the apex; awn solitary or often wanting.

TYPE LOCALITY: Presidio del Norte.
DISTRIBUTION: Western Texas to Arizona.

12. *Leptopharynx Lemmoni* (A. Gray) Rydberg.

Laphamia Lemmoni A. Gray, *Proc. Am. Acad.* 16: 101. 1880.

A suffruticose perennial with a thick woody caudex; stems depressed, spreading, branched, less than 1 dm. high, villous; leaves opposite; petioles about 1 cm. long, villous; blades cordate-orbicular, 5–7-lobed and incised, 1–1.5 cm. long, villous and glandular; heads solitary; peduncles about 1 cm. long; involucre 6 mm. high and fully as broad; bracts oblanceolate, boat-shaped at the base, villous; rays none; disk-corollas pale-yellow, 3 mm. long; tube about equaling the throat; achenes oblong, hirsutulous; pappus of a delicate awn or wanting.

TYPE LOCALITY: Near Camp Lowell, Arizona.
DISTRIBUTION: Arizona.

15. LAPHAMIA A. Gray, *Pl. Wright*. 1: 99. 1852.

Low suffruticose perennials, with rather thick woody bases and many stems. Leaves opposite, or alternate, or both, with ovate or lanceolate toothed blades, more or less punctate.

Heads several (except in one species) in naked corymbs, radiate or discoid. Involucre campanulate; bracts rather thin, neither boat-shaped nor surrounding the marginal achenes. Receptacle flat. Ray-flowers, if present, pistillate and fertile; ligules rectangular, oval, or obovate. Disk-flowers comparatively few; tube glandular-puberulent; throat campanulate to nearly cylindrical. Achenes flat, not ciliate on the margins. Pappus of 1 or 2 bristles or wanting; crown of squamellae never present.

Type species, *Laphamia halimifolia* A. Gray.

Heads corymbose; corolla-throat campanulate; pappus-awns wanting or solitary.

Rays present; leaf-blades rhombic-ovate, dentate.

Pappus of a single awn.

Leaf-blades rounded-ovate or suborbicular, truncate at the base, firm.

Leaf-blades ovate, cuneate at the base, thin.

Pappus wanting; leaf-blades ovate-rhombic, with few salient teeth.

Rays wanting; pappus wanting.

Leaf-blades ovate, laciniate; stems decumbent.

Leaf-blades narrowly lanceolate; stems erect, short.

Heads solitary; corolla-throat nearly cylindrical; pappus of 2 awns.

1. *L. rotundata*.
2. *L. Lindheimeri*.
3. *L. halimifolia*.
4. *L. laciniata*.
5. *L. angustifolia*.
6. *L. bisetosa*.

1. *Laphamia rotundata* Rydberg, sp. nov.

A low perennial with thick woody caudex; stems about 1 dm. high, glandular-puberulent; leaves mostly alternate; petioles 5–8 mm. long, glandular-puberulent; blades 5–10 mm. long, rounded-ovate or suborbicular, truncate at the base, coarsely dentate, 3-ribbed, rather firm, glandular- or scabrous-puberulent and impressed-punctate; heads corymbose; involucre campanulate, 4 mm. high and about as broad; bracts 10–12, linear-oblongate, glabrate; disk-corollas 3 mm. long; tube shorter than the campanulate-funnel-form throat; achenes oblong, 2 mm. long, sparingly and minutely hispidulous; pappus of a single bristle, nearly equaling the corolla.

Type collected at San Estaban, Texas, September 3, 1852, *Bigelow* (referred to *L. rupestris* by Dr. Gray; type in herb. N. Y. Bot. Gard.).

2. *Laphamia Lindheimeri* A. Gray, Pl. Wright. 1: 101. 1852.

A perennial with woody caudex; stems erect, 1–2 dm. high, grayish-puberulent; leaves mostly alternate; petioles about 1 cm. long; blades ovate to elliptic, entire or sinuate-dentate, minutely puberulent or glabrate, glandular-punctate, 1–2 cm. long, 3-ribbed; heads corymbose; involucre 3.5–4 mm. high, 4 mm. broad; bracts 12–14, linear-oblongate, ciliate towards the apex; ligules obovate, 3 mm. long, 3-toothed; disk-corollas 2 mm. long, the tube equaling the campanulate throat; achenes oblong, 2 mm. long, minutely hispidulous on the margins; pappus of a single bristle or rarely wanting.

TYPE LOCALITY: Banks of Guadalupe River, near New Braunfels, Texas.

DISTRIBUTION: Central Texas.

3. *Laphamia halimifolia* A. Gray, Pl. Wright. 1: 100. 1852.

A perennial with a thick woody caudex; stems 1–2 dm. high, minutely puberulent or glabrate; leaves alternate; petioles about 1 cm. long; leaf-blades rather firm, 1–2.5 cm. long, triple-ribbed, ovate or rhombic, veiny, dentate, with few rather salient teeth, glandular-granuliferous and punctate; heads many in naked corymbs, 18–20-flowered, involucre campanulate, 3.5 mm. high, 2.5–3 mm. broad; bracts about 10, linear, glabrous except the ciliate tips; ligules broadly oval, 2 mm. long, slightly 3-toothed; disk-corollas 2.5 mm. long; tube about equaling the campanulate throat; achenes linear-oblongate, minutely puberulent, the faces obscurely 2- or 3-nerved, with a slightly callous margin at the apex, but no pappus.

TYPE LOCALITY: San Pedro River [Texas].

DISTRIBUTION: Western Texas.

ILLUSTRATION: A. Gray, Pl. Wright. 1: pl. 9, B.

4. *Laphamia laciniata* (Torr.) Rydberg, sp. nov.

Laphamia angustifolia? *laciniata* Torr. Bot. Mex. Bound. Surv. 82. 1859.

A perennial with woody caudex; stems decumbent, diffuse, 3–5 dm. long, grayish-puberulent; leaves mostly alternate; petioles about 1 cm. long; blades spatulate or cuneate, with few

lanceolate salient teeth, 1–2 cm. long, puberulent and somewhat punctate, triple-ribbed; involucre turbinate, 5 mm. high, about 6 mm. broad; bracts oblanceolate, grayish-puberulent; rays wanting; disk-corollas fully 3 mm. long; tube slightly shorter than the deeply campanulate throat; achenes fully 3 mm. long, pilose; pappus wanting.

TYPE LOCALITY: Crevices of rocks along the Rio Grande, Texas.

DISTRIBUTION: Western Texas.

5. *Laphamia angustifolia* A. Gray, Pl. Wright. 1: 100. 1852.

A perennial with a thick woody caudex; stem about 1 dm. high, minutely and sparingly puberulent; leaves alternate or some opposite; blades lanceolate or oblanceolate, with a few sharp teeth or entire, 1–1.5 cm. long, glandular-punctate, less distinctly 3-ribbed; heads corymbose; involucre 4 mm. high, 4–5 mm. broad; bracts linear-oblanceolate, slightly puberulent, ciliate towards the apex; rays wanting; disk-corollas 2.5 mm. long; tube nearly equaling the narrowly campanulate throat; achenes oblong-oblanceolate, puberulent, 2 mm. long; pappus wanting.

TYPE LOCALITY: "Between Texas and El Paso."

DISTRIBUTION: Western Texas.

6: *Laphamia bisetosa* Torr.; A. Gray, Pl. Wright. 2: 106. 1853.

A dwarf perennial with a thick woody caudex; stems many, about 3 cm. high, scabrous-hispidulous; leaves opposite and alternate, short-petioled; blades about 5 mm. long, ovate or obovate, thick, entire or with 1 or 2 teeth, glandular-punctate; heads sessile; involucre campanulate, 5 mm. high, 3 mm. broad; bracts 6–8, oblanceolate, ciliate at the apex; rays none; disk-flowers 6–8; corolla 4 mm. long; tube half as long as the cylindrical throat; achenes oblong, puberulent; pappus of 2 awns, shorter than the achene.

TYPE LOCALITY: Cañon of the Rio Grande, below Presidio del Norte [on the label given as below Mt. Carmel, Rio Grande].

DISTRIBUTION: Western Texas.

16. PAPPOTHRIX (A. Gray) Rydberg, gen. nov.

Laphamia § *Pappothrix* A. Gray, Pl. Wright. 1: 99. 1852.

Low suffruticose perennials with woody bases. Leaves opposite or alternate, petioled; blades broad, 3-ribbed. Heads discoid, mostly solitary at the ends of leafy branches, short-peduncled. Involucre campanulate; bracts few, linear or linear-oblanceolate, flat and rather thin. Receptacle flat. Disk-flowers rather few; tube much shorter than the cylindrical or cylindro-funnelform throat. Achenes oblong, flat, not ciliate on the margins. Pappus of 15–30 barbellate subulate awns.

Type species, *Laphamia rupestris* A. Gray.

Leaves densely pubescent; involucre about 4 mm. broad.

Plant arachnoid and viscid-pubescent.

Plant finely and densely villous.

Leaves nearly glabrous; involucre 8–10 mm. wide.

1. *P. rupestris*.

2. *P. cinerea*.

3. *P. cernua*.

1. *Pappothrix rupestris* (A. Gray) Rydberg.

Laphamia rupestris A. Gray, Pl. Wright. 1: 100. 1852.

A perennial with thick woody caudex; stems diffuse, about 1 dm. high, subviscid-pubescent; leaves opposite and alternate, petioled; blades pubescent and glandular-granuliferous, rounded or deltoid, dentate to deeply lacinate, 1–1.5 cm. long; heads at the ends of short leafy branches; involucre cylindrical, about 6 mm. high and 4 mm. broad; bracts oblong-oblanceolate, puberulent and ciliate; rays wanting; corollas of the disk-flowers ochroleucous (?); tube 1 mm. long; throat nearly cylindrical, 3 mm. long; achenes narrowly oblong, hirsutulous, 2.5 mm. long, with thickened margins; pappus of about 20 subulate, barbellate awns.

TYPE LOCALITY: Pass of the Limpia, Texas.

DISTRIBUTION: Western Texas.

ILLUSTRATION: A. Gray, Pl. Wright. 1: pl. 9, A.

2. *Pappothrix cinerea* (A. Gray) Rydberg.

Laphamia cinerea A. Gray; Torr. Bot. Mex. Bound. Surv. 82. 1859.

A suffruticose perennial, woody below; stems leafy, branched, 1-2 dm. high, white-tomentose when young; leaves opposite, rounded, subentire or sinuate-dentate, 1-1.5 cm. long, tomentose when young, glabrate in age; involucre cylindric, about 6 mm. long and 4 mm. broad; bracts oblong, acute, tomentose; rays wanting; tube of disk-corollas fully 1.5 mm. long; throat nearly cylindric, 3 mm. long; achenes oblong, pubescent, usually with 2 ribs on one or both margins; pappus of subulate barbellate awns about 2 mm. long.

TYPE LOCALITY: Escondido Creek, Texas.

DISTRIBUTION: Western Texas.

3. *Pappothrix cernua* (Greene) Rydberg.

Laphamia cernua Greene, Bull. Torrey Club 25: 122. 1898.

A perennial with a thick woody caudex; herbaceous stems 5-10 dm. high, glabrous or nearly so; leaves 4-8, opposite or alternate, petioled; blades rounded-ovate or deltoid-ovate, 1-2 cm. long, coarsely dentate, nearly glabrous; heads solitary, nodding at the end of the stem or rarely in the upper axils; involucre campanulate, 7-8 mm. high, 8-10 mm. broad; bracts oblanceolate, short-acuminate; ray-flowers wanting; disk-corollas orange; tube glabrous, about 1.5 mm. long; throat cylindric, 3 mm. long; achenes oblong, 2 mm. long, puberulent, somewhat callous on the margins; pappus of many subulate barbellate awns.

TYPE LOCALITY: Organ Mountains, New Mexico.

DISTRIBUTION: Known only from the type locality.

ILLUSTRATION: Bull. Torrey Club 25: pl. 333, f. 3, 4.

17. *EATONELLA* A. Gray, Proc. Am. Acad. 19: 19. 1883.

Annual or biennial floccose subcaulescent herbs. Leaves alternate. Heads sessile, radiate. Involucre of 6-8 flat oval or oblong equal bracts. Receptacle plane, naked, alveolate. Ray-flowers present, pistillate, with short ligules. Disk-corollas short, 5-toothed; tube glandular-granuliferous. Style-branches short, obtuse or truncate. Achenes compressed or those of the margins compressed-triangular. Pappus of 2, broad erose or laciniate squamellae.

Type species, *Burrielia nivea* D. C. Eaton.

1. *Eatonella nivea* (D. C. Eaton) A. Gray, Proc. Am. Acad. 19: 19. 1883.

Burrielia nivea D. C. Eaton, in S. Wats. Bot. King's Expl. 174. 1871.

Actinolepis nivea A. Gray, Bot. Calif. 1: 379. 1876.

A dwarf annual (or biennial?); stems branched at the base, 25 cm. high; leaves sub-rosulate, sessile, villose-lanate, 1-2 cm. long; heads sessile among the leaves; involucre 6 mm. high, 8 mm. broad; bracts about 8, narrowly oblong, floccose; ligules oblanceolate, yellow or tinged with purple, 2 mm. long; disk-corollas yellow, about 2 mm. long, the tube slightly shorter than the campanulate throat; achenes about 3 mm. long, linear-oblanceolate, strongly ciliate on the margins; pappus-squamellae 2, about 2 mm. long, lanceolate, erose-dentate and aristate.

TYPE LOCALITY: Virginia Mountains, western Nevada.

DISTRIBUTION: Western Nevada and adjacent California.

ILLUSTRATION: S. Wats. Bot. King's Expl. pl. 18, p. 6-14.

18. *LEMBERTIA* Greene, Fl. Franc. 441. 1897.

Annual or biennial floccose low herbs. Leaves mostly alternate. Heads sessile. Involucre hemispheric; bracts 5, oval, floccose. Ray-flowers often wanting or, if present, not ligulate, not much unlike the disk-flowers but pistillate, smaller, and the throat oblique, campanulate, and only 3-toothed. Disk-flowers several; tube glandular-granuliferous; throat campanulate; lobes 4 or 5. Style-branches short, obtuse. Achenes compressed or those of the marginal flowers slightly 3-angular, ciliate on the margins. Pappus of few erose squamellae.

Type species, *Eatonella Congdoni* A. Gray.

1. *Lembertia Congdoni* (A. Gray) Greene, Fl. Franc. 441. 1897.

Eatonella Congdoni A. Gray, Proc. Am. Acad. 19: 20. 1883.

A low annual or perhaps biennial; stem branched at the base, 1–2 dm. high, sparingly floccose; leaves alternate, oblong or linear-oblong, loosely floccose, 2–3 cm. long, entire or sinuate-denticulate; heads sessile or short-peduncled from the upper axils; involucre hemispheric, 4 mm. high, 6 mm. broad; bracts 5, oval, floccose; rays-flowers wanting or with small corollas, 1 mm. long, pistillate; disk-corollas yellow, 1.5 mm. long; tube equaling the campanulate throat; achenes oblong, flat, but slightly ridged on the faces, 2.5 mm. long; pappus-squamellae few, erose, mucous, scarcely longer than the hairs.

TYPE LOCALITY: Deer Creek, Tulare County, California.

DISTRIBUTION: South-central California.

19. *PERICOME* A. Gray, Pl. Wright. 2: 81. 1853.

Tall perennial herbs, minutely puberulent and strong-scented. Leaves opposite, petioled, with more or less hastate or triangular, caudate-acuminate blades. Heads in large cymes, discoid. Involucre turbinate-campanulate or ellipsoid; bracts in a single series, narrow, more or less united at the base, hyaline on the margins, with thickened midribs. Flowers all hermaphrodite and fertile; corolla-tube short, glandular-granuliferous; throat cylindrical, long; teeth 4, ovate, spreading. Anthers subsagittate at the base. Style-branches filiform, slightly flattened, obtuse, minutely hirtellous externally and at the apex. Achenes linear-oblong, compressed, densely hispid-ciliate on the callous margins. Pappus of a crown of fimbriate-lacerate squamellae and sometimes with two marginal awns.

Type species, *Pericome caudata* A. Gray.

Involucre 5–6 mm. high.

Involucre fully 10 mm. high.

1. *P. caudata*.

2. *P. macrocephala*.

1. *Pericome caudata* A. Gray, Pl. Wright. 2: 82. 1853.

A tall branched perennial; stems 1–1.5 m. high, terete, striate, minutely puberulent; petioles 1–3 cm. long; blades hastate or deltoid, caudate-acuminate, entire or sinuate, 5–10 cm. long, minutely puberulent and punctate, pedately 3–5-ribbed; heads in terminal cymes; pedicels 1–2 cm. long; involucre turbinate-campanulate, 5–6 mm. high and nearly as broad; bracts about 20, linear, acuminate, puberulent; corolla-tube about 1.5 mm. long; throat about 3 mm. long; achenes narrowly-oblong, about 3 mm. long, sparingly hirsute or glabrate on the faces, densely hirsute-ciliate on the callous margins; crown of pappus about 1 mm. long; awns 4 mm. long or more, or commonly wanting.

TYPE LOCALITY: Copper Mines [Santa Rita del Cobre], New Mexico.

DISTRIBUTION: Western Texas to southern Colorado, Nevada, southern California, and Chihuahua.

ILLUSTRATION: Clements, Rocky Mt. Fl. pl. 41, f. 5.

2. *Pericome macrocephala* B. L. Robinson, Proc. Am. Acad.

43: 42. 1907.

A tall perennial, growing in bunches; stems subterete, striate, somewhat brownish, grayish-puberulent; petioles slender, 2–3 cm. long; leaf-blades triangular-hastate, 5–6 cm. long, 4–5 cm. wide, caudate-attenuate, grayish-puberulent, pedately 3–5-ribbed; heads numerous, cymose; pedicels pubescent, 1–2 cm. long; involucre ellipsoid, 10–12 mm. high, 5–7 mm. broad; bracts puberulent, united to near the top, grayish-pubescent, acute; corollas light-yellow, 1 cm. long; tube 3 mm. long, glandular-puberulent; throat cylindrical; teeth 4, short, ovate-oblong, obtuse; achenes black, narrowly oblong, sparingly hirsute or glabrate on the faces, densely hirsute on the margins; pappus of squamellae scarcely longer than the hairs; awns wanting.

TYPE LOCALITY: San Ramón, Durango.

DISTRIBUTION: Known only from the type locality.

20. **CROCKERIA** Greene; A. Gray, Syn. Fl. N. Am. 1²: 445. 1884.

Annual glabrous caulescent herbs. Leaves opposite, sessile, linear. Heads radiate, peduncled. Involucre hemispheric; bracts in a single series, broad, united three-fourths their length into a cup. Ray-flowers ligulate, pistillate and fertile; ligules yellow. Disk-flowers many, hermaphrodite and fertile; corolla-tube slender, longer than the obconic throat. Achenes flat, hispidulous on the callous margins. Pappus wanting.

Type species, *Crockeria chrysantha* Greene.

1. **Crockeria chrysantha** Greene; A. Gray, Syn. Fl. N. Am. 1²: 445. 1884.

Lasthenia chrysantha Greene, Man. Bay Reg. 204. 1894.

A glabrous annual; stem simple, 1-2 dm. high; leaves opposite, linear, 3-6 cm. long, 2-3 mm. wide, the lower connate-sheathing at the base; peduncles 3-8 cm. long; involucre hemispheric, glabrous, 5-6 mm. high, about 10 mm. broad; lobes triangular; ray-flowers 12-15; ligules about 5 mm. long, yellow; tube of the disk-corollas slender, 1.5 mm. long, glandular-puberulent; throat obconic, fully 1 mm. long; achenes obovate, 2 mm. long.

TYPE LOCALITY: Valley of the San Joaquin, California

DISTRIBUTION: Lowlands of central California.

Subtribe 4. **AMAURIANA**E. Heads radiate. Bracts linear and appressed, rounded on the back and double-ribbed in the manner of *Perityle*. Ray-flowers pistillate; corolla deciduous, fertile, ligulate or in *Microspermum* with an irregular, 5-cleft, oblique, funnellform limb. Disk-flowers with a slender glandular tube and from campanulate to trumpet-shaped throat. Pappus when present partly consisting of awns as in the preceding subtribe, but achenes 4-angled, not strongly flattened.

Marginal pistillate flowers if present with linear 3-cleft ligules.

Pappus wanting, represented by a callous crown; perennials, suffruticose at the base.

Pappus present.

Pappus of 4 squamellae and 4 alternating awns; shrubs.

Pappus of narrow bristle-like squamellae; annual herbs.

Marginal pistillate flowers with an irregularly 5-cleft oblique limb.

Marginal pistillate flowers short-tubular; pappus-squamellae united into a crown. (*Thymopsis* in the Tribe *Millerieae*.)

21. AMAURIA.

22. EUTETRAS.

23. OXYPAPPUS.

24. MICROSPERMUM.

21. **AMAURIA** Benth. Bot. Voy. Sulph. 31. 1844.

Low glandular-pubescent perennials, suffruticose at the base. Leaves petioled, the lower opposite, the upper alternate. Heads few, corymbose, radiate. Involucre hemispheric; bracts of the same lengths in two series, somewhat boat-shaped below and partly surrounding the achenes. Receptacle alveolate, but not chaffy. Ray-flowers ligulate, pistillate; style-branches smooth. Disk-flowers many, 4 mm. long, hermaphrodite; style-branches hispid, subulate or obtuse; anthers not caudate. Achenes linear, 4-angled, somewhat flattened, the angles 2 and 2 closer together. Pappus of a short callous crown.

Type species, *Amauria rotundifolia* Benth.

Achenes pubescent on the angles only; involucre 6-7 mm. high and 12 mm. broad. 1. *A. rotundifolia*.

Achenes pubescent on the faces as well as the angles; involucre 5 mm. high and about 7-9 mm. broad.

2. *A. Brandegeana*.

1. **Amauria rotundifolia** Benth. Bot. Voy. Sulph. 31. 1844.

Perityle Filchii Torr. Pacif. R. R. Rep. 4: 100. 1857.

Laphamia peninsularis Greene, Bull. Calif. Acad. 1: 8. 1884.

Perityle rotundifolia Brand. Zoe 4: 210. 1893.

A perennial with woody caudex; stem densely glandular-pubescent, 1-2 dm. high; lower leaves opposite, the upper alternate; petioles short, about 1 cm. long; blades thick, ovate to orbicular, subcordate at the base, doubly dentate or slightly lobed, 3-nerved, glandular on

both sides, 1–2 cm. long; heads few, corymbose or solitary; involucre hemispheric, 6–7 mm. high, about 12 mm. broad; bracts oblanceolate, acute, glandular-pubescent, the inner with broad membranous margins; ray-flowers about 20; ligules white, 8 mm. long; disk-flowers glandular, puberulent, short, 5-toothed; style-appendages subulate; achenes linear, hispidulous on the 4 angles, otherwise glabrous; pappus of a small callous crown.

TYPE LOCALITY: San Quentin, Lower California.

DISTRIBUTION: Lower California and California (?).

2. *Amauria Brandegeana* (Rose) Rydberg.

Perilyte Brandegeana Rose, Bot. Gaz. 15: 114. 1890.

A perennial; stem 1–3 dm. high, glabrous below, glandular above; leaves petioled; blades cordate, 2–3 cm. long, glandular-puberulent, 3-ribbed, more or less lobed and doubly dentate; heads cymose; involucre 5 mm. high, 7–9 mm. broad; bracts oblanceolate, acute, glandular-puberulent; ligules white, oblong, 5–6 mm. long; disk-corollas 3 mm. long; throat abruptly contracted into the tube; style-tips obtuse; achenes linear, 3–4 mm. long, 4-angled, sparingly hispid on the faces and more so on the angles with crinkled hairs.

TYPE LOCALITY: Lagoon Head, Lower California.

DISTRIBUTION: Lower California.

22. *EUTETRAS* A. Gray, Proc. Am. Acad. 15: 39. 1875.

Low shrubs with petioled, opposite leaves. Heads radiate, many-flowered. Involucre hemispheric or campanulate; bracts about 20, subequal, in two series, the outer subherbaceous, linear, glandular, double-ribbed, the inner with more scarios margins. Receptacle convex, naked. Ray-flowers pistillate, fertile; ligules oblong, 3-toothed. Disk-corollas numerous, hermaphrodite and fertile; tube glandular-puberulent, shorter than the narrow cylindric throat; limb 4-toothed. Anthers 4, sagittate at the base with obtuse tips. Style-branches linear, obtuse, hirtellous. Achenes linear or linear-oblong, 4-angled, glabrous or hispid on the angles. Pappus of 4 broad, truncate, erose squamellae and alternating with them 4 barbellate awns.

Type species, *Eutetras Palmeri* A. Gray.

Leaves green, densely glandular; involucre 1 cm. high, 12 mm. broad; rays 12–15.

1. *E. Pringlei*.
2. *E. Palmeri*.

Leaves cinereous; involucre 5 mm. high, 7–8 mm. broad; rays 9–12.

1. *Eutetras Pringlei* Greenman, Proc. Am. Acad. 41: 266. 1905.

A low shrub; stem erect, 1.5–3 dm. high, densely glandular and somewhat white-hispid in the axils; leaves opposite; petioles 0.5–3 cm. long, channeled above; blades deltoid-ovate, 1–4.5 cm. long, 1–4 cm. broad, acute, sinuate-dentate, dark-green, 3-ribbed at the cordate or truncate base; heads few in corymbose cymes; peduncles 2–5 cm. long, densely glandular, gradually thickened upwards; involucre broadly campanulate, nearly 1 cm. high, about 12 mm. broad; bracts linear-lanceolate, acuminate, acute, densely glandular; ray-flowers 12–15; tube 3.5 mm. long, glandular-pubescent; ligules oblong, 10–12 mm. long, white; disk-flowers numerous; corollas tubular, 7 mm. long, 4-toothed; achenes 3.5 mm. long, pubescent on the angles; squamellae 0.5 mm. long; awns about 5 mm. long.

TYPE LOCALITY: Basaltic cliffs near Acambaro, Guanajuato.

DISTRIBUTION: Known only from the type locality.

2. *Eutetras Palmeri* A. Gray, Proc. Am. Acad. 15: 40. 1879.

A low shrub; stem 1 dm. high or more, densely puberulent and glandular; leaves sub-opposite, petioled; petioles about 1 cm. long; blades deltoid-ovate, dentate, cinereous-pubescent, triple-ribbed at the base, 1–2 cm. long, 0.75 cm. wide; heads short-peduncled; involucre broadly campanulate, 7 mm. broad; bracts about 20, subequal in 2 series, 5 mm. high; ray-flowers 9–12; ligules white or tinged with rose, oblong, 3 mm. long; disk-flowers numerous, tubular, 4-toothed; achenes oblong-linear, 4-angled, nearly glabrous, 2.5 mm. long; squamellae 0.3 mm. long; awns 2 mm. long.

TYPE LOCALITY: Near Angostura, 100 miles east of San Luis Potosi.

DISTRIBUTION: Known only from the type locality.

ILLUSTRATIONS: Hemsl. Biol. Centr. Am. Bot. pl. 43, f. 6–13; E. & P. Nat. Pfl. 4^o: f. 124, M.

23. OXYAPPUS Benth. Bot. Voy. Sulph. 118. 1845.

Annual herbs. Leaves opposite, or those of the branches partly alternate, simple. Heads radiate, small, corymbose-paniculate. Involucre hemispheric; bracts uniserial, equal, linear, concave, rounded on the back. Receptacle conic, naked. Ray-flowers pistillate, fertile; ligules linear, 3-nerved, 3-toothed. Disk-flowers many, hermaphrodite, fertile; tube narrow, shorter than the cylindrical throat; lobes short. Anthers not caudate, with lanceolate tips. Style-branches filiform, acute, scarcely hirtellous. Achenes linear, 4-5-angled or those of the ray-flowers 3-angled, slightly contracted at the apex, striate on the faces. Pappus of 4 or 5, or in the ray-flowers only 3, subulate squamellae ending in long scabrous awns.

Type species, *Chrysopsis scabra* H. & A.

1. Oxypappus scaber (H. & A.) Benth. Bot. Voy. Sulph. 118. 1845.

Chrysopsis scabra H. & A. Bot. Beech. Voy. 434. 1841.

Pectis Seemannii Schultz-Bip.; Seem. Bot. Voy. Herald 309. 1856.

Pentachaeta gracilis Benth.; Hook. Ic. 12: 1. 1872.

Oxypappus gracilis A. Gray; O. Hoffm. in E. & P. Nat. Pfl. 4^o: 257. 1890.

A slender branched annual; stem 2-4 dm. high, hispid or glandular-scabrous above; lower leaves crowded and subsulate, oblanceolate, 3-5 cm. long, dentate, hirsute with crisp hairs; stem-leaves lanceolate, dentate, opposite; those of the branches linear and bract-like, entire, often alternate; involucre 4 mm. high, 6 mm. broad, glandular-puberulent; bracts about 15, linear; ligules yellow, about 5 mm. long, 1-1.5 mm. wide; disk-corollas about 4 mm. long, yellow; achenes black, scarcely 2 mm. long; squamellae 3 mm. long.

TYPE LOCALITY: Between San Blas and Tepic, Territory of Tepic.

DISTRIBUTION: Jalisco and Tepic.

ILLUSTRATIONS: Benth. Bot. Voy. Sulph. *pl.* 42; Hook. Ic. *pl.* 1101.

24. MICROSPERMUM Lag. Gen. & Sp. Nov. 25. 1816.

Miradora Schultz-Bip.; Benth. & Hook. Gen. 2: 407, as synonym. 1873.

Perennial herbs with creeping rootstocks. Stems decumbent, rooting. Leaves opposite, petioled, with dentate blades. Heads solitary, peduncled. Involucre hemispheric; bracts narrow, in 1-2 series, equal in length, double-ribbed on the back. Receptacle convex, naked. Corollas all 5-toothed and hermaphrodite, but the marginal ones enlarged, oblique with the three outer lobes much larger and stamens abortive; disk-corollas regular, with a campanulate throat. Anthers short, truncate at the base. Style-branches with subulate very acute appendages. Achenes obovoid-oblong, 4-angled, glabrous or hirtellous on the angles. Pappus a minute crown and 0-3 awns (?).

Type species, *Microspermum nummulariaefolium* Lag.

1. Microspermum nummulariaefolium Lag. Gen. & Sp. Nov. 25. 1816.

Microspermum debile Benth. Pl. Hartw. 64. 1840.

Miradora Sartori Schultz-Bip.; Benth. & Hook. Gen. 2: 407, as synonym. 1873.

A creeping perennial herb; stems decumbent or the upper part ascending; petioles about 1 cm. long; leaf-blades ovate, crenate, cuneate at the base, glabrous or sparingly hirtellous; 1.5-3 cm. long; peduncles 4-5 cm. long; heads solitary; involucre hemispheric; bracts subequal, lanceolate, glandular-pubescent, 3 mm. long; marginal flowers very oblique; limb 5-6 mm. long; achenes obovoid-oblong, slightly angled, hirtellous on the angles.

TYPE LOCALITY: Guanajuato, Mexico.

DISTRIBUTION: Vera Cruz to Guanajuato and Oaxaca.

Subtribe 5. **BAHIANAE**. Heads radiate or discoid. Involucre hemispheric to campanulate; bracts mostly broad, flat, appressed, thin, neither membranous nor conspicuously colored on the margin. Ray-flowers when present corollas; ligulate yellow or white, rarely tinged with purple, deciduous.

Disk-corollas usually with slender glandular tube; throat usually campanulate or funnellform, not exceeding the tube in length, except in *Platyschkuhria* and *Hulsea*. Achenes more or less distinctly angled, clavate-obpyramidal, *i. e.*, many times as long as broad and gradually tapering towards the base. Pappus squamellate or rarely wanting.

Achenes 4-5-angled, or only the marginal ones 3-angled.

Pappus present; lobes of the disk-corollas not longer than the throat.

Pappus oblique; squamellae at the exterior angles much shorter than those at the interior ones; heads discoid, with white flowers; undershrubs.

25. LOXOTHYSANUS.

Pappus not oblique; squamellae subequal.

Involucre campanulate; outer bracts keeled; squamellae with distinct midrib; foliage conspicuously impressed-punctate.

26. PICRADENIOPSIS.

Involucre hemispheric or broadly turbinate; bracts flat; herbage not at all or inconspicuously punctate.

27. BAHIA.

Corolla-throat campanulate; leaves more or less dissected.

Corolla-throat cylindro-campanulate, longer than the tube; leaves entire, toothed, or merely lobed.

Involucral bracts in two subequal series but not imbricate; puberulent perennials with entire thick leaves and woody caudices; pappus of 10-16 squamellae.

29. PLATYSCHKUHRRIA.

Involucral bracts in 2 or 3 series, somewhat imbricate, and the outer somewhat shorter; fleshy villous or viscid annuals or perennials; pappus of 4 squamellae.

30. HULSEA.

Pappus wanting; lobes of the disk-corollas much longer than the short funnellform throat.

28. AMAURIOPSIS.

Achenes all 3-angled.

Pappus wanting.

Marginal achenes not winged.

31. VASQUESIA.

Marginal achenes with concave incurved wings on the inner two angles.

32. GALEANA.

Pappus present, of 8 squamellae.

33. ACHYROPAPPUS.

25. LOXOTHYSANUS B. L. Robinson, Proc. Am. Acad. 43: 43. 1907.

Low shrubs or undershrubs. Leaves opposite, petioled, with ovate or orbicular blades, few-lobed or crenate, canescent, at least beneath. Heads discoid. Involucres hemispheric or turbinate; bracts subequal in 1-2 series, oblanceolate, puberulent, not scarious except slightly so on the margins below. Receptacle small, plain. Flowers all hermaphrodite and fertile, actinomorphic; corollas whitish; tube slender, glandular-puberulent, about equaling the campanulate throat; limb 5-lobed. Anthers shortly sagittate at the base. Style-branches short, scarcely thickened below the apex and with obtuse appendices. Achenes 4-angled (described as 5-angled), slender, attenuate at the base. Pappus oblique, of 5-8 oblong erose squamellae, those of the exterior angle of the achenes much shorter than the inner ones.

Type species, *Bahia sinuata* Less.

Erect or ascending shrubs; involucre hemispheric, 5 mm. high.

Inflorescence several-cephalous, corymbose with short individual peduncles.

1. *L. sinuatus*.

Inflorescence 1-3-cephalous with long individual peduncles.

2. *L. pedunculatus*.

Decumbent undershrub with slender branches; involucre turbinate, 4 mm. high.

3. *L. filipes*.

1. *Loxothysanus sinuatus* (Less.) B. L. Robinson, Proc. Am. Acad. 43: 43. 1907

Bahia sinuata Less. in Schlecht. & Cham. Linnaea 5: 160. 1830.

Bahia nepetaefolia A. Gray, Proc. Am. Acad. 5: 184. 1861.

A low shrub; stem terete, erect, tomentulose, corymbosely branched; leaves opposite, petioled; petioles 0.5-1.5 cm. long; blades deltoid-ovate or subcordate, 1-5 cm. long, sometimes 3-lobed, or obtusely and coarsely toothed, puberulent above, grayish- or whitish-tomentulose beneath; heads corymbose; involucre hemispheric, 5 mm. high, 8-10 mm. broad; bracts about 12, oblanceolate, acute, tomentulose without; corollas white; tube glandular-puberulent; lobes lanceolate, fully as long as the turbinate-campanulate throat; achenes 3 mm. long, hirsute, attenuate at the base; inner squamellae about 1 mm. long, the outer ones half as long.

TYPE LOCALITY: Hacienda de la Laguna, Vera Cruz.

DISTRIBUTION: Tamaulipas, Puebla, and Vera Cruz.

2. *Loxothysanus pedunculatus* Rydberg, sp. nov.

A low shrub, erect; stem terete, puberulent; leaves opposite; petioles 1–1.5 cm. long; blades ovate or ovate-deltoid, sometimes 3-lobed, sinuately round-toothed, 2–3 cm. long, puberulent above, grayish-tomentulose beneath; inflorescence of 1–3 heads on peduncles 3–5 cm. long; involucre hemispheric, 5 mm. high, 8–10 mm. broad; bracts 10–12, oblanceolate, canescent; corollas 3 mm. long, white; tube glandular-pubescent, 1.5 mm. long; lobes oblong, as long as the turbinate throat; achenes 3–3.5 mm. long, hirsute; inner squamellae fully 1 mm. long.

Type collected in Tamasopa Canyon, San Luis Potosi, 1890, *Pringle 3096* (herb. Columbia Univ.).
DISTRIBUTION: San Luis Potosi.

3. *Loxothysanus filipes* B. L. Robinson, Proc. Am. Acad. 43: 44.
1907.

A small shrub, procumbent; stem curved-ascending, short-pubescent; leaves alternate; petioles slender, 1–1.5 cm. long, puberulent, flexuose; blades suborbicular, 1–2 cm. long, crenate, green and obscurely tomentulose above, canescent-tomentulose beneath; involucre turbinate-campanulate; bracts about 7, oblong, obtuse, about 3 mm. long; flowers about 30; corollas 2.8 mm. long; tube 1 mm. long, glandular-puberulent, nearly equaling the throat; achenes 2.8 mm. long; inner squamellae less than 0.5 mm. long, the outer ones much shorter.

TYPE LOCALITY: Zacuapan, Vera Cruz.
DISTRIBUTION: Vera Cruz.

26. *PICRADENIOPSIS* Rydb.; Britton, Man. 1008. 1901.

Low perennial canescent herbs more or less woody at the base. Leaves opposite, palmately or pedately 3–5-divided (or the upper entire), with linear or oblong divisions, grayish-strigose and prominently glandular-punctate. Heads in leafy corymbs. Involucre campanulate; bracts subequal in about two series, 3-nerved, the outer ones more or less keeled, canescent, not at all petaloid. Ray-flowers few, pistillate, fertile; ligules short. Disk-flowers many; corolla-tube glandular, about equaling the campanulate throat; lobes ovate, shorter than the throat. Achenes elongate-obpyramidal, not conspicuously hirsute or hispid on the angles, either glandular or hispidulous all over. Pappus of a crown of squamellae 8 in number, ovate or lanceolate with a distinct costa or midrib.

Type species, *Bahia oppositifolia* "Nutt." [DC.].

Squamellae ovate or obovate; achenes glandular.
Squamellae lanceolate; achenes hispidulous.

1. *P. oppositifolia*.
2. *P. Woodhousei*.

1. *Picradeniopsis oppositifolia* (Nutt.) Rydb.; Britton, Man. 1008.
1901.

Trichophyllum oppositifolium Nutt. Gen. 2: 167. 1818.
Helenium oppositifolium Spreng. Syst. 3: 573. 1826.
Bahia oppositifolia DC. Prodr. 5: 656. 1836.
Eriophyllum oppositifolium Heynh. Nom. Bot. 310. 1840.

A low suffruticose perennial; stem 1–3 dm. high, much-branched, angled, canescent-puberulent; leaves opposite, 3–5-divided into linear or oblong divisions or entire, 1–3 cm. long, canescent-strigose and conspicuously punctate, thick; peduncles short; involucre campanulate, 5 mm. high, 7–8 mm. wide; bracts oblong, about 10, the outer ones carinate, 3-ribbed; ligules 5–6, oval, 3–4 mm. long; disk-flowers numerous; corollas 3 mm. long; achenes narrowly obpyramidal, 4-angled, glandular-puberulent; squamellae 1 mm. long, ovate or obovate, with a distinct midrib.

TYPE LOCALITY: Hills near Fort Mandan [North Dakota].
DISTRIBUTION: North Dakota to Montana, Arizona, and Texas.

ILLUSTRATIONS: Sitgreaves, Rep. Exp. Bot. pl. 3; Britt. & Brown, Ill. Fl. pl. 3967; ed. 2. pl. 4536; E. & P. Nat. Pl. 4^o: f. 124, O.

2. *Picradeniopsis Woodhousei* (A. Gray) Rydb. Bull. Torrey Club
37: 333. 1910.

Achyropappus Woodhousei A. Gray, Proc. Am. Acad. 6: 546. 1865.

Schkuhria Woodhousei A. Gray, Proc. Am. Acad. 9: 199. 1874.

Bahia Woodhousei A. Gray, Proc. Am. Acad. 19: 28. 1883.

A low suffruticose perennial; stem branched, slightly angled, grayish-puberulent; leaves opposite, 3-cleft into linear, obtuse divisions, grayish-strigulose, distinctly punctate; heads short-peduncled; involucre turbinate, 5-6 mm. high, 6-8 mm. wide; bracts 8-10, oblong, obtuse, puberulent; ligules 6-8, oblong, 3 mm. long, white or ochroleucous; disk-flowers about 20; corollas 3 mm. long; achenes 4 mm. long, elongate-obpyramidal, hirsutulous; squamellae narrowly lanceolate, with a strong rib, acute.

TYPE LOCALITY: New Mexico.

DISTRIBUTION: New Mexico and Arizona.

27. *BAHIA* Lag. Gen. & Sp. Nov. 30. 1816.

Stylesia Nutt. Trans. Am. Phil. Soc. II. 7: 377. 1841.

Virletia Schultz-Bip.; Benth. & Hook. Gen. 2: 403, as synonym. 1873.

Annual or perennial herbs or rarely undershrubs. Leaves opposite or alternate, or both, more or less dissected, not conspicuously punctate. Heads in leafy corymbs. Involucre hemispheric or turbinate; bracts in 2 or 3 series, mostly oblanceolate, not keeled, sometimes slightly petaloid on the margins. Ray-flowers usually present, pistillate, fertile, with linear ligules. Disk-flowers many, hermaphrodite and fertile; corolla-tube glandular; throat campanulate. Achenes elongate, narrowly obpyramidal, often hirsutulous on the angles below. Pappus of a crown of 8-10 squamellae, which are either callous at the base, or with a midrib, sometimes produced into an awn-tip.

Type species, *Bahia ambrosioides* Lag.

Leaves not tomentose-canescens.

Squamellae without distinct midribs, merely callous-thickened at the base; leaf-segments linear-filiform or filiform, glabrous or hirsute, more or less impressed-punctate.

Annuals.

Squamellae of the fruit much shorter than the corolla-tube; ligules 5 mm. long.

Squamellae of the fruit equaling the corolla-tube; ligules 3 mm. long.

Perennials.

Perennial with a thick tap-root; bracts in 2 series.

Perennial with a slender rootstock; bracts in 3 series.

Squamellae with distinct midribs often excurrent; leaf-segments oblong or obovate to linear-filiform, not at all punctate.

Perennials; bracts acute.

Annuals; bracts obtuse.

Plant cinereous-puberulent, if somewhat glandular the glands sessile.

Leaf-segments broad, obovate to oblong; midribs of the squamellae not excurrent.

Leaf-segments narrow, linear-filiform to oblong; midribs of the squamellae often excurrent.

Plant erect; involucre 4-5 mm. high.

Plant branched at the base; branches spreading and decumbent at the base; involucre 6-7 mm. high.

Plant conspicuously glandular with stipitate glands.

Leaves tomentose-canescens; perennial, suffruticose at the base.

Leaf-segments narrowly linear; bracts narrowly oblanceolate.

Leaf-segments lanceolate to broadly linear; bracts broadly oblanceolate.

1. *B. Bigelovii*.

2. *B. Schaffneri*.

3. *B. xylopada*.

4. *B. Pringlei*.

5. *B. Ehrenbergii*.

6. *B. pedata*.

7. *B. biternata*.

8. *B. aristata*.

9. *B. glandulosa*.

10. *B. absinthifolia*.

11. *B. dealbata*.

1. *Bahia Bigelovii* A. Gray, in Torr. Bot. Mex. Bound. 96. 1859.

Schkuhria Bigelovii A. Gray, Proc. Am. Acad. 9: 199. 1874.

A branched annual; stem 2-4 dm. high, hirsutulous; leaves short-petioled, opposite, once or twice ternately dissected into linear-filiform divisions, sparingly hirsutulous and distinctly glandular-punctate, 3-5 cm. long; involucre nearly hemispheric, 5-6 mm. high, 8-9 mm. broad, hirsute and glandular-punctate; bracts 8-9, obovate or the outer oblong, abruptly short-acuminate; ligules 5-8, yellow, oblong or elliptic, 5 mm. long; disk-flowers 20-30; corollas 2 mm. long, the glandular tube shorter than the deeply campanulate throat; achenes

3 mm. long, narrowly obpyramidal, hispidulous on the edges; squamellae 8, obovate, 0.5 mm. long, thickened near the base.

TYPE LOCALITY: Valley of the Limpio, Texas.
DISTRIBUTION: Western Texas.

2. *Bahia Schaffneri* S. Wats. Proc. Am. Acad. 26: 142. 1891.

Bahia anthemoides A. Gray, Proc. Am. Acad. 15: 40, in part. 1879. Not *Achyropappus anthemoides* H. B. K. 1820.

A strigose annual; stem decumbent and branched at the base, strigose; leaves mostly opposite, 2-3 cm. long, ternately three or four times dissected, with narrow linear divisions, strigose; heads terminating the branches; peduncles 2-4 cm. long; involucre hemispheric, 4-5 mm. high, about 8 mm. broad; bracts strigose, oblanceolate or obovate, acute, somewhat yellowish towards the tip; ligules yellow, oval, 3 mm. long; tube of disk-corollas slender, glandular, 2 mm. long; throat campanulate, 1.5 mm. long; achenes narrowly obpyramidal, 3 mm. long, hispidulous on the angles; pappus of 8 obovate squamellae, 1 mm. long, with a short ovate thickening at the base.

TYPE LOCALITY: Near San Luis Potosi.
DISTRIBUTION: San Luis Potosi to Aguascalientes.

3. *Bahia xylopoda* Greenman, Proc. Am. Acad. 34: 577. 1899.

A perennial, somewhat woody at the base, with a taproot; stem decumbent, branched from the base, about 1.5 dm. high, grayish-hirsute; leaves opposite or alternate, thrice ternately dissected into linear, obtusish divisions, grayish-hirtellous; heads solitary at the ends of the branches; involucre about 6 mm. high and 10 mm. broad; bracts 2 in series, oblanceolate to oblong, rounded or obtuse at the apex, grayish-hirsute and slightly glandular; ligules oblong, about 6 mm. long; disk-flowers numerous; corolla-tube 1.5 mm. long, glandular; throat campanulate, about 1 mm. long; achenes 5-6 mm. long, narrowly obconic, striate, hirtellous; squamellae narrowly obovate, distinctly callous-thickened for half their length.

TYPE LOCALITY: Bare hills above Pachuca, Hidalgo.
DISTRIBUTION: Hidalgo.

4. *Bahia Pringlei* Greenman, Proc. Am. Acad. 32: 309. 1897.

A perennial with a slender rootstock; stem branching from the base, ascending, 2-3 dm. high, grayish-hirsute; leaves opposite or alternate, thrice ternately dissected into linear divisions, white or grayish hirsute-pubescent; peduncles 3-5 cm. long, solitary at the ends of the branches; involucre 6 mm. high, 15 mm. broad; bracts oblanceolate, acute, hirsute, in 3 series, the inner ones with scarious margins; ligules yellow, 6-7 mm. long, 2 mm. broad; disk-flowers numerous; corolla-tube densely glandular, 2 mm. long, a little longer than the deeply campanulate throat; achenes 4 mm. long, 4-angled, obscurely striate, puberulent; squamellae about 8, obovate, 2 mm. long, thickened only at the base.

TYPE LOCALITY: Calcareous bluff near Tula, Hidalgo.
DISTRIBUTION: Hidalgo.

5. *Bahia Ehrenbergii* Schultz-Bip. MS. sp. nov.

A low perennial, somewhat woody at the base, branched, about 1.5 dm. high, grayish-strigose; leaves mostly opposite, 1-2 cm. long, pinnatifid into linear-filiform divisions, strigose and somewhat punctate; peduncles 1-3 cm. long; involucre 6 mm. high, 8-10 mm. wide; bracts oblanceolate, acute, hirsutulous and glandular; ligules 8-10, linear, 5 mm. long, yellow; disk-corollas many, 3 mm. long; tube nearly equaling the turbinate throat; achenes 3 mm. long, hispidulous on the angles; squamellae of the pappus obovate-oblong, obtuse, 1-1.5 mm. long, callous at the base.

Type collected in Mexico, *Ehrenberg 362* (Gray Herb.).

6. *Bahia pedata* A. Gray, Pl. Wright. 1: 123. 1852.

Schkuhria pedata A. Gray, Proc. Am. Acad. 9: 199. 1874.

A puberulent annual; stem erect, puberulent, 3–5 dm. high; leaves puberulent and glandular-granuliferous, alternate, pedately 3–5-dissected; petioles 1–4 cm. long; primary segments 1–5 cm. long, obovate in outline, again cleft into obovate oblanceolate or oblong toothed lobes; heads in foliaceous cymes; peduncles 2–5 cm. long; involucre hemispheric, 5 mm. high, 6–7 mm. broad; bracts oblanceolate, glandular-puberulent and slightly glandular-hispid, acute; ligules cuneate-oblanceolate, 5 mm. long, 2.5 mm. wide; tube of disk-corollas 2 mm. long, glandular; throat campanulate, fully 1 mm. long; achenes narrowly obpyramidal, 3.5 mm. long, angled, striate, hirsute; squamellae obovate, about 1.5 mm. long, obtuse, with a narrow rib not reaching the apex.

TYPE LOCALITY: "Between western Texas and El Paso" [now western Texas].
DISTRIBUTION: Western Texas to Arizona.

7. *Bahia biternata* A. Gray, Pl. Wright. 2: 95. 1853.

Schkuhria biternata A. Gray, Proc. Am. Acad. 9: 199. 1874.

A cinereous-puberulent annual; stem erect, slender, about 3 dm. high; leaves alternate, short-petioled, cinereous-puberulent, biternately dissected into linear, obtuse, entire or 2–3-lobed segments; peduncles slender, 4–5 cm. long; involucre hemispheric, about 5 mm. high; bracts about 12, obovate, obtuse, puberulent; ligules 8–10, obovate-cuneate, bright-yellow, 6–7 mm. long; tube of disk-corollas less than 2 mm. long, glandular; throat campanulate; achenes 3 mm. long, narrowly obpyramidal, 4-angled, hirsute and strongly striate; squamellae of the pappus 12–14, obovate, the midrib often excurrent beyond the apex, especially in the inner achenes.

TYPE LOCALITY: Hills near Ojo de Gavilan, New Mexico.
DISTRIBUTION: Western Texas to Arizona and Sonora.

8. *Bahia aristata* Rydberg, sp. nov

A decumbent annual, branched at the base; stem about 2 dm. high, hirsutulous-canescens; leaves opposite or the uppermost alternate, bipinnatifid into linear divisions, 2–4 cm. long, canescens-hirsutulous; peduncles 3–5 cm. long; involucre turbinate, 6–7 mm. high, about 1 cm. broad; bracts obovate, rounded at the apex, hirsutulous; ligules about 10, oblong, 2 mm. long; disk-corollas yellow, many, 3 mm. long; tube shorter than the throat; achenes 3 mm. long, sparingly hispidulous; pappus-squamellae lanceolate, with an excurrent midrib, together with the awn nearly equaling the corolla.

Type collected on alkaline plains, Hacienda de Angostura, San Luis Potosi, 1891, *Pringle 5127* (Gray Herb.).

DISTRIBUTION: San Luis Potosi.

9. *Bahia glandulosa* Greenman, Proc. Am. Acad. 39: 116. 1903.

A herbaceous perennial with a tap-root; stem erect, 5–7 dm. high, glandular-pubescent, branching; leaves alternate, petioled, three or four times dissected, 2–12 cm. long; divisions linear to oblong, obtuse, densely glandular; heads in terminal corymbose cymes; peduncles 2–4 cm. long; involucre 5 mm. high, about 1 cm. broad; bracts 10–14, oblanceolate or oblong, obtuse, in one series; ligules 15–20, pale-yellow or whitish, 5–6 mm. long; disk-corollas numerous; tube 2 mm. long, glandular, longer than the campanulate throat; achenes 3 mm. long, angled, puberulent, striate; squamellae 10–12, obovate-spatulate, rounded to aristulate at the apex.

TYPE LOCALITY: Vicinity of the City of Durango.
DISTRIBUTION: Durango and Chihuahua.

10. *Bahia absinthifolia* Benth. Pl. Hartw. 18. 1839.

A perennial, suffruticose at the base; stem 2–4 dm. high, finely white-tomentose, branched; leaves opposite, subsessile, white-tomentose, 2–5 cm. long, pinnately dissected into 3–5 nar-

rowly linear, entire or again dissected segments; heads at the end of the branches; peduncles 2–5 cm. long; involucre hemispheric, 6–7 mm. high, 10–12 mm. broad; bracts usually rather narrowly oblanceolate, acuminate, white-tomentose; ligules yellow, linear, 7–8 mm. long; tube of disk-corollas nearly 2 mm. long, glandular; throat campanulate, fully 1 mm. long; achenes narrowly obpyramidal, 5 mm. long, 4-angled, villous and striate; squamellae of the pappus 1.5 mm. long, obovate, truncate, the dorsal thickening lanceolate, extending about two-thirds their length.

TYPE LOCALITY: Aguascalientes, Mexico.

DISTRIBUTION: Arizona and Texas to Aguascalientes and Durango.

11. *Bahia dealbata* A. Gray, Mem. Am. Acad. II. 4: 99. 1849.

Bahia absinthifolia dealbata A. Gray, Pl. Wright. 1: 121. 1852.

Picradeniopsis dealbata Wootton & Standley, Contr. U. S. Nat. Herb. 16: 192. 1913.

A perennial with a woody base; stem branched, about 3 dm. high, white-tomentose; leaves opposite, subsessile or short-petioled, white-tomentose, 1–5 cm. long, 3-cleft with lanceolate or linear, entire or toothed segments, or the lower leaves lanceolate and entire; peduncles at the ends of the branches, 2–6 cm. long; involucre hemispheric, 7 mm. high, 12–13 mm. broad; bracts 12–15, tomentose, broadly oblanceolate, acuminate; ligules linear, yellow, 18–20 mm. long; disk-corollas yellow; tube 2 mm. long, glandular; throat about 1 mm. long, campanulate; achenes about 5 mm. long, narrowly obpyramidal, strongly 4-angled, villous and distinctly striate on the faces; squamellae of the pappus 1.5 mm. long, obovate, truncate, with the dorsal thickening lanceolate and two-thirds their length.

TYPE LOCALITY: Valley between Mapimi and Guajuquilla, Chihuahua.

DISTRIBUTION: Western Texas to Arizona and Chihuahua.

28. *AMAURIOPSIS* Rydberg, gen. nov.

Glandular-pubescent annuals. Leaves alternate, twice or thrice ternately divided. Heads in leafy corymbs, radiate. Involucre hemispheric; bracts 16–20, herbaceous, oblanceolate in about 3 series. Receptacle flat, alveolate. Ray-flowers 16–20, pistillate, fertile; ligules cuneate, 3-cleft. Disk-flowers numerous, hermaphrodite and fertile; corolla-tube densely glandular, longer than the funnellform throat; teeth lanceolate, longer than the throat. Achenes elongate and narrowly obpyramidal, 4-angled, striate, rounded at the apex. Pappus wanting.

Type species, *Amauria dissecta* A. Gray.

1. *Amauriopsis dissecta* (A. Gray) Rydberg.

Amauria dissecta A. Gray, Mem. Am. Acad. II. 4: 104. 1849.

Villanova chrysanthemoides A. Gray, Pl. Wright. 2: 96. 1853.

Bahia chrysanthemoides A. Gray, Proc. Am. Acad. 19: 28. 1888.

Bahia dissecta Britton, Trans. N. Y. Acad. Sci. 8: 68. 1883.

Eriophyllum chrysanthemoides Kuntze, Rev. Gen. 307. 1891.

Villanova dissecta Rydb. Bull. Torrey Club 37: 333. 1910.

A tall annual; stems 3–6 dm. high, puberulent and glandular, especially above; leaves 1–3 times ternately divided into obovate, oblong, or oblanceolate toothed divisions, puberulent; involucre hemispheric, 6 mm. high, 10–13 mm. broad; bracts oblanceolate, acuminate. glandular-hirsute; ligules spatulate, 6–8 mm. long, 3-cleft with rounded teeth; disk-corollas 3 mm. long; achenes narrowly obpyramidal, 4 mm. long, 0.5 mm. thick, glandular-puberulent,

TYPE LOCALITY: A few miles east of Mora River [New Mexico].

DISTRIBUTION: Wyoming to New Mexico, Arizona, and Chihuahua.

ILLUSTRATION: Clements, Rocky Mt. Fl. pl. 41, f. 1.

29. *PLATYSCHUHRIA* Rydb. Bull. Torrey Club 33: 154. 1906.

Schkuhria § *Platyschkuhria* A. Gray, Am. Nat. 8: 213. 1874.

Bahia § *Platyschkuhria* A. Gray, Syn. Fl. N. Am. 2: 332. 1884.

Perennial grayish puberulent herbs with rather thick woody bases. Leaves alternate, petioled, entire. Heads radiate, corymbose. Involucre hemispheric; bracts herbaceous in about two series, subequal. Receptacle glabrous, flat. Ray-flowers about 10; ligules yellow,

oblong, slightly 3-toothed. Disk-flowers numerous; corolla-tube glandular, shorter than the cylindro-campanulate throat; teeth 5, short. Achenes elongate, 4-angled, tapering downward. Pappus of 10-16 squamellae which are narrowly lanceolate, with a distinct midrib extending to or beyond the apex.

Type species, *Schkuhria integrifolia* A. Gray.

Stem subscaiose; leaves mostly near the base; upper stem-leaves reduced.
Stem leafy throughout.

1. *P. integrifolia*.
2. *P. oblongifolia*.

1. *Platyschkuhria integrifolia* (A. Gray) Rydb. Bull. Torrey Club

33: 155. 1906.

Schkuhria integrifolia A. Gray, Am. Nat. 8: 213. 1874.
Bahia nudicaulis A. Gray, Proc. Am. Acad. 19: 27. 1883.
Bahia desertorum M. E. Jones, Zoe 2: 249. 1891.
Platyschkuhria desertorum Rydb. Bull. Torrey Club 37: 333. 1910.

A perennial with a thick woody caudex; stem leafy mostly at the base, 1.5-3 dm. high, canescent and more or less glandular, especially above; lower leaves petioled, crowded; blades oval or ovate, triple-ribbed, entire, 2-8 cm. long, canescent-hirsutulous, thick; upper stem-leaves much reduced, oblanceolate to linear; heads 1-9, corymbose; peduncles 3-7 cm. long; involucre hemispheric, about 1 cm. high, 15-18 mm. broad; bracts lanceolate or oblanceolate, acute or abruptly acuminate, glandular-puberulent; ligules 10-12, oblong, about 1 cm. long; disk-flowers many; corolla about 6 mm. long; tube glandular, shorter than the cylindro-campanulate throat; achenes oblong-obpyramidal, 4 mm. long, striate, hirsute throughout; pappus-squamellae 12-15, lanceolate, 2 mm. long.

TYPE LOCALITY: Wind River Mountains, Wyoming.
DISTRIBUTION: Wyoming, Colorado, and Utah.

2. *Platyschkuhria oblongifolia* (A. Gray) Rydb. Bull. Torrey Club

33: 155. 1906.

Schkuhria integrifolia oblongifolia A. Gray, Am. Nat. 8: 213. 1874.
Bahia oblongifolia A. Gray, Proc. Am. Acad. 19: 27. 1883.

A low perennial with woody caudex; stem about 2 dm. high, canescent-puberulent, leafy; leaves alternate, petioled or the uppermost sessile; blades oblong or elliptic, thick, puberulent, triple-ribbed, 3-5 cm. long; heads mostly 3, corymbose; involucre hemispheric, 8-9 mm. high, about 1 cm. broad; bracts oblong or elliptic, obtuse, puberulent; ligules about 10, oblong, 1 cm. long; disk-flowers many; corollas about 5 mm. long; tube glandular, shorter than the throat; achenes elongate-obconic, 3 mm. long, less pubescent; squamellae 10-12, narrowly lanceolate, 3 mm. long.

TYPE LOCALITY: Dry hills, Valley of San Juan, Utah or New Mexico.
DISTRIBUTION: Colorado, New Mexico and Arizona.

30. *HULSEA* T. & G.; A. Gray, in Torr. Pacif. R. R. Rep. 6: 76.

1857.

More or less fleshy villous or viscid perennials, biennials, or annuals. Leaves alternate, sessile or with winged petioles. Heads rather large, solitary or paniculate. Involucre hemispheric; bracts in 2 or 3 series, narrow, the outer somewhat shorter. Receptacle flat, without paleae, alveolate-dentate, the teeth minute, horny. Ray-flowers ligulate, fertile, pistillate; ligules elongate, yellow or purplish. Disk-flowers numerous, hermaphrodite, fertile; corollas tubular; tube slender, glandular-viscid; throat cylindrical; limb 5-toothed. Anthers not caudate. Style-branches of the hermaphrodite flowers obtuse, not appendaged. Achenes all alike, linear-cuneate, subtetragonal, compressed, villous especially on the margins. Pappus of 4 hyaline squamellae, which are broad, obtuse, erose or fimbriate, without nerves.

Type species, *Hulsea californica* T. & G.

Basal leaves spatulate or obovate to oblanceolate, woolly or floccose.

Stem tall, 3-10 dm. high, leafy; plant apparently biennial or annual.

Ligules more than 1 cm. long; leaves in age glabrate and green.
Ligules 5-8 mm. long; leaves permanently floccose.

1. *H. californica*.
2. *H. callicarpa*.

- Stem low, less than 3 dm. high, leafy at the base; plant perennial.
 Leaves thick, entire or merely sinuately toothed, densely tomentose; stem branched, with several heads.
- Leaves comparatively thin, more loosely floccose, usually coarsely lobed or toothed; stems scapiform, monocephalous.
- Leaves linear or oblanceolate to oblong or obovate, viscid-villous, green, sinuate-dentate.
- Stem low, with the leaves crowded at the base, and with monocephalous naked peduncles.
 Leaves oblanceolate in outline, as well as their lobes obtuse; bracts broadly lance-linear, acute.
 Involucre densely villous, white; ligules short.
 Involucre not densely villous, green; ligules 7-8 mm. long.
- Leaves linear or linear-oblanceolate in outline, as well as their lobes acutish.
 Bracts linear-lanceolate, acute or short-acuminate; lobes or teeth of the leaves coarse, broadly triangular.
 Bracts narrowly linear-lanceolate, attenuate; teeth of the leaves small and more lance-triangular.
- Stem tall, equally leafy throughout; heads several.
 Leaves lanceolate, 1-ribbed; peduncles elongate.
 Leaves oblong to obovate, 3-ribbed; peduncles short.
- Stem-leaves oval or elliptic or ovate, saliently-toothed; rays numerous.
- Stem-leaves oblong-oblanceolate, denticulate; rays 10-12.
3. *H. vestita*.
 4. *H. Parryi*.
 5. *H. Larseni*.
 6. *H. nana*.
 7. *H. carnosa*.
 8. *H. algida*.
 9. *H. mexicana*.
 10. *H. heterochroma*.
 11. *H. brevifolia*.

1. *Hulsea californica* T. & G.; A. Gray, in Torr. Pacif. R. R. Rep. 6: 77. 1857.

A robust biennial; stem 5-10 dm. high, sparingly villous when young, glabrate in age; peduncles more or less glandular; lower leaves spatulate, loosely villous when young, 8-10 cm. long; stem-leaves lanceolate, the upper reduced, villous as well as glandular; heads several; involucre hemispheric, about 2 cm. broad; bracts linear-lanceolate, acuminate, in 3 series, villous and glandular-puberulent, often purplish-tipped; ligules yellow, 10-12 mm. long; tube of disk-flowers slender, 3.5 mm. long, glandular-villous; throat cylindrical, 3 mm. long; lobes triangular-ovate; achenes about 5 mm. long, silky-villous on the blunt angles; pappus-squamellae obovate, arose, 1 mm. long.

TYPE LOCALITY: San Diego.

DISTRIBUTION: Southern California.

2. *Hulsea callicarpha* (H. M. Hall) S. Watson, sp. nov.

Hulsea callicarpha S. Wats.; A. Gray, Syn. Fl. N. Am. 1²: 342, merely mentioned under *H. vestita*. 1884.
Hulsea vestita callicarpha H. M. Hall, Univ. Calif. Publ. Bot. 1: 129. 1902.

A floccose biennial or annual, often branched at the base as well as above, 2-9 dm. high, densely floccose below, viscid- or glandular-hirsute above; lower leaves numerous, densely white-floccose, obovate or spatulate, with winged petioles, 4-8 cm. long; upper leaves much reduced, lanceolate, sessile; heads several; involucre 15-18 mm. broad; bracts in 3 series, linear-lanceolate, acuminate, often purple-tipped, viscid-villous and glandular-puberulent; ligules yellow or tinged with purple, 6-7 mm. long; tube of disk-corollas 2-2.5 mm. long, glandular; throat 5 mm. long; achenes 5 mm. long, silky-villous, especially on the angles; pappus-squamellae obovate, fully 2 mm. long, nearly equaling the corolla-tube.

TYPE LOCALITY: Thomas Valley, San Jacinto Mountains, California.

DISTRIBUTION: Mountains of southern California.

3. *Hulsea vestita* A. Gray, Proc. Am. Acad. 6: 547. 1865.

Subscapose perennial, 1-2 cm. high; leaves 2-3 cm. long, thick, white-tomentose, merely crenulate or entire; stem-leaves minute; involucre 15 mm. high, 15-20 mm. broad; bracts viscid-villous and puberulent, in 3 series, acute; ligules 6 mm. long, yellow; disk-corollas numerous; tube 2 mm. long; throat 4 mm. long; achenes about 5 mm. long; silky-hirsute on the angles; squamellae fully 2 mm. long, fully equaling the corolla-tube.

TYPE LOCALITY: Volcanic hill south of Mono Lake, California.

DISTRIBUTION: Southern Sierra Nevada, California.

4. *Hulsea Parryi* A. Gray, Proc. Am. Acad. 12: 59. 1876.

Hulsea vestita pygmaea A. Gray, Syn. Fl. N. Am. 1²: 343. 1884.

A subscapose perennial with cespitose caudex; leaves basal, numerous, oblanceolate or spatulate, rather loosely white-floccose, sharply dentate; stems monocephalous, scapiform and 1–2 dm. high, or in alpine forms (*H. vestita pygmaea*) very short or almost none; stem-leaves reduced, linear, bract-like; involucre 10–18 mm. broad; bracts linear-lanceolate, acute, viscid-ciliate and glandular-puberulent; ligules 5–6 mm. long, yellow or tipped with purple; tube of disk-corollas 2.5 mm. long, glandular; throat 3 mm. long; achenes 5 mm. long, silky-hirsute, especially on the angles; pappus-squamellae oblong, fully 2 mm. long.

TYPE LOCALITY: Southeastern California, in the Mohave district.

DISTRIBUTION: Mountains of Southern California.

5. *Hulsea Larseni* (A. Gray) Rydberg, sp. nov.

Hulsea nana Larseni A. Gray, Bot. Calif. 1: 387. 1876.

A cespitose perennial; stems about 1 dm. high, more or less white-villous; leaves usually scattered on the short stem, 2–4 cm. long, villous and glandular-puberulent, oblanceolate, pinnately lobed, with short ovate or oblong divisions; peduncles 1–5 cm. long; heads solitary; involucre about 2 cm. broad, turbinate; bracts linear-lanceolate, densely white-villous, acute; ligules yellow, 5–6 mm. long; tube of disk-corollas glandular, 2 mm. long; throat 3 mm. long; achenes 7 mm. long, long-silky, especially on the angles; pappus-squamellae oblong, lacinate, unequal, 1–2 mm. long.

TYPE LOCALITY: Lassen's Peak, California.

DISTRIBUTION: High mountains of northern California and Oregon.

6. *Hulsea nana* A. Gray, in Torr. Pacif. R. R. Rep. 6: 76. 1857.

A cespitose subscapose perennial; leaves crowded at the base, oblanceolate, 2–5 cm. long, viscid-villous, pinnately lobed with oblong, obtusish divisions; stems scapiform, usually less than 1 dm. long; involucre hemispheric, about 2 cm. broad; bracts linear-lanceolate, acute, viscid-villous and glandular-puberulent; ligules 8–10 mm. long; tube of disk-corollas 2 mm. long, glandular; throat 3 mm. long; achenes about 6 mm. long, long-silky; hairs hiding the short, unequal, oblong-obovate squamellae, which are about 1 mm. long.

TYPE LOCALITY: Crater Pass, Cascade Mountains, Oregon.

DISTRIBUTION: On volcanic ash, high mountains, Washington and Oregon.

ILLUSTRATION: Pacif. R. R. Rep. 6: pl. 13.

7. *Hulsea carnosa* Rydb. Mem. N. Y. Bot. Gard. 1: 423. 1900.

A cespitose perennial with creeping rootstock; stems 1.5–4 dm. high, very leafy and fleshy, viscid-hairy and glandular-puberulent; leaves fleshy, linear, 3-ribbed, 5–10 cm. long, sinuately lobed with broadly triangular lobes; heads solitary; peduncles 2–10 cm. long; involucre hemispheric, 2–2.5 cm. broad; bracts linear-lanceolate, viscid-pubescent, acute; ligules yellow, 8–12 mm. long; tube of disk-corollas 3 mm. long, glandular-pubescent; throat fully 3 mm. long; achenes fully 1 cm. long, long-silky, especially on the angles; pappus-squamellae ovate, fimbriate, 2 mm. long.

TYPE LOCALITY: Indian Creek, Montana.

DISTRIBUTION: Among loose rocks on high mountains, southern Montana, Idaho and the Yellowstone National Park.

8. *Hulsea algida* A. Gray, Proc. Am. Acad. 5: 547. 1865.

Hulsea caespitosa Nels. & Kenn. Proc. Biol. Soc. Wash. 19: 38. 1906.

A cespitose, subscapose perennial; stems 1–2 dm. high, viscid-villous; basal leaves crowded, linear, repand-dentate with short lanceolate teeth, 3-nerved towards the base, 5–10 cm. long, viscid-villous; stem-leaves reduced, linear-lanceolate; heads solitary; involucre 2–2.5 cm. wide; bracts linear-lanceolate, acuminate or attenuate-villous and somewhat viscid; ligules yellow, about 1 cm. long; tube of disk-corollas 2 mm. long, glandular-pubescent;

throat 3 mm. long; achenes 6-7 mm. long, long-silky on the angles; squamellae obovate, fimbriate, 1 mm. long.

TYPE LOCALITY: Mt. Dana, California.

DISTRIBUTION: Sierra Nevada, California and Nevada.

9. *Hulsea mexicana* Rydberg, sp. nov.

A leafy annual or biennial; stem 5-6 dm. high, viscid-villous, branched above, with nearly erect branches; leaves lanceolate, 1-ribbed, 4-7 cm. long, saliently dentate, green; viscid-pubescent, sessile; heads few; peduncles 3-8 cm. long; involucre hemispheric, about 8 mm. high and 15 mm. broad; bracts in 3 series, viscid-villous, linear, acuminate; ligules yellow, 7-8 mm. long; tube of disk-corollas 2 mm. long, puberulent; throat 4 mm. long, glandular-puberulent; achenes 5 mm. long, silky-villous; pappus-squamellae oblong, acute, 1.5 mm. long.

Type collected at La Grulla, San Pedro Martir Mountains, Lower California, *Goldman 1256* (U. S. Nat. Herb.).

10. *Hulsea heterochroma* A. Gray, Proc. Am. Acad. 7: 359. 1868.

A tall annual or biennial; stem 4-15 dm. high, viscid-villous, leafy; leaves oblong, elliptic or the upper ovate-lanceolate, sessile, 3-15 cm. long, dentate, viscid-pubescent; heads racemose; peduncles 1-3 cm. long; involucre about 2.5 cm. broad; bracts lanceolate, acuminate, viscid-villous; ligules purplish or yellow, 7-8 mm. long, hirsute; tubes of the disk-corollas 2 mm. long, glandular-hirsute; throat 2 mm. long; achenes 6 mm. long, long-silky on the angles and slightly viscid; squamellae oblong, unequal, lacerate, the longer about equaling the corolla-tube.

TYPE LOCALITY: Yosemite Valley, California.

DISTRIBUTION: At middle altitudes, central and southern California.

11. *Hulsea brevifolia* A. Gray, Proc. Am. Acad. 7: 359. 1868.

A leafy perennial; stem 3-5 dm. high, viscid-villous, branched above; leaves oblong, 3-5 cm. long, repand-dentate above the middle, viscid-villous, 3-ribbed; heads in leafy corymbs; peduncles 1-5 cm. long; involucre turbinate, about 1.5 cm. broad; bracts linear-lanceolate, acuminate, glandular-puberulent and viscid-villous; ligules yellow, 7-8 mm. long; tube of disk-corollas 3 mm. long; throat 4 mm. long; achenes about 7 mm. long, long-silky; squamellae 2 mm. long, obovate, erose.

TYPE LOCALITY: Mariposa Big-tree Grove, California.

DISTRIBUTION: Sierra Nevada of middle California.

31. *VASQUESIA* Philippi, Pl. Atac. 31. 1860.

Villanova Lag. Gen. & Sp. Nov. 31. 1816. Not *Villanova* Ortega. 1797.

Glandular pubescent annuals, with leafy stems and more or less dissected opposite or alternate leaves. Heads radiate, usually cymose. Involucre campanulate or hemispheric; bracts few, broad, subequal in two series, herbaceous, glandular-pubescent, somewhat enclosing the marginal achenes. Receptacle small, naked. Ray-flowers in a single series, pistillate; ligules broad, 3-toothed, yellow. Disk-flowers hermaphrodite, fertile; tube glandular-pubescent; throat short, campanulate, often somewhat oblique, 5-toothed. Anthers subsagittate at the base. Style-branches of the disk-flowers with short, acute appendages. Achenes cuneate, truncate or rounded at the apex, glabrous, compressed-triquetrous, *i. e.*, the outer face distinctly keeled. Pappus wanting.

Type species, *Vasquesia biterna* Philippi.

1. *Vasquesia achillaeoides* (Less.) Rydberg.

Unxia achillaeoides Less. in Schlecht. & Cham. Linnaea 5: 159. 1830.

Villanova achillaeoides Less. Syn. Comp. 256. 1832.

A glandular-pubescent annual; stem trichotomously branched, 2-3 dm. high; leaves opposite, pinnatifid, subsessile or with broad petioles, 2-5 cm. long, sparingly pubescent and

glandular-punctate; divisions obovate to oblong, usually again cleft or toothed; heads short-peduncled; involucre hemispheric, 5 mm. high, 8 mm. wide; bracts about 10, elliptic, concave, glandular-pubescent; ray-flowers 5-6; ligules light-yellow, broadly oval, 5 mm. long, fully 3 mm. broad; tube of the disk-flowers densely glandular, 1.5 mm. long; throat about 1 mm. long; achenes cuneate, 2 mm. long, black, minutely scabrous, sub-triangular, *i. e.*, somewhat flattened, strongly keeled on the outer and obscurely so on the inner face.

TYPE LOCALITY: Plains of Perote [Vera Cruz].
DISTRIBUTION: Southern Mexico.

32. *GALEANA* Llave; Llave & Lex. Nov. Veg. Descr. 1: 12. 1824.

Chlamysperma Less. Syn. Comp. 256. 1832.

Slender, dichotomously branched annuals, more or less glandular-pubescent and with glandular-punctate foliage. Leaves petioled, mostly opposite. Heads small, in leafy cymes, slender-peduncled in the forks. Involucral bracts broad, concave, oval, 5 in number. Ray-flowers 3, pistillate and fertile; ligules short, broadly cuneate, 3-toothed. Disk-flowers 3-4, of these 1 or 2 hermaphrodite and fertile, the rest staminate; corolla-tube of the hermaphrodite flowers short, glandular; throat short-campanulate; staminate corollas longer, glabrous and with more funnel-form throat. Achenes of the hermaphrodite flowers pear-shaped, triangular; those of the rays broader and with the inner two angles with more or less corky, concave wings with incurved and crenate margins.

Type species, *Galeana hastata* Llave.

Disk-corollas 5-toothed, some of them fertile; leaf-blades more than 1 cm. long, mostly toothed; plants about 3 dm. high.

Leaf-blades lanceolate-hastate; achenes strongly tuberculate, on the back, hispidulous on the margins.

Leaf-blades broadly ovate; achenes slightly tuberculate, glabrate.

Disk-corollas 4-toothed, mostly sterile; leaf-blades mostly less than 1 cm. long; plant about 1 dm. high.

1. *G. hastata*.

2. *G. pratensis*.

3. *G. arenarioides*.

1. *Galeana hastata* Llave; Llave & Lex. Nov. Veg. Descr. 1: 12. 1824.

A dichotomously branched annual; stem about 3 dm. high, round-angled, glabrous below, glandular-hispidulous above; leaves petioled, opposite; blades lanceolate, hastately lobed or the upper entire, minutely puberulent and glandular-punctate, 1.5-2 cm. long; peduncles fully 1 cm. long; involucre 3 mm. high, 2.5 mm. broad; bracts oval, minutely hairy, concave; ligules less than 1 mm. long, deeply 3-toothed; corolla of the disk-flowers about 1 mm. long, 5-toothed; disk-achenes black, linear-cuneate, decidedly tuberculate, 2.5 mm. long; ray-achenes large, with wings as broad as the body, decidedly tuberculate and minutely hispidulous on the margins of the wings and the third angle.

TYPE LOCALITY: San José del Corral.
DISTRIBUTION: Vera Cruz to Chiapas.

2. *Galeana pratensis* (H.B.K.) Rydberg.

Unxia pratensis H. B. K. Nov. Gen. & Sp. 4: 279. 1820.

Chlamysperma pratense Less. Syn. Comp. 256. 1832.

Villanova pratensis Benth. & Hook. Gen. Pl. 2: 405. 1873.

A dichotomously branched annual; stem 2-3 dm. high, angular, glandular-pubescent; leaves petioled, opposite; blades of the lower ones deltoid-ovate, truncate or cuneate at the base, coarsely serrate, triple-ribbed, glandular-pubescent and punctate, 2-3 cm. long; upper leaves more oblong and less toothed; peduncles in the forks, about 1 cm. long; involucre obovoid, 3 mm. high and nearly as broad; bracts 5, concave, oval, glandular-pubescent; ligules less than 1 mm. long; achenes black, glabrate, slightly tuberculate when ripe, 3 mm. long; wings of the marginal achenes at first light, turning dark, undulate, glabrous, rarely slightly tubercled.

TYPE LOCALITY: Valladolid [Morelia], Michoacan.

DISTRIBUTION: Southern Mexico to Costa Rica.

ILLUSTRATIONS: H. B. K. Nov. Gen. & Sp. *pl.* 401; E. & P. Nat. Pfl. 4^{is}: *f.* 124, *E, F.*

3. *Galeana arenarioides* (H. & A.) Rydberg

Chlamysperma arenarioides H. & A. Bot. Beech. Voy. 300. 1837.

A dwarf annual; stem 0.5–1.5 dm. high, glandular-pubescent, intricately branched; leaves opposite, short-petioled or sessile; blades rarely more than 1 cm. long, elliptic or oval, mostly entire, glandular-puberulent; peduncles about 5 mm. long; involucre 2.5 mm. high, 2 mm. broad; bracts 5, oval, glandular-puberulent; ligules short; disk-corollas 4-toothed, few, mostly staminate, with glandular-puberulent tube; achenes of the rays oval, not tuberculate, and margins of the wings scarcely undulate.

TYPE LOCALITY: Tepic, Mexico.

DISTRIBUTION: Tepic and Jalisco.

ILLUSTRATION: H. & A. Bot. Beech. Voy. *pl.* 64.

33. *ACHYROPAPPUS* H.B.K. Nov. Gen. & Sp. 4: 257. 1820.

Strigose and somewhat glandular-hispid annuals. Leaves opposite, twice ternate, glandular-hispid, with linear segments. Heads terminating the branches, radiate. Involucre hemispheric; bracts 5, obovate. Receptacle small, plain. Ray-flowers 5, pistillate, fertile; ligules cuneate, white. Disk-flowers hermaphrodite and perfect, more numerous; corollas short; tube pilose; throat campanulate. Achenes obpyramidal, 3-angled, hirsute. Pappus of 6–8 scarious obtuse squamellae.

Type species, *Achyropappus anthemoides* H. B. K.

1. *Achyropappus anthemoides* H.B.K. Nov. Gen. & Sp. 4: 259. 1820.

Bahia anthemoides A. Gray, Proc. Am. Acad. 15: 40. 1879.

Schkuhria anthemoides Wedd.; Jacks. Ind. Kew. 4: 827, as synonym. 1895. Not *S. anthemoides* Coult. 1895.

A strigose and glandular annual; stem erect, branched, 2–4 dm. high, angular, glandular-hispid, especially above; leaves opposite, twice ternate, glandular-hispid, and hirsute, petioled, with linear segments; heads at the ends of the branches; peduncles 1–3 cm. long, glandular-hispid; involucre hemispheric, 5 mm. high, 7 mm. broad; bracts 5, obovate, glandular-hispid, with yellow margins; ligules 5, cuneate, 5 mm. long, white; achenes obpyramidal, 3-angled, hirsute; squamellae 6–8, scarious, obovate-cuneate, obtuse, slightly costate at the base.

TYPE LOCALITY: Near Ixtlahuaca, Mexico (state).

DISTRIBUTION: South central Mexico.

ILLUSTRATION: H. B. K. Nov. Gen. & Sp. *pl.* 390.

Subtribe 6. *HYMENOPAPPANAE*. Heads radiate or discoid. Involucres from turbinate to hemispheric; bracts mostly broad, flat or somewhat convex, but not enclosing the marginal achenes, thin with more or less scarious, colored or white ends and margins. Ray-corollas when present yellow or white, ligulate, deciduous. Disk-corollas yellow, white or rarely tinged with purple, with glandular tube usually longer than the campanulate or funnelform throat. Achenes distinctly angled, from clavate to rather broadly obpyramidal. Pappus squamellate or wanting.

Principal bracts of the turbinate involucre 4 or 5, rarely 6–8, subtended by 1 or 2 smaller ones, punctate; leaves distinctly impressed-punctate.

Bracts of the involucre keeled, glabrous, conspicuously punctate; rays usually present; throat of the disk-corollas campanulate.

Bracts of the involucre not keeled, hirsute, not conspicuously punctate; rays wanting; throat of the disk-corollas funnelform.

Principal bracts 6–12, not punctate; leaves if at all not conspicuously punctate.

Disk-corollas with ovate to oblong lobes which are not twice as long as the campanulate or cylindro-campanulate throat.

Disk-corollas with a campanulate throat and spreading lobes; bracts obovate; squamellae obovate or ovate, rarely with excurrent midrib, sometimes wanting.

34. *TETRACARPUM*.

35. *CEPHALOBEMBIX*.

Disk-flowers not subtended by membranous paleae; heads discoid, except in one species.

Disk-flowers subtended by membranous paleae, which partly enclose the fruit; heads radiate.

Disk-corollas with cylindro-campanulate throat and erect lobes; bracts oblong; squamellae narrowly linear-lanceolate, with the midrib excurrent into a barbellate awn; heads radiate.

Disk-corollas deeply cleft into linear-oblong lobes at least three times as long as the funnelliform throat.

Principal bracts oblong, subtended by linear smaller ones; corollas cleft nearly to the tube; anthers wholly exerted.

Bracts subequal, obovate; corollas of the disk-flowers deeply cleft but with a distinct funnelliform throat; anthers partly exerted.

36. HYMENOPAPPUS.

37. LEUCAMPYX.

38. HYMENOTHRIX.

39. TRICHYMENIA.

40. FLORESTINA.

34. TETRACARPUM Moench, Meth. Suppl. 240. 1802.

Schkuhria Roth, Catal. 1: 116. 1797. Not *Schkuhria* Moench, 1794.

Mieria Llave; Llave & Lex. Nov. Veg. Descr. 2: 9. 1825.

Achyropappus Link & Otto, Ic. Pl. Rar. pl. 30. 1829. Not *Achyropappus* H. B. K. 1820.

Hopkirkia DC. Prodr. 5: 660. 1836. Not *Hopkirkia* Spreng. 1818.

Slender, paniculately branched annuals. Leaves alternate or the lower opposite, pinnately divided into linear or filiform divisions, conspicuously impressed-punctate. Heads radiate or discoid. Involucre turbinate or obpyramidal; bracts 4 or 5, rarely 6, more or less scarious, colored and petaloid at the apex, keeled on the back, often subtended by 1-3 bractlets at the base. Receptacle small. Ray-flowers 1-6, with ascending or spreading, sometimes obsolete, ligules, or wanting. Disk-flowers usually few; tube glandular, shorter than the campanulate throat; lobes 5, rather short. Achenes narrowly obpyramidal, 4-angled, hispidulous on the angles, especially below. Pappus of 8 scarious squamellae with callous-thickened bases or a prominent midrib, those on the angles sometimes larger.

Type species, *Tetracarpum pinnatum* Moench.

Ray-flowers 1 or 2, or wanting, with short ascending ligules.

Squamellae obtuse.

Squamellae subequal, 1.5 mm. long.

Squamellae unequal, the longer less than 1 mm. long.

Squamellae acute, usually awn-tipped.

Squamellae equal.

Ligules 1 mm. long or less, not longer than the disk-flowers.

Ligules fully 2 mm. long, much exceeding the disk-flowers.

Squamellae unequal, those at the angles much longer.

Ligules 1 mm. long or less, scarcely exceeding the disk-flowers.

Achenes short-hairy on the angles.

Achenes long-hairy on the angles.

Ligules 2-3 mm. long, much exceeding the disk-flowers.

Ray-flowers 3-6, with more conspicuous spreading ligules.

1. *T. Wrightii*.2. *T. Pringlei*.3. *T. anthemoideum*.4. *T. guatemalense*.5. *T. virgatum*.6. *T. Wislizeni*.7. *T. flavum*.8. *T. schkuhrioides*.

1. *Tetracarpum Wrightii* (A. Gray) Rydberg.

Schkuhria Wrightii A. Gray, Pl. Wright. 2: 95. 1853.

A slender annual; stem erect, angled, striate, glandular-puberulent, 2-3 dm. high, with ascending branches; leaves alternate, pinnately dissected into filiform divisions, 2-4 cm. long, sparingly puberulent and conspicuously impressed-punctate; peduncles 1-2 cm. long; involucre obconic, 4-5 mm. long; bracts glabrous, obovate, conspicuously punctate, with more or less purple-tinged scarious margins and apex; ligule one or wanting, ascending, 1 mm. long; disk-flowers 3-5; achenes 3 mm. long, densely long-pubescent on the edges, striate on the faces; squamellae 8, obovate, similar, rounded at the apex, purple-striate.

TYPE LOCALITY: "On the Sonorita near Deserted Rancho," Sonora.

DISTRIBUTION: Chihuahua, New Mexico, Arizona, and Sonora.

2. *Tetracarpum Pringlei* (S. Wats.) Rydberg.

Schkuhria Pringlei S. Wats. Proc. Am. Acad. 23: 278. 1888.

A slender annual; stem 3-5 dm. high, somewhat angled, sparingly puberulent and slightly glandular; leaves alternate, pinnately 3-7-divided into narrowly linear divisions or the upper entire, distinctly punctate but nearly glabrous; peduncles 1-2 cm. long; involucre obconic, 5 mm. high, 3 mm. broad; bracts obovate, punctate, yellowish-green with purplish tinged margins; disk-flowers 7-9; corolla yellow, nearly 2 mm. long; achenes elongate-obpyramidal, 4 mm.

long, short-puberulent on the angles, striate and glabrous on the faces; squamellae unequal, obovate, those of the angles less than 1 mm. long, the intermediate still shorter.

TYPE LOCALITY: Near Guerrero, Chihuahua.
DISTRIBUTION: Chihuahua.

3. *Tetracarpum anthemoideum* (DC.) Rydberg.

Hopkirkia anthemoidea DC. Prodr. 5: 660. 1836.
Schkuhria Hopkirkia A. Gray, Pl. Wright. 2: 94. 1853.
Schkuhria anthemoidea Coult.; Donn. Smith, Enum. Pl. Guat. 4: 93. 1895.

A branched annual; stem 3-5 dm. high, somewhat angled, sparingly puberulent and glandular-granuliferous; leaves pinnately 5-7-divided or the upper 3-divided or entire, with narrowly linear divisions, nearly glabrous and conspicuously punctate; peduncles 1-3 cm. long; involucre obpyramidal, 5-6 mm. high, 3-4 mm. broad; bracts 4 or 5, obovate, keeled, the scarious tips tinged with purple, subtended by 1 or 2 small bractlets; ray-flower solitary; ligule 1 mm. long; disk-flowers 2-4; corollas 3 mm. long; achenes 4 mm. long, elongate-obpyramidal, strongly villous on the 4 angles, strongly striate and somewhat pubescent on the faces; squamellae 3 mm. long, subequal, lanceolate, acute, usually awned and in age often 3-cleft.

TYPE LOCALITY: Real del Monte, Mexico.
DISTRIBUTION: Chihuahua to Arizona, Sonora, Jalisco, and Mexico.

4. *Tetracarpum guatemalense* Rydberg, sp. nov.

Schkuhria virgata Hemsl. Biol. Centr. Am. Bot. 2: 212, in part. 1881. Not *Schkuhria virgata* DC. 1836.
Schkuhria anthemoidea Coult.; Donn. Smith, Enum. Pl. Guat. 4: 93, in part. 1895.

A slender annual; stem 2-4 dm. high, sparingly puberulent, with ascending branches; leaves alternate, pinnatifid with 3-5 linear-filiform divisions or the upper entire, glabrate, impressed-punctate, 2-3 cm. long; peduncles 3-5 cm. long; involucre about 5 mm. high and 4 mm. broad; bracts obovate, somewhat carinate, glandular-punctate, purplish at the tips; ray-flower solitary or wanting; ligule oblong, fully 2 mm. long; disk-flowers 5-7; corollas 2 mm. long; achenes 3 mm. long, obpyramidal, densely villous, hirsute on the margins, striate and muriculate on the faces; squamellae subequal, lanceolate, aristulate, about equaling the corolla.

Type collected at Llano de San Juan de Dios, Guatemala, 1865, *Bernoulli 135* (herb. Columbia Univ.).
DISTRIBUTION: Guatemala and Salvador.

5. *Tetracarpum virgatum* (Llave) Rydberg.

Mieria virgata Llave; Llave & Lex. Nov. Veg. Descr. 2: 9. 1825.
Schkuhria virgata DC. Prodr. 5: 654. 1836.

An erect annual; stem angled and strongly grooved, glandular-hispidulous, with ascending branches; leaves alternate, 2-3 cm. long, pinnatifid with filiform divisions, hispidulous and impressed glandular-punctate; peduncles 1-3 cm. long; involucre obconic, 5 mm. high, 4 mm. broad; bracts 5, obovate, rounded at the apex, carinate, hispidulous and punctate, yellowish-green, more or less purple-tinged on the margins, usually with 1 or 2 small oblong bractlets below; ray-flowers solitary or wanting; ligule short, obovate, 1 mm. long; disk-flowers 5-8; corolla 2 mm. long; achenes black, elongate-pyramidal, 4-angled, 3 mm. long, hispid on the angles, minutely muriculate on the faces; squamellae 8, the four on the angles lanceolate, acute, awned, 1-2 mm. long, purple-striate, the intermediate much smaller and blunt.

TYPE LOCALITY: Tacubaya, near Mexico.
DISTRIBUTION: Durango to San Luis Potosi and Puebla.

6. *Tetracarpum wislizeni* (A. Gray) Rydberg.

Schkuhria wislizeni A. Gray, Mem. Am. Acad. II. 4: 96. 1849.

A slender annual; stem 1-3 dm. high, minutely glandular-puberulent; leaves mostly 3-sected into filiform divisions, or the upper and lower entire, glandular-punctate, glabrous or

sparingly puberulent; involucre 5 mm. high, 4 mm. broad; bracts 4, obovate, keeled, yellow at the apex; ray-flowers solitary or often wanting; ligule obovate, short, not longer than the disk-corollas; disk-flowers 3-5; corolla-tube glandular; limb 4-lobed; achenes densely villous on the angles, obpyramidal, about 4 mm. long; squamellae unequal, those of the angles ovate, awn-pointed, equaling the corolla, the intermediate ones shorter, mucous.

TYPE LOCALITY: Around Cosiquiriachi in the Sierra Madre west of Chihuahua.

DISTRIBUTION: Arizona and Chihuahua.

7. *Tetracarpum flavum* Rydberg, sp. nov.

A slender annual; stem about 3 dm. high, sparingly glandular-puberulent; leaves alternate, 2-4 dm. long, pinnatifid into 3-5 narrowly linear divisions or the upper entire, conspicuously punctate, glabrate; peduncles 2-4 cm. long; involucre 6-7 mm. high, 5-6 mm. broad; bracts about 5, obovate, punctate and minutely puberulent, keeled, with light-yellow margins and tip; ligule 2-3 mm. long, oblong, light-yellow; disk-flowers 4-6; corollas 3 mm. long; achenes elongate, obpyramidal, 5 mm. long, densely villous-hirsute on the angles, slightly so on the striate faces; squamellae unequal, those of the angles lanceolate, aristate, fully as long as the corollas, the intermediate ones about half as long and acute.

Type collected in Sierra de San Felipe, Oaxaca, October 10, 1894, *Charles L. Smith 263 & 626* (herb. N. Y. Bot. Gard.).

8. *Tetracarpum schkuhrioides* (Link & Otto) Rydberg.

Achyropappus schkuhrioides Link & Otto, Ic. Pl. Rar. pl. 30. 1829.

Bahia schkuhrioides A. Gray, Proc. Am. Acad. 19: 27. 1883.

Schkuhria senecioides Nees, Del. Sem. Hort. Bonn. 1831.—DC. Prodr. 5: 654, as synonym. 1836.

Schkuhria schkuhrioides Thellung, Repert. Sp. Nov. 11: 308. 1912.

A slender annual; stem erect, 3-6 dm. high, glabrate, strongly grooved; leaves alternate, 3-7 cm. long, bipinnatifid into linear or linear-filiform divisions, glabrous or nearly so, impressed-punctate; involucre turbinate, 5 mm. long, 6 mm. broad, glabrous, glandular-punctate; bracts 6-8; obovate, with yellow scarious margins and tips, subtended by 1-3 smaller ones; ligules 1-4, broadly oblong or cuneate, 4 mm. long; disk-corollas many, 3 mm. long; achenes narrowly obpyramidal, 3 mm. long, hispidulous on the angles; squamellae obovate, 6.5 mm. long, slightly thickened on the back, without distinct costa.

TYPE LOCALITY: Mexico.

DISTRIBUTION: Central and southern Mexico.

ILLUSTRATION: Link & Otto, Ic. Pl. Rar. pl. 30.

EXCLUDED SPECIES

SCHKUHRIA ABROTANOIDES Roth has been reported erroneously from Mexico by Hemsley: *Galeotti 2045* belongs to *Tetracarpum Wislizeni*; *Mueller 270* belongs to *T. anthemoideum*; *Bourgeau 372* and *Couller 314* belong to *T. virgatum*.

35. CEPHALOBEMBIX Rydberg, gen. nov.

Slender glandular-hirsutulous annuals. Lower leaves opposite, the upper alternate, pinnately dissected into linear-filiform divisions, hirsutulous and impressed-punctate. Heads discoid, many in leafy corymbs. Involucre turbinate or obconic; bracts 5-8, obovate, somewhat convex but not keeled, herbaceous, hirsutulous and somewhat punctate, scarious and more or less colored around the margin. Rays wanting. Disk-flowers light-yellow; tube glandular, slender, equaling or exceeding the funnelform throat; lobes oblong. Style-branches with short acute appendages. Achenes elongate-obpyramidal, 4-angled, hispidulous on the angles especially below. Pappus of 8 scarious squamellae either callous-thickened at the base or with prominent midrib.

Type species, *Schkuhria neomexicana* A. Gray.

1. *Cephalobembix neomexicana* (A. Gray) Rydberg.

Schkuhria neomexicana A. Gray, Mem. Am. Acad. II. 4: 96. 1849.

Amblyopappus neomexicanus A. Gray, in Torr. Pacif. R. R. Rep. 4: 106. 1857.

Bahia neomexicana A. Gray, Proc. Am. Acad. 19: 27. 1883.

Achyropappus neomexicanus A. Gray; Rydb. Fl. Colo. 377. 1906.

A slender low annual; stem 1-2 dm. high, branched from near the base, with ascending branches, hirsutulous or glabrate, more or less glandular-hispidulous above; leaves opposite or the upper ones alternate, pinnately 3-7-divided into linear-filiform divisions, sparingly hirsutulous and impressed-punctate; heads numerous; peduncles 1-3 cm. long; involucre obconic or turbinate, about 6 mm. high, 6-7 mm. broad; bracts obovate-spatulate, often tinged with purple, hirsute and glandular; rays none; disk-flowers many; corollas light-yellow, 1.5 mm. long; achenes very narrowly obpyramidal, 4-angled, 4 mm. long, hirsutulous on the angles below, otherwise sparingly puberulent; squamellae 8, broadly obovate, almost equaling the corolla, strongly thickened at the base.

TYPE LOCALITY: Santa Fé, New Mexico.
DISTRIBUTION: Colorado to Chihuahua.

36. HYMENOPAPPUS L'Hér. Hymenop. 1. 1788.

Rothia Lam. Jour. Hist. Nat. 1: 16. 1792.

Annual, biennial, or perennial herbs, often more or less tomentose. Leaves alternate, more or less pinnatifid or the lower rarely entire, in some species crowded at the base. Heads corymbose, discoid or in one species radiate. Involucre hemispheric or campanulate; bracts in 2-3 series, the inner broad, scarious, more or less petaloid, obtuse, yellowish or whitish. Disk-flowers many, hermaphrodite, yellow; tube slender, glandular, puberulent; throat campanulate, 5-lobed; lobes mostly ovate. Style-branches with short subulate or conic appendages. Achenes obpyramidal, 4-5-angled, striate, hirsute. Pappus of 12-16 membranous squamellae, with or without a distinct midrib, the latter in two species excurrent, or sometimes wanting.

Type species, *Hymenopappus scabiosaeus* L'Hér.

Heads discoid.

Plants more or less glandular at least below.

Bracts obovate, obtuse; upper part of the plant decidedly glandular-hirsute; squamellae usually awn-tipped.

Bracts oblong, acute; upper part of the plant somewhat tomentose, not glandular; squamellae usually muticous.

Plants not at all glandular, usually more or less tomentose, rarely glabrate.

Squamellae of at least the inner achenes awn-tipped.

Squamellae not awn-tipped, sometimes wanting.

Corolla-lobes lanceolate, about equaling the short-campanulate throat; biennials.

Bracts almost wholly petaloid, white or sulphur-yellow.

Pappus-squamellae less than a third as long as the corolla-tube; earliest leaves pinnatifid.

Bracts of the involucre broadly obovate or ovate; achenes hirsutulous at least on the angles.

Bracts with white tips.

Bracts with sulphur-yellow tips.

Bracts of the involucre oblong, or oblong-obovate with greenish-white tips; achenes merely puberulent; leaf-segments very narrow.

Pappus-squamellae half as long as the corolla-tube or nearly so; earliest leaves entire.

Bracts only with petaloid bright tips.

Stem-leaves twice pinnate, with linear or linear-filiform divisions.

Stem-leaves pinnate, with oblong or broadly linear obtuse divisions.

Corolla-lobes shorter than the throat; perennials, woody at the base (except *H. tenuifolius*).

Leaves bi- or tri-pinnatifid with linear or filiform divisions; achenes densely hirsute and strongly striate.

Corolla-throat campanulate, not more than twice as long as the lobes.

Pappus not hidden by the hairs of the achenes.

Stem leafy, usually 3 dm. high or more; heads numerous.

Plant not densely white-tomentose; leaves in age glabrate.

Biennial; branches and peduncles merely ascending.

Perennial; branches and peduncles erect.

1. *H. glandulosus*.

2. *H. Nelsoni*.

3. *H. Palmeri*.

4. *H. scabiosaeus*.

5. *H. sulphureus*.

6. *H. corymbosus*.

7. *H. artemisiaefolius*.

8. *H. robustus*.

9. *H. flavescens*.

10. *H. tenuifolius*.

12. *H. cinereus*.

- Plant densely and permanently white-tomentose.
- Stem usually less than 3 dm. high; heads few.
- Stem sparingly grayish-tomentose, glabrate in age; achenes loosely villous.
- Stem permanently white-tomentose, densely villous at the base; achenes silky.
- Pappus minute, hidden by the long hairs of the achenes.
- Leaves glabrate in age; ultimate segments 5-30 mm. long; stem 3 dm. high or more.
- Leaves permanently white-tomentose; ultimate segments short, 1-5 mm. long; stem 1-2 dm. long.
- Corolla-throat deeply campanulate, 3-4 times as long as the short teeth.
- Pappus decidedly shorter than the corolla-tube.
- Stem leafy, densely woolly at the base.
- Leaf-segments rather soft, narrowly filiform; pappus-squamellae, 1 mm. long.
- Leaf-segments broader and stiffer, nearly 1 mm. wide; pappus-squamellae minute, almost hidden by the hairs.
- Stem less leafy, subscapose, not densely woolly at the base; leaf-segments broader, stiff, 1 mm. broad.
- Pappus about equaling the corolla-tube.
- Stem decidedly leafy, densely white-tomentose.
- Stem more or less scapiform, loosely floccose or glabrate; stem-leaves usually much reduced.
- Involute hemispheric, or in *H. lugens* somewhat turbinate, 6-9 mm. high, 9-15 mm. broad.
- Stem about 3 dm. high; throat of the corolla tapering at the base.
- Bracts oblong, only the outer purple-margined.
- Bracts broadly obovate.
- Bracts all more or less rose- or purple-tinged.
- Bracts all yellow-tinged.
- Stem 1-1.5 dm. high; corolla-throat rounded and swollen at the base; bracts obovate, slightly rose-tinged.
- Involute turbinate, about 5 mm. high and broad; plant 1-2 dm. high; margins of the bracts yellow.
- Leaves simple or simply pinnate with comparatively broad, linear, oblong, or lanceolate divisions and broad rachis; achenes sparingly puberulent or glabrate and indistinctly striate on the faces; squamellae minute or wanting.
- Leaves thin, all entire or some with 3, rarely 5, lanceolate lobes.
- Leaves firm, all except the earlier and those of the inflorescence pinnately cleft into 5-9 oblong lobes.
- Bracts broadly obovate, rounded at the apex, shorter than the disk-flowers.
- Bracts elliptic, acute, as long as the disk-flowers.
- Heads radiate; ligules white.
11. *H. tomentosus*.
12. *H. cinereus*.
13. *H. arenosus*.
14. *H. filifolius*.
15. *H. luteus*.
16. *H. eriopodus*.
17. *H. columbianus*.
18. *H. macroglottis*.
19. *H. niveus*.
20. *H. lugens*.
21. *H. gloriosus*.
22. *H. scaposus*.
23. *H. nanus*.
24. *H. parvulus*.
25. *H. integer*.
26. *H. mexicanus*.
27. *H. petaloideus*.
28. *H. radiatus*.

1. *Hymenopappus glandulosus* (S. Wats.) Rydberg.

Hymenothrix glandulosa S. Wats. Proc. Am. Acad. 23: 278. 1888.

A leafy-stemmed biennial; stem 5-7 dm. high, more or less purple-tinged, glandular-hirsute throughout, branched; leaves twice or thrice pinnate, 5-10 cm. long, glandular-hirsute; divisions linear, obtuse; heads corymbose on short peduncles; involucre hemispheric, 6-7 mm. high, about 1 cm. broad; corollas light-yellow; tube strongly glandular; lobes lanceolate, fully as long as the broadly campanulate throat; achenes 3 mm. long, hispidulous on the sharp angles, puberulent on the faintly nerved faces; squamellae about half as long as the corolla-tube, blunt, unequal, some of them usually with an excurrent midvein.

TYPE LOCALITY: Sierra Madre, Chihuahua.

DISTRIBUTION: Chihuahua.

2. *Hymenopappus Nelsoni* (Greenman) Rydberg, sp. nov.

Hymenothrix glandulosa Nelsonii Greenman Proc. Am. Acad. 40: 46. 1904.

A leafy-stemmed annual; stem 5–6 dm. high, striate, glandular-villous below, somewhat tomentulose above; leaves rhombic in outline, bipinnatifid into linear obtusish divisions, somewhat pubescent; heads numerous in corymbs or flat-topped panicles; involucre about 6 mm. high, nearly 1 cm. broad; bracts broadly obovate, rounded at the apex, slightly pubescent, yellow, often tinged with purplish; corollas yellow; tube nearly 2 mm. long, the lanceolate lobes equaling the broadly campanulate throat; achenes 3 mm. long, silky-hirsute on the angles; squamellae oblong-obovate, muticous or rarely slightly awn-pointed.

TYPE LOCALITY: Sierra Madre near Colonia Garcia, Chihuahua.

DISTRIBUTION: Known only from the type locality.

3. *Hymenopappus Palmeri* (A. Gray) O. Hoffm. in E. & P. Nat. Pfl.

4⁵: 256. 1890.

Hymenothrix Palmeri A. Gray, Proc. Am. Acad. 21: 391. 1886.

A leafy-stemmed biennial or perhaps annual; stem 5–7 dm. high, striate, glabrous or nearly so; leaves rhombic in outline, bipinnatifid into linear or oblanceolate, obtuse or acutish divisions, puberulent or glabrate; heads numerous in dense corymbs; involucre about 6 mm. high, and 1 cm. broad; bracts obovate or oblanceolate, acutish, glabrous, mostly scarious; corollas yellow; tube 1.5–2 mm. long, the lanceolate lobes equaling the broadly campanulate throat; achenes 3 mm. long, silky-hirsute on the angles, sparingly pubescent but glabrate on the indistinctly veined faces; squamellae of the marginal achenes usually oblong, muticous, 1 mm. long, those of the rest lanceolate, fully 2 mm. long and with excurrent midrib.

TYPE LOCALITY: In the mountain district 150 miles north of Batopilas, Chihuahua.

DISTRIBUTION: Chihuahua to Durango.

ILLUSTRATION: E. & P. Nat. Pfl. 4⁵: f. 124, J.

4. *Hymenopappus scabiosaeus* L'Hér. Hymenop. 1. 1788.

Rothia caroliniensis Lam. Jour. Hist. Nat. 1: 17. 1792.

Hymenopappus laxiflorus L'Hér.; DC. Prodr. 5: 658, as synonym. 1836.

Hymenopappus caroliniensis Porter, Mem. Torrey Club 5: 338. 1894.

A leafy-stemmed biennial; stem 3–7 dm. high, angled, often purplish, glabrate or sparingly floccose, corymbosely branched; leaves alternate, the earlier ones oblanceolate, merely cleft or sometimes nearly entire; stem-leaves once or twice pinnatifid with linear or sometimes oblong divisions, 5–15 cm. long, sparingly floccose, green and glabrate above, grayish-floccose beneath; heads corymbose; involucre 7–8 mm. high, 10–15 mm. broad; bracts obovate, mostly bright-white; corollas ochroleucous; tube about 2 mm. long; throat campanulate, 1.5 mm. long; lobes oblong, about as long as the throat; anthers and a part of filaments exerted; achenes obconic, 4 mm. long, short-hirsute; squamellae less than 1 mm. long.

TYPE LOCALITY: South Carolina.

DISTRIBUTION: South Carolina to Kansas, Texas, and Florida.

ILLUSTRATIONS: L'Hér. Hymenop. pl.; Jour. Hist. Nat. 1: pl. 1; Lam. Ill. pl. 667; Britt. & Brown Ill. Fl. f. 3960; ed. 2. f. 4529.

5. *Hymenopappus sulphureus* Rydb.; Britton, Man. 1007. 1901.

A leafy-stemmed biennial; stem 3–6 dm. high, permanently white-tomentose, branched above; lower leaves pinnately divided into oblong or linear lobes, white-tomentose beneath, sparingly floccose and glabrate above; stem-leaves twice pinnatifid with linear divisions; heads corymbose; involucre 7 mm. high, 10–12 mm. broad; bracts obovate, with sulphur-yellow tips; corollas ochroleucous; tube 2 mm. long; lobes oblong, about equaling the campanulate throat, 1.5 mm. long; anthers exerted; achenes 3.5–4 mm. long, strongly striate, hirsutulous on the angles.

TYPE LOCALITY: Kansas.

DISTRIBUTION: Kansas to Texas.

ILLUSTRATIONS: Britt. & Brown, Ill. Fl. f. 3961; ed. 2. f. 4530 (both as *H. corymbosus*).

6. *Hymenopappus corymbosus* T. & G. Fl. N. Am. 2: 372. 1842.

Hymenopappus corymbosus Nuttallii T. & G. Fl. N. Am. 2: 372. 1842.

Hymenopappus tenuifolius Nutt.; T. & G. Fl. N. Am. 2: 372, as synonym. 1842.

A leafy-stemmed biennial; stem 3–7 dm. high, angled and grooved, glabrate below, glandular and puberulent above; leaves twice pinnatifid with narrowly linear divisions, somewhat floccose when young, glabrate in age; heads numerous, corymbose; bracts oblong or oblong-obovate, with greenish-white tips; corolla yellowish; tube about 2 mm. long; throat campanulate, 1.5 mm. long, about equaling the oblong lobes; anthers wholly exserted; filaments partly so; achenes 3.5 mm. long, broadly obpyramidal, merely puberulent, strongly muricate and striate; squamellae minute.

TYPE LOCALITY: Arkansas.

DISTRIBUTION: Missouri and Arkansas to Kansas and Texas.

7. *Hymenopappus artemisiaefolius* DC. Prodr. 5: 658. 1836.

A leafy-stemmed biennial; stem 3–10 dm. high, floccose, striate; leaves loosely floccose and glabrate above, densely white-tomentose beneath, the earliest ones with lanceolate entire blades, those following lyrate-lobed, the main stem-leaves once or twice pinnatifid with linear-lanceolate or oblong, entire or toothed lobes; heads corymbose; involucre 6 mm. high, about 1 cm. broad; bracts obovate, with sulphur-yellow or whitish tips; corolla-tube about 2 mm. long; lobes more than 1 mm. long, about equaling the broadly campanulate throat; anthers wholly exserted; achenes 3 mm. long, striate, hirsute; squamellae about 1 mm. long.

TYPE LOCALITY: Texas.

DISTRIBUTION: Texas and Oklahoma.

8. *Hymenopappus robustus* Greene, Bull. Torrey Club 9: 63. 1882.

Hymenopappus flavescens A. Gray, Pl. Wright. 2: 94. 1853. Not *H. flavescens* A. Gray. 1849.

A leafy-stemmed biennial; stem 3–8 dm. high, striate, white-tomentose, corymbosely branched; leaves bipinnatifid into narrowly linear divisions, or the earliest ones rarely pinnatifid with lanceolate divisions, loosely floccose above, white-tomentose beneath; heads corymbose; involucre 6 mm. high, about 8 mm. broad; bracts obovate, tomentose with yellow tips; corollas yellow; tube about 2 mm. long; lobes lance-oblong, about equaling the campanulate throat, 1.5 mm. long; anthers wholly and filaments partly exserted; achenes 4 mm. long, striate, long-villous on the angles; squamellae oblong, fully half as long as the corolla-tube.

TYPE LOCALITY: New Mexico.

DISTRIBUTION: Texas to Arizona, Coahuila, and Chihuahua.

ILLUSTRATIONS: Britt. & Brown, Ill. Fl. f. 3963; ed. 2. f. 4532.

9. *Hymenopappus flavescens* A. Gray, Mem. Am. Acad. II. 4: 97.
1849.

Hymenopappus Fisheri Wooton & Standley, Contr. U. S. Nat. Herb. 16: 191. 1913.

A leafy-stemmed biennial; stem erect, 3–4 dm. high, floccose; leaves once pinnatifid with oblong or broadly linear obtuse divisions, densely tomentose beneath, sparingly floccose but soon glabrate above; heads numerous, corymbose; involucre 5–6 mm. high, 8–10 mm. broad; bracts sparingly tomentose, obovate, with thin yellow scarious tips and margins; corollas bright-yellow; tube 2 mm. long; throat campanulate, about equaling the lanceolate lobes; achenes nearly naked on the faces, densely villous on the angles; squamellae conspicuous, 1 mm. long.

TYPE LOCALITY: Between San Miguel and Las Vegas, New Mexico.

DISTRIBUTION: Western Texas and New Mexico.

10. *Hymenopappus tenuifolius* Pursh, Fl. Am. Sept. 742. 1814.

A leafy-stemmed biennial; stem 3–7 dm. high, corymbosely branched above, loosely floccose; leaves 2–10 cm. long, twice pinnatifid into filiform divisions, loosely floccose; involucre hemispheric, 5 mm. high, 7–8 mm. broad; bracts obovate, with yellow tips, floccose;

corollas light-yellow; tube about 1.5 mm. long; throat fully 1 mm. long; lobes ovate, somewhat shorter; anthers only partly exerted; achenes 3 mm. long, strongly striate, villous-hirsute on the angles; squamellae obovate, fully 1 mm. long.

TYPE LOCALITY: "Upper Louisiana" [probably South Dakota].

DISTRIBUTION: North Dakota to Kansas, northern New Mexico, and Wyoming.

ILLUSTRATIONS: Britt. & Brown, Ill. Fl. f. 3962; ed. 2. f. 4531; Clements, Rocky Mt. Fl. pl. 41, f. 4.

11. *Hymenopappus tomentosus* Rydb. Bull. Torrey Club

27: 633. 1900.

A leafy-stemmed biennial or perennial; stem densely and permanently white-tomentose, 3-4 dm. high; leaves 5-7 cm. long, bipinnatifid into linear divisions 4-10 mm. long, about 1 mm. wide; heads several, corymbose; involucre 5 mm. high, 8 mm. broad, densely woolly; bracts elliptic-obovate, with yellow tips; corollas yellow; tube fully 1 mm. long; throat campanulate, about as long as the tube, a little longer than the ovate lobes; achenes 3 mm. long, silky-strigose; squamellae obovate, a little shorter than the corolla-tube.

TYPE LOCALITY: St. George, Utah.

DISTRIBUTION: Known only from the type locality.

12. *Hymenopappus cinereus* Rydb. Bull. Torrey Club 27: 634.

1900.

Hymenopappus ochroleucus Greene, Pl. Baker. 3: 30. 1901.

A low perennial with caespitose caudex; stems 2-3 dm. high, few-leaved, grayish-floccose; leaves mostly basal, bipinnatifid into narrowly linear divisions, grayish-floccose; heads few, corymbose; involucre 6 mm. high, 10-12 mm. broad, tomentose; bracts oblong-obovate, with yellowish tip and margins; corollas yellow; tube and throat each about 1.5 mm. long, the latter campanulate, twice as long as the ovate lobes; achenes 4 mm. long, loosely villous-hirsute; squamellae obovate, nearly or fully 1 mm. long, not hidden by the hairs.

TYPE LOCALITY: Walsenburg, Colorado.

DISTRIBUTION: Colorado and Utah.

13. *Hymenopappus arenosus* A. Heller, Bull. Torrey Club

25: 200. 1898.

A low perennial, caespitose at the base; stems 2-3 dm. high, densely white-floccose-tomentose, especially below; leaves 5-10 cm. long, mostly basal, twice or thrice pinnatifid into narrowly linear divisions; heads few, corymbose; involucre about 6 mm. high and 1 cm. broad; bracts obovate, with white or light-yellow tips, and floccose at the base; corollas yellow; tube about 2 mm. long; throat cylindro-campanulate, twice or thrice as long as the lobes; achenes silky villous, 3 mm. long; squamellae oblong, fully 1 mm. long.

TYPE LOCALITY: Española, New Mexico.

DISTRIBUTION: New Mexico, Colorado, and Arizona.

14. *Hymenopappus filifolius* Hook. Fl. Bor. Am. 1: 317. 1833.

Hymenopappus tenuifolius Dougl.; Hook. Fl. Bor. Am. 1: 317, as synonym. 1833.

A leafy-stemmed perennial; stem 3-5 dm. high, floccose, densely leafy towards the base, lower leaves 7-15 cm. long, twice pinnatifid into nearly filiform divisions, sparingly floccose, in age glabrate; heads comparatively few; involucre 5-6 mm. high, 8-10 mm. broad, tomentose; bracts obovate, with yellow tips; corollas yellow; tube a little over 1.5-2 mm. long; throat campanulate, about 1.5 mm. long, longer than the ovate lobes; achenes 4 mm. long, densely silky-hirsute all over; squamellae very short, hidden by the hairs.

TYPE LOCALITY: Arid ground of the Columbia near the Walla-Walla.

DISTRIBUTION: Saskatchewan to Washington, Nevada, New Mexico, and Kansas.

ILLUSTRATIONS: Britt. & Brown, Ill. Fl. f. 3964; ed. 2. f. 4533.

15. *Hymenopappus luteus* Nutt. Trans. Am. Phil. Soc. II. 7: 374.

1841.

A low subscapose perennial with a branched caudex; stems 1-2 dm. high, densely woolly at the base; leaves mostly basal, 5-10 cm. long, twice pinnatifid with short oblong or

linear divisions, permanently white-tomentose; stem-leaves few and smaller; heads 1-5; involucre about 6 mm. high and 1 cm. broad, densely tomentose; bracts obovate with pale-yellow tips; corollas yellow; tube 1.5 mm. long; throat about 1.5 mm. long, longer than the ovate lobes; achenes 4 mm. long, densely silky-hirsute; squamellae very short, hidden by the hairs or often wanting.

TYPE LOCALITY: Ham's Fork of the Colorado of the West, Wyoming.

DISTRIBUTION: Wyoming.

16. *Hymenopappus eriopodus* A. Nelson, Bot. Gaz. 37: 274. 1904.

A leafy-stemmed perennial with a caespitose densely woolly caudex; stems 4-10 dm. high, striate and sparingly floccose; leaves 5-15 cm. long, bipinnatifid into filiform divisions, floccose when young, in age glabrate; heads 1-4, corymbose, with long slender peduncles; involucre rusty-tomentose, 7-8 mm. high, 10-12 mm. broad; bracts elliptic or obovate, with white or purple-tinged tips and margins; corollas yellowish; tube 2-2.5 mm. long; throat deeply campanulate, 3 mm. long, three times as long as the lobes; achenes 5 mm. long, silky; squamellae oblong, fully 1 mm. long.

TYPE LOCALITY: Diamond Valley, Utah.

DISTRIBUTION: Utah and Nevada.

17. *Hymenopappus columbianus* Rydberg, sp. nov.

A leafy-stemmed perennial with a densely woolly caudex; stems 3-5 dm. high, branched above, striate and floccose; leaves 7-15 cm. long, pinnatifid or bipinnatifid with spreading linear-filiform divisions nearly 1 mm. broad; heads 5-12, corymbose-paniculate; involucre white-tomentose, 7 mm. high, 10-12 mm. broad; bracts broadly obovate, with yellowish margins; corollas yellow; tube 2-2.5 mm. long; throat deeply campanulate, 2.5 mm. long, three times as long as the lobes; achenes 4 mm. long, villous; squamellae small, almost hidden by the hairs.

Type collected near Moses Lake, Washington, July 4, 1893, Sandberg & Leiberger 375 (U. S. Nat. Herb.).

DISTRIBUTION: Eastern Washington.

18. *Hymenopappus macroglottis* Rydb. Bull. Torrey Club 27: 636. 1900.

A subscaPOSE perennial with caespitose caudex; stems 3-4 dm. high, striate, more or less floccose; leaves mostly basal, about 1 dm. long, bipinnatifid with narrowly linear divisions; stem-leaves reduced, simply pinnate or entire; heads few, corymbose; involucre 7-8 mm. high, 12-15 mm. broad; bracts oblong or oblong-obovate, with yellow tips and margins; corollas yellow; tube about 2 mm. long; throat deeply campanulate, 3-4 mm. long, 3-4 times as long as the lobes; achenes about 5 mm. long, hirsute; squamellae of the pappus about 1 mm. long.

TYPE LOCALITY: Oak Creek, Arizona.

DISTRIBUTION: Colorado to Arizona.

19. *Hymenopappus niveus* Rydberg, sp. nov.

A leafy-stemmed perennial with caespitose caudex; stems densely white-tomentose, 3 dm. high; leaves 5-10 cm. long, twice pinnatifid with short linear-filiform divisions, white-tomentose; heads 3-7, corymbose on erect peduncles; involucre somewhat turbinate, 8 mm. high, 8-10 mm. broad, densely tomentose below; bracts obovate, tipped and bordered with yellow; corollas yellow; tube about 2 mm. long; throat 2.5 mm. long, deeply campanulate, about 4 times as long as the ovate lobes; achenes densely silky, 4 mm. long; squamellae oblong, about equaling the corolla-tube.

Type collected at Springdale, Utah, May 14, 1894, M. E. Jones 5261 (herb. N. Y. Bot. Gard.).

DISTRIBUTION: Utah and Nevada.

20. *Hymenopappus lugens* Greene, Pittonia 4: 43. 1899.

A subscaPOSE perennial with a caespitose woody caudex; stems 2-3 dm. high, floccose; leaves tomentose, 5-10 cm. long, bipinnatifid with linear-filiform divisions; heads 1-4, on rather

long peduncles, corymbose; involucre 6 mm. high, 9–12 mm. broad, tomentose below; bracts elliptic, the inner usually with yellow tips and margins, the outer ones more or less purplish; corollas greenish-yellow; tube about 1 mm. long; throat tubular-campanulate, 3–3.5 mm. long, four times as long as the lobes; achenes 5 mm. long, silky-hirsute; squamellae oblong-obovate, 1 mm. long.

TYPE LOCALITY: Inyo and San Bernardino counties, California.

DISTRIBUTION: Southern California to Utah and Arizona.

21. *Hymenopappus gloriosus* A. Heller, Bull. Torrey Club

26: 551. 1899.

A subscapose perennial with cespitose caudex; stems 2–3 dm. high, sparingly floccose; leaves mostly basal, 4–6 cm. long, woolly at the base, twice pinnatifid into linear divisions, grayish-tomentose; stem-leaves few and reduced, simply pinnatifid; heads 3–4, subracemose; involucre about 9 mm. high and 12–15 mm. broad; bracts obovate or some of the outer elliptic, tipped and bordered with crimson, tomentose below; corollas bright-yellow; tube 1.5 mm. long; throat over 2 mm. long, deeply campanulate; lobes less than a third as long as the throat; achenes silky-hirsute; squamellae about 1 mm. long.

TYPE LOCALITY: Mormon Mountain, south of Flagstaff, Arizona.

DISTRIBUTION: Southern Utah and Arizona.

22. *Hymenopappus scaposus* Rydb. Bull. Torrey Club 27: 634.

1900.

Hymenopappus luteus A. Gray, Mem. Am. Acad. II. 4: 97. 1849. Not *H. luteus* Nutt. 1841.

Hymenopappus nudatus Wootton & Standley, Contr. U. S. Nat. Herb. 16: 191. 1913.

A subscapose perennial with cespitose caudex; stems floccose, almost naked, 2–4 dm. high; leaves mostly basal, 5–10 cm. long, bi- or tri-pinnatifid into linear divisions, 3–10 mm. long, densely tomentose, especially at their bases; stem-leaves much reduced, pinnatifid or simple; heads few, corymbose; involucre 6–8 mm. high, about 10–15 cm. broad; bracts obovate or broadly elliptic, with yellow scarious tips and margins; corollas pale-yellow; tube nearly 2 mm. long; throat deeply campanulate, 2.5–3 mm. long, thrice as long as the lobes; achenes densely silky; squamellae of the pappus nearly 2 mm. long, as long as the tube of the corolla.

TYPE LOCALITY: Vicinity of Flagstaff, Arizona.

DISTRIBUTION: New Mexico, Arizona, and Utah.

23. *Hymenopappus nanus* Rydberg, sp. nov.

A scapose perennial with a thick cespitose woody caudex; stems 1 dm., rarely 1.5 dm. high, sparingly floccose, with only 1 or 2 small bract-like leaves; leaves basal, 3–4 cm. long, twice pinnatifid with narrowly linear divisions, sparingly tomentose; heads 1 or 2; involucre hemispheric, 6 mm. high, 10–12 mm. broad, tomentose at the base; bracts obovate, with the scarious margins yellowish or pinkish; corollas yellow; tube and throat each about 2 mm. long, the latter deeply campanulate, more or less inflated at the base, three times as long as the ovate lobes; achenes 4 mm. long, densely hirsute; squamellae oblong, equaling the corolla-tube.

Type collected on ridge above Cave Creek Post Office, Elko County, Nevada, August 20, 1908, A. A. Heller 9494 (herb. N. Y. Bot. Gard.).

DISTRIBUTION: Mountains of Nevada.

24. *Hymenopappus parvulus* Greene, Pl. Baker. 3: 30. 1901.

A subscapose perennial with cespitose caudex; stems 1–2 dm. high, sparingly floccose, striate; leaves mostly basal, once or more commonly twice pinnatifid into linear-filiform divisions; heads several, corymbose; involucre turbinate, 5 mm. high and about as broad; bracts elliptic to oblong-obovate with light-yellow scarious tips and margins; corollas light-yellow; tube 1 mm. long; throat deeply campanulate, 2 mm. long, nearly 4 times as long

as the lobes; achenes 3 mm. long, strongly striate, silky-hirsutulous; squamellae cuneate-obovate, about 1 mm. long.

TYPE LOCALITY: Gunnison, Colorado.

DISTRIBUTION: Known only from the type locality.

25. *Hymenopappus integer* Greene, *Pittonia* 3: 249. 1897.

Hymenopappus flavescens var. A. Gray, *Pl. Wright*. 2: 94. 1853.

Perennial with a thick caudex; stems 3-6 dm. high, floccose; basal leaves numerous, usually entire, petioled, oblanceolate, thin-floccose above, white-tomentose beneath, 5-10 cm. long; stem-leaves similar or irregularly 3-5-lobed with lanceolate divisions; heads few, corymbose; involucre densely tomentose, somewhat turbinate at the base, 7-8 mm. high and about as broad; bracts ovate or elliptic, narrowed upwards but obtuse, with yellow tips; corollas ochroleucous; tube and throat each 1.5 mm. long, the latter more than twice as long as the ovate lobes; achenes 4 mm. long, faintly striate, muriculate, glabrous; pappus obsolete.

TYPE LOCALITY: Mogollon Mountains, New Mexico.

DISTRIBUTION: Western Texas to Arizona.

26. *Hymenopappus mexicanus* A. Gray, *Proc. Am. Acad.* 19: 29. 1883.

Hymenopappus obtusifolius A. Heller, *Bull. Torrey Club* 26: 251. 1899.

A perennial with cespitose caudex; stems 3-6 dm. high, tomentose-floccose; leaves mostly basal, the earlier ones entire, linear-oblanceolate, 5-10 cm. long, somewhat floccose above, white-tomentose beneath, the rest of the lower leaves pinnatifid with linear-lanceolate or oblong, acute or obtuse divisions; stem-leaves reduced, either entire or with 2-4 approximate lobes below, sessile; heads few, corymbose; involucre hemispheric, about 6 mm. high and fully 1 cm. broad; bracts broadly obovate, tomentose below, with conspicuous yellow tips; corolla light-yellow; tube and campanulate throat each 1.5 mm. long; lobes ovate, shorter than the throat; anthers partly exerted; achenes 4 mm. long, faintly striate on the faces, hispidulous or in age glabrate; pappus a mere minute crown or wanting.

TYPE LOCALITY: San Luis Potosi, Mexico.

DISTRIBUTION: New Mexico and Arizona to San Luis Potosi.

27. *Hymenopappus petaloideus* Rydberg, sp. nov.

A leafy-stemmed perennial with a branched caudex; stems floccose, terete, about 3 dm. high; leaves 5-10 cm. long, pinnatifid with linear, acute, spreading divisions, floccose on both sides; heads few, corymbose; involucre 8-9 mm. high, 10-12 mm. broad, sparingly floccose; bracts lanceolate or lance-elliptic, acute, yellow and petaloid about half their length; corollas light-yellow; tube more than 1 mm. long; throat 1.5 mm. long, campanulate, longer than the ovate lobes; achenes 4 mm. long, faintly striate, puberulent; pappus a minute crown of squamellae.

Type collected at the head of Rock Creek Canyon, Chiricahua Mountains, Arizona, *Blumer 1202* (herb. N. Y. Bot. Gard.).

28. *Hymenopappus radiatus* Rose, *Contr. U. S. Nat. Herb.* 1: 122. 1891.

A perennial with branched caudex; stems 3-5 dm. high, floccose; leaves mostly basal, once to twice pinnate into narrowly linear segments, 5-10 cm. long; heads few, corymbose; involucre about 6 mm. high and 1 cm. broad, not densely floccose; bracts obovate, with only a narrow yellowish scarious portion; ray-flowers about 5; ligules white, 6-8 mm. long, elliptic or oval; disk-corollas yellowish; tube and throat about 1.5 mm. long each, the latter more than twice as long as the lobes; achenes 4 mm. long, indistinctly striate on the faces, muriculate, slightly puberulent; pappus of minute squamellae.

TYPE LOCALITY: Willow Springs, Arizona.

DISTRIBUTION: Arizona and New Mexico.

DOUBTFUL AND EXCLUDED SPECIES

HYMENOPAPPUS ENGELMANNIANUS Kunth, Ind. Sem. Hort. Berol. 15. 1848.—Ann. Sci. Nat. III. 11: 228. 1849. This is a species of the *H. scabiosaes* group and may be *H. scabiosaes*, *H. corymbosus*, or *H. sulphureus*, or a distinct related species; but which cannot be told from the description.

HYMENOPAPPUS MATRICARIOIDES Spreng. Syst. 3: 450 (1826) is an *Ageratum*.

37. LEUCAMPYX A. Gray (Benth. & Hook. Gen. 2: 422; hyponym. 1873); Porter & Coult. Syn. Fl. Colo. 97. 1874.

More or less floccose perennial herbs. Leaves alternate, bi- or tri-pinnatifid into narrow linear segments. Heads corymbose, peduncled, radiate. Involucre hemispheric; bracts in 2-3 series, subequal, broad, with scarious colored tip and margins. Receptacle convex, with broad, membranous paleae, half enclosing the achenes. Ray-flowers present, pistillate, fertile, with slender tubes and broad 3-toothed or 3-cleft, white ligules. Disk-flowers hermaphrodite, fertile; tube glandular; throat campanulate; lobes ovate, spreading. Style-branches penicillate, with short appendages. Anthers obtuse at the base. Achenes of the ray-flowers cuneate, sub-3-gonous, with rounded back, striate; those of the disk-flowers somewhat compressed, 5-gonous; all more or less incurved, glabrous, striate and muriculate. Pappus a minute crown.

Type species, *Leucampyx Newberryi* A. Gray.

1. Leucampyx Newberryi A. Gray; Porter & Coult. Syn. Fl. Colo. 77. 1874.

A somewhat floccose perennial; stem 2-3 dm. high, corymbosely branched; leaves 1-1.5 dm. long, somewhat floccose above, tomentose beneath, with narrowly linear segments; involucre about 6 mm. high and 1 cm. broad; bracts obovate; ligules white, 10-12 mm. long, 6-7 mm. broad; disk-corollas 4 mm. long, light-yellow; achenes 4-5 mm. long; paleae of the receptacle about 6 mm.

TYPE LOCALITY: New Mexico.

DISTRIBUTION: Southern Colorado and New Mexico.

38. HYMENOTHRIX A. Gray, Mem. Am. Acad. II. 4: 102. 1849.

Annual (?) herbs. Leaves alternate, petioled, bi- or tri-ternately dissected into linear or oblong, entire or cleft divisions. Heads radiate, corymbose. Involucre turbinate; bracts about 10, lanceolate-oblong, equal, in about two series, with yellowish and more or less scarious tips. Receptacle small, papillose. Ray-flowers 8-10, pistillate, fertile; ligules light-yellow, oblong-cuneate, 3-toothed at the apex. Disk-flowers many, hermaphrodite, fertile; corolla-tube slender, glandular-puberulent, about equaling the cylindro-campanulate throat; lobes ovate, shorter than the throat. Anthers not caudate at the base, with ovate appendages at the apex. Style-branches linear with short conic appendages. Achenes linear-obpyramidal, obtusely 4-5-angled. Pappus of about 12 equal narrow subulate slightly scarious squamellae, with a prominent midrib excurrent into a barbellate awn.

Type species, *Hymenothrix Wislizeni* A. Gray.

1. Hymenothrix Wislizeni A. Gray, Mem. Am. Acad. II. 4: 102. 1849.

Hymenopappus Wislizeni setiformis M. E. Jones, Contr. W. Bot. 12: 475. 1908.

A tall herb; stem 5-7 dm. high, minutely puberulent, striate; leaves 5-10 cm. long, bi- or tri-ternate with linear or oblong divisions, minutely strigulose; heads numerous, corymbose-paniculate; involucre turbinate, 5 mm. high and broad; ligules 3-4 mm. long; disk-corollas yellow; tube and the throat each about 2 mm. long; achenes 3-4 mm. long, 0.5 mm. broad, sparingly hirsutulous; pappus about 3 mm. long.

TYPE LOCALITY: Ojo de Gallejo, Chihuahua.

DISTRIBUTION: New Mexico, Arizona, and Chihuahua.

39. TRICHYMENIA Rydberg, gen. nov.

Perennial herbs. Leaves alternate, petioled, biternately divided into linear divisions. Heads discoid, corymbose-paniculate. Involucre turbinate; bracts in two series, the inner 6-8 obovate or oblong, scarious and tinged with purple, the outer 4 or 5 linear, smaller and more herbaceous. Ray-flowers wanting. Disk-flowers hermaphrodite; corollas pale-purplish or almost white; tube slender, glandular; limb cleft nearly to the tube into oblong linear lobes, equal or in the marginal flowers somewhat unequal. Anthers purple, wholly exerted, bidentate at the base, tipped with ovate appendages. Style-branches flat, linear, with conic, subulate-tipped appendages. Achenes elongate, obconic, 4-angled, villous. Pappus of 15-18 narrowly linear-lanceolate squamellae with strong midribs excurrent into short barbellate awns.

Type species, *Hymenothrix Wrightii* A. Gray.

1. *Trichymenia Wrightii* (A. Gray) Rydberg.

Hymenothrix Wrightii A. Gray, Pl. Wright. 2: 97. 1853.

Hymenopappus Wrightii H. M. Hall, Univ. Calif. Publ. 3: 179. 1907.

A perennial herb; stem 6-10 m. high, sparingly hirsute below, glabrous above, striate; leaves bi- or tri-ternate, 5-10 cm. long, with linear divisions, the lower ones hirsute, the upper glabrous; inflorescence paniculate, the heads corymbose on the branches; involucre turbinate-campanulate, 6 mm. high, 8-9 mm. broad; corolla-tube 2.5 mm. long; throat practically none; lobes oblong-linear, acute, 2-3 mm. long; achenes 4 mm. long, 1 mm. thick, hirsute; squamellae 3-4 mm. long.

TYPE LOCALITY: Hills between Barbocomori and Santa Cruz, Sonora.

DISTRIBUTION: New Mexico to southern California and Sonora.

ILLUSTRATION: Sitgreaves, Rep. Exp. Bot. pl. 6.

40. FLORESTINA Cass. Bull. Soc. Philom. 1815: 175. 1815.

Lepidopappus Moc. & Sessé; DC. Prodr. 5: 655, as synonym. 1836.

Pubescent and more or less glandular annuals. Leaves petioled, the lower opposite, the upper alternate, all except the uppermost either pinnately, pedately, or palmately 3-7-divided, or entire and triple-ribbed. Heads in flat-topped panicles, numerous, discoid. Involucre turbinate or campanulate; bracts 5-10, obovate, with scarious margins and tips, flat or somewhat concave but not keeled. Flowers 10-20, hermaphrodite and fertile; corolla white, ochroleucous, or in two species purplish; tube short, funnellform, glandular-puberulent; lobes longer than the tube, oblong. Style-branches terminated by long attenuate hispid appendages. Achenes elongate-obpyramidal, truncate at the apex, 4-angled, pubescent. Pappus of 8 scarious squamellae, callous-thickened at the base, with or without distinct midrib, sometimes awn-tipped.

Type species, *Stevia pedata* Cav.

At least the middle leaves dissected.

Lower leaves divided, the divisions linear; involucre bracts purplish.

Pappus-squamellae not awn-tipped.

Pappus-squamellae awn-tipped.

Lower leaves simple, the middle ones 3-fid with oblong divisions; involucre bracts with dull white tips and margins.

Leaves none dissected.

Leaf-blades lanceolate, mostly entire-margined; corollas and tips of bracts whitish.

Leaf-blades broadly ovate or subcordate, doubly crenate-dentate; corollas and bracts purplish.

Pappus-squamellae ovate or suborbicular, much shorter than the corolla.

Pappus-squamellae lanceolate awn-pointed, about equaling the corolla.

1. *F. pedata*.

2. *F. purpurea*.

3. *F. tripteris*.

4. *F. Liebmannii*.

5. *F. platyphylla*.

6. *F. latifolia*.

1. *Florestina pedata* (Cav.) Cass. Dict. Sci. Nat. Atlas 3: pl. 8.

1816.

Stevia pedata Cav. Ic. 4: 33. 1797.

?*Ageratum pedatum* Ort. Desc. Dec. 38. 1797.

Hymenopappus pedatus Cav.; Lag. Gen. & Sp. Nov. 28. 1816.

Achyropappus pedatus Less. Syn. Comp. 239. 1832.

Schkuhria glomerata Rob. & Seaton, Proc. Am. Acad. 28: 109. 1893.

An erect annual; stem 3–5 dm. high, simple below, striate, glandular-hispid and hirsute; lower leaves opposite, petioled, 4–7 cm. long, pedately divided into 3–5 linear to oblong divisions, hirsutulous; upper leaves alternate, 3-divided or those of the branches simple; heads corymbose-paniculate; involucre turbinate-campanulate, 4 mm. high, 5 mm. broad; bracts about 8, obovate, usually purplish; flowers 10–15; corollas white, 3 mm. long; tube about 1 mm. long; lobes oblong; achenes elongate-obpyramidal, 4-angled, hirsute, 3 mm. long; squamellae 8, orbicular or obovate, 1 mm. long, callous at the base.

TYPE LOCALITY: Mexico.

DISTRIBUTION: Central and southern Mexico.

ILLUSTRATIONS: Cav. Ic. 4: *pl.* 356; Cass. Opusc. 1: *pl.* 7; Dict. Sci. Nat. 64: *pl.* 86 (Atlas 3: *pl.* 8); E. & P. Nat. Pfl. 4^e: *f.* 124, K; Bot. Mag. *pl.* 2040.

2. *Florestina purpurea* (Brand.) Rydberg.

Hymenothrix purpurea Brand. Univ. Calif. Publ. Bot. 3: 392. 1909.

A strict annual; stem 3–5 dm. high, angled, striate, hirsutulous and more or less glandular-hispid, especially above; leaves 3–5 cm. long, alternate, twice ternately dissected into linear segments, hirsutulous and sparingly glandular; heads corymbose; involucre about 5 mm. high, 8–10 mm. broad; bracts 8–10, oblanceolate, obtuse, dark-purple on the margin; flowers about 25; corollas white, tinged with purple; tube slender; lobes oblong, longer than the funnel-form throat; achenes 4 mm. long, narrowly obpyramidal, 4-angled, glabrous, except the densely hirsutulous base; squamellae 8, ovate-lanceolate, the strong midrib excurrent into a short awn-point.

TYPE LOCALITY: Near San Louis [Tultitlanapa], Puebla.

DISTRIBUTION: Puebla.

3. *Florestina tripteris* DC. Prodr. 5: 655. 1836.

Lepidopappus tripteris Moc. & Sessé; DC. Prodr. 5: 655, as synonym. 1836.

An erect annual; stem 3–6 dm. high, canescent, striate; leaves petioled, all except the lowest alternate; petioles 1–3 cm. long; blades of the lowest leaves entire, ovate, 1–3 cm. long, canescent on both sides, triple-ribbed, the middle ones ternate with oblong to linear-lanceolate entire or rarely lobed divisions, the uppermost with linear divisions or entire; heads corymbose-paniculate; involucre campanulate, 4 mm. high, 3–5 mm. broad; bracts 8–10, elliptic-obovate, with dull white scarios tips and margins; flowers 10–15; corollas white, 3 mm. long; tube about 1 mm. long; lobes oblong; anther-tips acute; achenes elongate-obpyramidal, 4-angled, hirsutulous; squamellae 8, obovate, 1 mm. long, callous-thickened at the base.

TYPE LOCALITY: Laredo, Texas.

DISTRIBUTION: Texas and New Mexico to Tamaulipas, Oaxaca, and Chihuahua.

4. *Florestina Liebmannii* Schultz-Bip.; Greenman, Field Mus.

Publ. Bot. 2: 272. 1907.

A canescent herb, probably annual, but somewhat indurate at the base; stem erect, 3–5 dm. high, terete below, striate above, strigillose as well as glandular-pubescent; lower leaves opposite, petioled, simple; blades lanceolate, 2–3.5 cm. long, obtuse or acute, entire or few-dentate, strigose-hispid on both sides, triple-ribbed; upper stem-leaves alternate and gradually diminishing, linear; inflorescence corymbose, glandular; involucre turbinate, 5 mm. high, 6 mm. broad; bracts about 8, elliptic-oblong to oblong-obovate, rounded at the apex, with dirty-white scarios tips and margins, puberulent; flowers 12–14; corollas 3 mm. long; lobes oblong; achenes narrowly obpyramidal, 3–4 mm. long, 4–5-angled, striate, pubescent; squamellae 8, obovate or broadly spatulate, 1.5 mm. long, thickened at the narrow base.

TYPE LOCALITY: Boca del Rio, Vera Cruz.

DISTRIBUTION: Vera Cruz.

5. *Florestina platyphylla* Rob. & Greenm. Proc. Am. Acad. 32: 49.
1896. .

Schkuhria platyphylla Rob. & Greenm. Am. Jour. Sci. III. 50: 156. 1895.

An erect stout annual; stem terete, striate, purplish, villous-pilose and more or less glandular, simple below; lower leaves opposite, the upper alternate; petioles 1-2 cm. long; blades rounded-ovate, truncate or caudate at the base, doubly crenate-dentate, triple-ribbed, densely pubescent on both sides, 4-6 cm. long, slightly paler beneath; inflorescence corymbose-paniculate, densely glandular; involucre 5 mm. high, 8 mm. broad; bracts about 5, obovate, rounded at the apex, scarious-margined, glandular-pubescent; flowers about 20; corollas 3 mm. long, purplish; squamellae 8, ovate or suborbicular, callous at the base and with a distinct midrib.

TYPE LOCALITY: Monte Alban, Oaxaca.
DISTRIBUTION: Oaxaca.

6. *Florestina latifolia* (DC.) Rydberg.

Palafoxia latifolia DC. Prodr. 5: 125. 1836.

An erect stout annual; stem terete, glandular-pubescent, 5-7 dm. high, di- or tri-otomously branched; leaves opposite or the uppermost alternate; petioles 1-2 cm. long; blades broadly ovate or subcordate, 2-4 cm. long, glandular-pubescent on both sides, sinuately dentate; inflorescence corymbose-paniculate, densely glandular; involucre turbinate, 7 mm. high, 5-7 mm. broad; bracts oblanceolate or obovate, glandular-pubescent, more or less purplish; corollas purplish; tube about 1 mm. long, slender; throat funnellform, 2 mm. long, about equaling the oblong erect lobes; achenes black, 4 mm. long, sparingly hispid on the ribs; pappus of 8 scarious squamellae callous on the petiole-like base, those of the angles lanceolate, 6 mm. long with a strong midrib, awn-tipped, the intermediate ones much smaller, obovate.

TYPE LOCALITY: Tehuantepec, Oaxaca.
DISTRIBUTION: Oaxaca.

Subtribe 7. **PALAFOXIANAE**. Heads discoid or radiate. Involucre turbinate to nearly cylindrical; bracts narrow in 1 or 2 series, herbaceous, often with scarious or colored tips. Ligules when present rose-colored, cuneate, deeply lobed. Disk-corollas rose-purple to flesh-colored; throat from scarcely any to elongate-cylindric. Style-branches linear-filiform, hispidulous to or even below the forking. Achenes clavate-obpyramidal to linear, 4-angled.

Throat of the disk-corollas short-campanulate or scarcely any, much shorter than the long linear lobes and the tube.

Involucral bracts subequal, narrow, colored only at the tips; disk-corollas cleft nearly to the slender tube; annuals; heads radiate or discoid.

Involucral bracts imbricate; inner bracts almost wholly scarious, the outer ones shorter; disk-corollas deeply cleft but with a short funnellform throat; perennials; heads discoid.

Throat of the disk-corollas cylindraceous, much longer than the lobes and tube.

41. OTHAKE.

42. POLYPTERIS.

43. PALAFOXIA.

41. **OTHAKE** Raf. New Fl. 4: 73. 1838.

Erect, glandular, canescent or cinerous, annual herbs. Leaves except the lowermost alternate, mostly entire. Heads corymbose or paniculate, radiate or discoid. Involucre campanulate or obconic; bracts narrow, in 1 or 2 series, herbaceous, subequal or a few of the outer ones shorter, usually colored, at least at the narrow tips. Receptacle small, flat, naked. Ray-flowers, when present, pistillate, fertile; ligules pink or rose-colored, 3-cleft. Disk-flowers many, hermaphrodite, fertile; corollas pink or rose-colored, with slender tube and the limb 5-divided almost to the tube. Anthers entire or emarginate at the base. Style-branches filiform, pubescent throughout. Achenes linear to narrowly obpyramidal, 4-angled, pubescent. Pappus of 6-12 lanceolate, usually strongly ribbed squamellae, those of the outer achenes often much shorter, obtuse, erose or fimbriate.

Type species, *Othake tenuifolium* Raf.

Ray-flowers wanting.

Involucre 4-7 mm. high and broad; bracts 6-9, rarely more; leaves linear.

Pappus-squamellae about 1 mm. long, obtuse; involucre 4-6 mm. long.

Pappus-squamellae, at least those of the center, 2 mm. long, lanceolate, acute; involucre 6-7 mm. long.

Involucre 7-10 mm. high, 8-12 mm. broad; bracts 10-15; leaves of a lanceolate type.

Pappus-squamellae shorter than the corolla-tube, the outer ones obtuse.

Inner squamellae 3 mm. long, acutish; plant branched; bracts oblanceolate.

Inner squamellae 1.5-2 mm. long, obtuse; plant stout, simple; bracts linear.

Pappus-squamellae, at least the inner ones, equaling or longer than the corolla-tube, lanceolate.

Achenes decidedly hairy.

Pappus-squamellae 5 mm. long, acuminate; plant wholly herbaceous.

Pappus-squamellae 3 mm. long, acute; plant often ligneous below.

Achenes glabrous or practically so.

Ray-flowers present.

Involucre 10-15 mm. high, 10-20 mm. broad; ray-flowers 8-12; disk-flowers more numerous.

Leaves all lanceolate or linear-lanceolate, the uppermost not much reduced, 3-ribbed; involucre 12-15 mm. high, 12-20 mm. broad.

Lower leaves lanceolate or linear-lanceolate, rarely 3-ribbed, the upper reduced and linear; involucre about 1 cm. high and broad.

Involucre about 8 mm. wide; ray-flowers and disk-flowers each 3-6; leaves linear.

1. *O. callosum*.

2. *O. roseum*.

3. *O. texanum*.

4. *O. robustum*.

5. *O. macrolepis*.

6. *O. canescens*.

7. *O. Lindeni*.

8. *O. Hookerianum*.

9. *O. sphacelatum*.

10. *O. Reverchoni*.

1. *Othake callosum* (Nutt.) Bush, Trans. Acad. St. Louis 14: 174. 1904.

Stevia callosa Nutt. Jour. Acad. Phila. 2: 121. 1821.

Florestina callosa DC. Prodr. 5: 655. 1836.

Othake tenuifolium Raf. New Fl. 4: 74. 1838.

Palafoxia callosa T. & G. Fl. N. Am. 2: 369. 1842.

Polypteris callosa A. Gray, Proc. Am. Acad. 19: 30. 1883.

A slender annual; stem much-branched, 2-6 dm. high, strigose, glandular-hirsute in the inflorescence; branches more or less flexuose, ascending; leaves short-petioled or sessile, thick, linear, 2-5 cm. long, 1-3 mm. broad, strigose-hispidulous on both sides, 1-nerved; involucre turbinate, 4-6 mm. high and as broad; bracts about 8, strigose-hispidulous, rarely glandular, linear-oblanceolate, with short colored tips; ray-flowers wanting; disk-flowers 5-12; corollas flesh-colored; tube 2 mm. long; lobes linear, 3-4 mm. long; achenes 3-4 mm. long, angular, hirsutulous; squamellae obovate or spatulate, about 1 mm. long or less; costa scarcely reaching the apex.

TYPE LOCALITY: Banks of the Arkansas [Arkansas or Oklahoma].

DISTRIBUTION: Missouri and Arkansas to New Mexico.

ILLUSTRATIONS: W. Barton, Fl. N. Am. pl. 46; Britt. & Brown, Ill. Fl. f. 3966; ed. 2. f. 4535.

2. *Othake roseum* Bush, Trans. Acad. St. Louis 14: 175. 1904.

Polypteris rosea Small, Fl. SE. U. S. ed. 2. 1372. 1913.

An annual; stem erect, comparatively simple, with strongly ascending branches, strigose-hirsute, glandular above, 4-7 dm. high; leaves short-petioled, narrowly linear-lanceolate or linear, 1-nerved, 2-5 cm. long, 2-5 mm. wide, strigose-hirsute; involucre turbinate, 6-7 mm. high and as broad; bracts 7-9, oblanceolate, strigose-hispidulous and glandular, with deep-purple tips; peduncles slender; ray-flowers wanting; disk-flowers 10-15; corollas bright rose-colored; tube about 3 mm. long; lobes linear, 3 mm. long; achenes 3-4 mm. long, 1 mm. thick, hirsute; squamellae lanceolate, acute, about 2 mm. long, those of the marginal achenes shorter and obtuse.

TYPE LOCALITY: Sheldon, 18 miles east of Houston, Texas.

DISTRIBUTION: Texas and Oklahoma.

3. *Othake texanum* (DC.) Bush, Trans. Acad. St. Louis 14: 176. 1904.

Palafoxia texana DC. Prodr. 5: 125. 1836.

Polypteris texana A. Gray, Proc. Am. Acad. 19: 30. 1883.

A rather stout annual; stem 2–6 dm. high, strigose-hirsute, with ascending branches, only the peduncles slightly glandular; leaves short-petioled, from ovate-lanceolate to linear-lanceolate, strigose-hirsutulous, 2–5 cm. long, 5–25 mm. wide, more or less distinctly 3-nerved; involucre turbinate, 6–10 mm. long, 8–10 mm. broad; bracts 8–15, oblanceolate, rose-tipped, hirsutulous, scarcely glandular; ray-flowers wanting; corollas rose-colored; tube and linear lobes each 4–5 mm. long; achenes 5–6 mm. long, 1 mm. thick, hirsute; squamellae lanceolate, acute or acuminate, about 3 mm. long, or those of the outer achenes obovate, obtuse, and 1.5–2 mm. long.

TYPE LOCALITY: Texas.

DISTRIBUTION: Oklahoma to Tamaulipas and Coahuila.

4. *Othake robustum* Rydberg, sp. nov.

A stout annual; stem simple, strigose, densely grayish strigose-hispidulous, 6–10 dm. high, scarcely at all glandular; leaves petioled, narrowly lanceolate, 3-ribbed, 4–7 cm. long, thick, grayish-hispidulous; heads corymbose, with short peduncles; involucre broadly turbinate, 7 mm. high, about 10 mm. broad; bracts about 15, linear, hispidulous; ray-flowers wanting; corollas rose-colored; tube and lobes each 2.5–3 mm. long; achenes 5–6 mm. long, 1 mm. thick, hispidulous; squamellae ovate or obovate, 1.5–2 mm. long.

Type collected on sand-dunes of Gulf Coast, Tampico, Tamaulipas, July 4, 1896, *Pringle 6354* (herb. Columbia Univ.).

DISTRIBUTION: Southern Texas and Tamaulipas.

5. *Othake macrolepis* Rydb. Bull. Torrey Club 37: 332. 1910.

A rather stout annual; stem 3–4 dm. high, strigose-hirsutulous, also glandular above, with ascending branches; leaves linear to lanceolate, indistinctly 3-ribbed, short-petioled, 3–5 cm. long, 2–8 mm. wide; peduncles short and densely glandular; involucre turbinate, 9–10 mm. high and about as broad; bracts 8–12, linear-oblanceolate, scabrous-hispidulous and glandular, with rose-colored tips; ray-flowers wanting; corollas rose-purple; tube and linear lobes each 5 mm. long; achenes 7 mm. long, 1 mm. thick, strigose; squamellae 6–8, lanceolate, caudate-acuminate, 5–6 mm. long.

TYPE LOCALITY: Rule Creek, Bent County, Colorado.

DISTRIBUTION: Type locality and vicinity.

6. *Othake canescens* Rydberg, sp. nov.

A branched annual or perhaps perennial, somewhat woody below; stem 3–4 dm. high, densely hispidulous-strigose; leaves linear-lanceolate, petioled, 2–4 cm. long, 3–6 mm. wide, strigose-canescens, 1-nerved; heads numerous; involucre 8–9 mm. high, 8–10 mm. broad; bracts about 12, linear, hispidulous; ray-flowers wanting; disk-flowers 15–20; corollas rose-colored; tube and linear lobes each about 3 mm. long; achenes 6 mm. long, 1 mm. thick, densely hirsute; squamellae ovate-lanceolate, acute, 3 mm. long, or those of the marginal flowers somewhat shorter and more blunt.

Type collected among river-gravel at Monterey, Nuevo Leon, July 4, 1888, *Pringle 1919* (herb. Columbia Univ.).

7. *Othake Lindeni* (A. Gray) Bush, Trans. Acad. St. Louis 14: 173. 1904.

Palafoxia Lindeni A. Gray, Pl. Wright. 1: 120. 1852.

Polypteris Lindeni A. Gray; Bush, Trans. Acad. St. Louis 14: 173, as synonym. 1904.

A rather simple stout annual; stem 3–6 dm. high, grayish-puberulent, glandular in the inflorescence; leaves oblong-lanceolate or oblanceolate, obtuse, short-petioled, 3–5 cm. long, somewhat 3-nerved, puberulent; involucre turbinate, 8–9 mm. high, 10–12 mm. broad; bracts 12–15, linear, rose-tipped, densely puberulent; ray-flowers wanting; disk-flowers 20 or more; tube and linear lobes each 4–5 mm. long; achenes 7 mm. long, 1 mm. broad, almost glabrous; squamellae lanceolate, about 5 mm. long, acute but not awn-tipped.

TYPE LOCALITY: Antigua, Vera Cruz.

DISTRIBUTION: Vera Cruz and Tamaulipas (?).

8. **Othake Hookerianum** (T. & G.) Bush, Trans. Acad. St. Louis 14: 177. 1904.

Palafoxia texana Hook. Ic. pl. 148. 1837. Not *P. texana* DC. 1836.
Palafoxia Hookeriana T. & G. Fl. N. Am. 2: 368. 1842.
Polypteris Hookeriana A. Gray, Proc. Am. Acad. 19: 31. 1883.
Polypteris maxima Small, Fl. SE. U. S. 1288. 1903.
Othake maximum Bush, Trans. Acad. St. Louis 14: 179. 1904.

A stout rather simple annual; stem 5–10 dm. high, hispidulous and glandular throughout; leaves all linear-lanceolate or lanceolate, 3-nerved, the upper not much reduced, 5–10 cm. long, 1–2 cm. wide; involucre 12–15 mm. high, 15–20 mm. broad; bracts linear, hispid and glandular; ray-flowers 8–12; ligules deeply 3-cleft, about 15 mm. long; disk-corollas purplish or rose-colored; tube about 8 mm. long; lobes linear, 4 mm. long; achenes 6–7 mm. long, 1 mm. thick, hirsute; squamellae of the disk-flowers lanceolate, 7–8 mm. long.

TYPE LOCALITY: Texas.

DISTRIBUTION: Texas.

ILLUSTRATIONS: Hook. Ic. pl. 148 (as *Palafoxia texana*); Bot. Mag. pl. 5549.

9. **Othake sphacelatum** (Nutt.) Rydb. Bull. Torrey Club 37: 331. 1910.

Stevia sphacelata Nutt.; Torr. Ann. Lyc. N. Y. 2: 214. 1827.
Palafoxia Hookeriana subradiata T. & G. Fl. N. Am. 2: 368. 1842.
Polypteris Hookeriana A. Gray, Syn. Fl. N. Am. 1²: 337, in part. 1884. Not *Palafoxia Hookeriana* T. & G. 1842.
Polypteris sphacelata Trel. in Branner & Coville, Rep. Ark. Geol. Surv. 1888¹: 197. 1891.
Othake Hookerianum Bush, Trans. Acad. St. Louis 14: 177; excl. syn. 1904.

A branched annual; stem 2–6 dm. high, hispid and strongly glandular above; leaves petioled, linear-lanceolate to lanceolate, or the upper linear, 3–10 cm. long, 6–15 mm. wide, rarely distinctly 3-nerved, hispid-strigose; involucre turbinate, about 1 cm. high and broad; bracts 10–15, linear-oblancheolate, purple-tipped, densely scabrous-hispidulous and glandular; ray-flowers 8–10; ligules rose-purple, deeply 3-cleft, 1–2 cm. long, rarely none; disk-flowers purplish; tube about 5 mm. long; lobes 3 mm. long; achenes 6–7 mm. long, pubescent; squamellae of the disk-flowers lanceolate, awned, as long as the corolla-tube, those of the ray-flowers spatulate, obtuse.

TYPE LOCALITY: Not given, but type was collected on Long's Expedition to the Rocky Mountains, probably in Colorado.

DISTRIBUTION: Kansas and Colorado to Texas and Chihuahua.

ILLUSTRATIONS: Britt. & Brown, Ill. Fl. f. 3965 (as *Polypteris Hookeriana*); ed. 2. f. 4534.

10. **Othake Reverchoni** Bush, Trans. Acad. St. Louis 14: 180. 1904.

Polypteris Reverchoni Small, Fl. SE. U. S. ed. 2. 1373. 1913

A slender simple annual; stem sparingly strigose, 4–7 dm. high, only sparingly glandular above; leaves linear, minutely scabro-hispidulous on both sides, 3–6 cm. long, 2–6 mm. wide; heads on slender peduncles; involucre about 1 cm. high, 8 mm. broad; bracts 8–10, linear-oblancheolate, sparingly pubescent and slightly glandular, purple-tipped; ray-flowers 3–6; ligules rose-colored, 1–1.5 cm. long, deeply 3-cleft; disk-flowers 3–6; tube about 6 mm. long; lobes 3 mm. long; achenes 4–5 mm. long, not 1 mm. thick, pubescent; squamellae of the disk-flowers narrowly lanceolate, 4–5 mm. long, cuspidate; those of the ray-flowers 1 mm. long, oblong-spatulate.

TYPE LOCALITY: Big Sandy, Texas.

DISTRIBUTION: Texas.

DOUBTFUL SPECIES

OTHAKE LONGIFOLIUM Raf. New. Fl. 4: 74 (1838) can not be identified.

42. **POLYPTERIS** Nutt. Gen. 2: 139. 1818.

Lomaxeta Raf. New Fl. 4: 72. 1838.

Scabrous perennial herbs. Leaves mostly alternate, entire. Heads discoid, corymbose. Involucre turbinate; bracts in 2–3 series, more or less imbricate, mostly scarios,

except the midrib, oblong, or oblong-spatulate, thin, the outermost linear, shorter, and herbaceous. Rays wanting. Disk-flowers many, all hermaphrodite and actinomorphic, perfect; corollas white or flesh-colored; tube slender, longer than the funnellform throat; lobes oblong, longer than the throat. Style-branches filiform, hispidulous their whole length. Achenes elongate-obpyramidal, attenuate at the base, slightly 4-angled, striate, pubescent. Pappus of 10-12 elongate narrowly linear-lanceolate squamellae, with a strong midrib.

Type species, *Polypteris integrifolia* Nutt.

1. *Polypteris integrifolia* Nutt. Gen. 2: 139. 1818.

Hymenopappus integrifolius Spreng, Syn. 3: 449. 1826.

Paleolaria fastigiata Less. Syn. Comp. 156. 1832.

Palafoxia fastigiata DC. Prodr. 5: 125. 1836.

Lomaxeta verrucosa Raf. New Fl. 4: 72. 1838.

Palafoxia integrifolia T. & G. Fl. N. Am. 2: 369. 1842.

A stout perennial herb; stem 5-15 dm. high, corymbosely branched above; sparingly hispidulous; leaves short-petioled, linear to narrowly lanceolate, 3-7 cm. long, obtuse, entire, sparingly hispidulous-scabrous; peduncles somewhat enlarged under the heads; involucre about 12 mm. high, 12-15 mm. broad; inner bracts white or pinkish, obtuse, glabrous, the outer ones green, hispidulous; corolla-tube 6-7 mm. long; lobes linear, 4 mm. long; achenes 6 mm. long, 1 mm. thick, hirsutulous; squamellae linear-subulate, longer than the corolla-tube.

TYPE LOCALITY: Banks of the Altamaha.

DISTRIBUTION: Pinelands, Georgia and Florida.

43. PALAFOXIA Lag. Gen. & Sp. Nov. 26. 1816.

Paleolaria Cass. Bull. Soc. Philom. (1816: 198; hyponym. 1816) 1818: 47. 1818.

Herbaceous or frutescent perennials or annuals. Leaves alternate or the lower opposite, entire. Heads corymbose, discoid. Involucre oblong to campanulate; bracts narrow, subequal, mainly in a single series, becoming somewhat concave, inclined to embrace the outer achenes, herbaceous to the tip. Receptacle flat, small. Ray-flowers wanting. Disk-flowers hermaphrodite and fertile; corollas flesh-colored or whitish, both tube and narrow lobes much shorter than the cylindraceous throat. Style-branches elongate, filiform, obtuse, puberulent their whole length. Achenes nearly linear, tapering somewhat downward, 4-angled, merely pubescent. Pappus of 4-8 usually unequal squamellae with strong midribs, those of the marginal achenes often much shorter.

Type species, *Palafoxia linearis* Lag.

Leaf-blades linear or linear-lanceolate; pappus-squamellae of the inner achenes lanceolate, longer than the corolla-tube.

Leaves attenuate; plant annual, if perennial not shrubby, erect.

Leaves obtuse; plant perennial and shrubby below, decumbent.

Leaf-blades oblong or elliptic; pappus-squamellae oblong, shorter than the corolla-tube.

1. *P. linearis*.

2. *P. leucophylla*.

3. *P. Feayi*.

1. *Palafoxia linearis* Lag. Gen. & Sp. Nov. 26. 1816.

Ageratum lineare Cav. Ic. 3: 3. 1795.

Paleolaria carnea Cass. Bull. Soc. Philom. 1818: 47. 1818.

Stevia linearis Willd. Sp. Pl. 3: 1774. 1804.

Stevia lavandulaefolia Willd.; DC. Prodr. 5: 125, as synonym. 1836.

A branched annual or perhaps perennial; stem 3-5 dm. high, hispid and glandular especially above; leaves very narrowly lance-linear, attenuate, 5-10 cm. long, 2-6 mm. wide, canescent, strigose-hirsute or hispid; peduncles densely glandular; involucre narrowly turbinate-campanulate, 12-15 mm. high, 7-12 mm. broad; bracts linear, densely hispid and glandular; flowers 10-30; tube of the corollas 3-5 mm. long; throat 3 mm. long; lobes oblong-linear, 1.5 mm. long; achenes 10-12 mm. long, 1 mm. thick, pubescent; squamellae 4, usually 6-7 mm. long, with strong excurrent midrib and scarious margins or those of the marginal achenes much smaller, not scarious and sometimes minute.

TYPE LOCALITY: Mexico.

DISTRIBUTION: Nevada, southern Utah (?), and southern California, to Lower California and Coahuila.

ILLUSTRATIONS: Cav. Ic. *pl.* 205; Bot. Mag. *pl.* 2132.

2. *Palafoxia leucophylla* A. Gray, Proc. Am. Acad. 8: 291. 1870.*Palafoxia arenaria* Brand. Proc. Calif. Acad. II. 2: 178. 1889.

A decumbent perennial, more or less woody; stem 3-10 dm. long; branches divaricate, hispid and glandular; leaves densely strigose-canescens, linear, 1-3 cm. long, 3-6 mm. wide, obtuse; involucre narrowly turbinate-campanulate, 10-12 mm. long; bracts linear, densely hispid and glandular; corollas about 15, flesh-colored; tube 3 mm. long; throat about 4 mm. and lobes 1.5 mm. long; achenes 6-8 mm. long, 1 mm. wide; pappus of 3-5 squamellae, about 5 mm. long, with strong midrib.

TYPE LOCALITY: Carmen Island, Lower California.

DISTRIBUTION: Lower California.

3. *Palafoxia Feayi* A. Gray, Proc. Am. Acad. 12: 59. 1876.

A perennial, suffruticose at the base; stem terete, minutely scabrous, 3-7 dm. high; leaves short-petioled; blades oblong or elliptic, rounded at both ends, or the uppermost acute at the apex, 3-ribbed at the base, scabrous-hispidulous; heads corymbose; involucre turbinate, about 1 cm. high and broad; bracts spatulate-linear, truncate or rounded at the apex, purplish; corollas 15-20; tube 2 mm. long; throat cylindric, 4 mm. long; lobes oblong, 1.5 mm. long; pappus-squamellae 8, oblong, 1-1.5 mm. long.

TYPE LOCALITY: South Florida.

DISTRIBUTION: Florida.

Subtribe 8. **CHAENACTIDANAE.** Heads discoid, or if radiate ligules inconspicuous, not longer than the disk. Involucre turbinate, campanulate, or nearly cylindric; bracts narrow, linear or linear-lanceolate, usually appressed. Disk-flowers yellow to white or flesh-colored, the short tube much shorter than the throat, which is nearly cylindric or in the marginal flowers somewhat funnellform or trumpet-shaped. Achenes scarcely angled (4-angled in *Chamaechaenactis*), terete or oval in cross-section, striate, linear or clavate.

Heads radiate, but rays inconspicuous, not longer than the disk; pappus-squamellae opaque, elongate; leaves entire.

44. RIGIOPAPPUS.

Heads discoid, but the marginal flowers sometimes enlarged and irregular; pappus of hyaline squamellae.

Achenes angled; pappus-squamellae with strong midribs; scapose plants with entire broad leaves.

45. CHAMAECHEAENACTIS.

Achenes scarcely angled; pappus-squamellae not conspicuously ribbed; plants usually caulescent, if not, leaves at least lobed.

Bracts many; heads peduncled; squamellae of the pappus distinct or rarely wanting; style-tips subulate; leaves usually pinnately dissected or pinnately lobed.

46. CHAENACTIS.

Bracts 4; heads sessile; squamellae of the pappus united at their base and falling off together; style-tips obtuse leaves narrowly linear.

47. OROCHAENACTIS.

44. *RIGIOPAPPUS* A. Gray, Proc. Am. Acad. 6: 548. 1865.

Slender puberulent annual herbs. Leaves alternate, linear, entire. Heads solitary at the ends of the stem and several smaller ones on elongate peduncles from the upper axils. Involucre turbinate; bracts subequal, in two series, linear-subulate, concave, partly enclosing the ray-flowers. Receptacle plain, naked. Ray-flowers 5-8, pistillate, fertile, with short ligules scarcely exceeding the disk. Disk-flowers hermaphrodite, fertile; corolla-tube slightly shorter than the tubular throat; teeth 3-4, short. Style-branches of the hermaphrodite flowers partly stigmatose, short, glabrous, flattened with subulate hirtellous tips. Achenes slender, linear, compressed, hispid, transversely rugose. Pappus simple, of 4 or 5 ridged subulate aristiform squamellae.

Type species, *Rigiopappus leptocladus* A. Gray.

Squamellae slightly longer than the disk-corollas.

1. *R. leptocladus*.

Squamellae about twice as long as the disk-corollas.

2. *R. longiaristatus*.

1. *Rigiopappus leptocladus* A. Gray, Proc. Am. Acad. 6: 548. 1865.

A slender annual; stem 1-3 dm. high, puberulent; branches 3-10 cm. long, sometimes prolific; leaves 1-3 cm. long, linear, hirsutulous, almost erect; involucre of the principal head 6-7 mm. high and about 1 cm. broad; that of the lateral heads 5 mm. high and 8 mm. broad; bracts hirsutulous, pungent; corollas ochroleucous, 2.5-3 mm. long; achenes 5-6 mm. long, 0.5 mm. thick, hirsutulous; squamellae 4-5 mm. long.

TYPE LOCALITY: Dalles of the Columbia River.

DISTRIBUTION: Washington and Idaho to southern California.

2. *Rigiopappus longiaristatus* (A. Gray) Rydberg, sp. nov.

Rigiopappus leptocladus longiaristatus A. Gray, Syn. Fl. N. Am. 1²: 339. 1884.

A slender annual; stem 1-2 dm. high, branched from near the base, puberulent; branches 3-7 cm. long; leaves 1-2 cm. long, linear, hirsutulous, almost erect, those of the branches about 0.5 mm. long or less; involucre 5 mm. high and about as broad; bracts linear, pungent; corollas ochroleucous, 2-2.5 mm. long; achenes about 4 mm. long, 0.5 mm. thick, hirsutulous; squamellae subulate, fully 5 mm. long.

TYPE LOCALITY: Rattlesnake Bar, California.

DISTRIBUTION: California.

45. *CHAMAEAENACTIS* Rydb. Bull. Torrey Club 33: 155.

1906.

Cespitose scapiferous perennials with a multicapital caudex and thick woody root. Leaves all basal, simple, petioled, coriaceous, sparingly hirsute and punctate above. Heads discoid. Involucre turbinate; bracts about 12 in two series, distinct, the inner slightly longer and with scarios margins. Rays wanting. Disk-flowers hermaphrodite and fertile; corollas flesh-colored; throat trumpet-shaped, many times longer than the short tube; lobes 5, equal, ovate spreading. Style-branches broad and flat, obtuse at the apex. Achenes clavate, obpyramidal, densely villous, 4-angled. Pappus of about 8 hyaline squamellae with a thick chartaceous midrib.

Type species, *Chaenactis scaposa* Eastw.

1. *Chamaechaenactis scaposa* (Eastw.) Rydb. Bull. Torrey Club 33:

156. 1906.

Chaenactis scaposa Eastw. Zoe 2: 231. 1891.

Actinella carnosae A. Nelson; Coult. & Nels. Man. 559. 1909.

A cespitose scapiferous perennial; leaves all basal, simple, 1-2 cm. long; petioles with hirsute bases; blades ovate, oblong, or suborbicular, coriaceous, entire-margined or nearly so, revolute, densely hirsutulous-canescens; peduncles 2-4 cm. long; involucre about 1.5 mm. high and broad; bracts oblong, obtuse, densely hirsute-villous, the inner with reddish tips; corollas about 8 mm. long; achenes clavate-obpyramidal, densely villous, 6 mm. long; squamellae 5-6 mm. long, silvery, spatulate.

TYPE LOCALITY: On the mesa across the Gunnison River near Grand Junction, Colorado.

DISTRIBUTION: Known only from the type locality and vicinity.

46. *CHAENACTIS* DC. Prodr. 5: 659. 1836.

Macrocarpus Nutt. Trans. Am. Phil. Soc. II. 7: 376. 1841.

Acarphaea Harv. & Gray; A. Gray, Mem. Am. Acad. II. 4: 98. 1849.

Acicarphaea Walp. Ann. 2: 877. 1852. Not *Acicarphaea* Juss. 1803.

Annual, biennial, or perennial plants, usually more or less floccose or rarely scurfy when young. Leaves mostly alternate and pinnately dissected. Heads discoid, but the marginal flowers often with enlarged funnellorm throat and irregular limb, sometimes even palmately 5-lobed. Involucre campanulate, turbinate or rarely hemispheric; bracts herbaceous, linear or linear-lanceolate, equal or nearly so, in two series and sometimes with a few shorter outside. Receptacle alveolate, naked or in some species with bristles subtending some of

the flowers. Corollas yellow, white or flesh-colored; tube very short, often glandular; throat elongate, longer than the tube and (except in the marginal flowers of some species) almost cylindrical; lobes lanceolate or ovate, erect or spreading. Achenes linear or nearly so, terete, oval in cross-section, or obscurely 4-angled, striate and pubescent, in the first two species considerably compressed and somewhat tapering downward. Pappus of 4-16 hyaline squamellae, sometimes equal and sometimes very unequal in length, those of the marginal flowers often much shorter, or in one species wanting and in another rudimentary.

Type species, *Chaenactis glabriuscula* DC.

Annuals.

Achenes decidedly compressed, tapering below; plants scurfy when young. (ACARPHAEA.)

Pappus wanting.

Pappus present, of 8-10 lacerated squamellae.

Achenes subterete, linear or nearly so; plants floccose when young; pappus of 4 (rarely 5 or 6) principal merely erose squamellae, with or without 1-4 shorter external ones. (EUCHAENACTIS.)

Corollas yellow.

Squamellae 4 or 5, without outer smaller squamellae.

Bracts broadly linear; marginal flowers with decidedly enlarged throat and limb, the latter palmately 5-lobed (less marked in *C. lanosa*).

Stem branching at the base only; peduncles elongate, the earlier scape-like; plant decidedly floccose.

Stem mostly branched above, leafy; peduncles shorter, never scape-like; plant sparingly floccose.

Bracts glabrate or glandular-granuliferous in age.

Bracts glandular-hispidulous.

Bracts narrowly linear; marginal flowers with slightly enlarged throat and limb, merely obliquely 5-toothed.

Pappus of hyaline squamellae, at least 1 mm. long; plants floccose when young.

Leaf-segments linear, not very fleshy.

Pappus of the disk-flowers nearly as long as the corolla, of lanceolate acute squamellae.

Plant tall and mostly simple below, soon glabrate.

Plant branched at the base and decidedly floccose.

Pappus of all flowers less than one half as long as the corolla, of oblong or obovate, obtuse squamellae.

Leaf-segments very short and obtuse, crowded, fleshy.

Pappus of minute callous squamellae; plant not at all floccose.

Squamellae 4 or 5, with some smaller ones outside.

Plant erect, about 2 dm. high, leafy, conspicuously floccose; leaf-segments long.

Plant low, almost scapose, not conspicuously floccose; leaf-segments short.

Corollas white or flesh-colored.

Stamens partly exerted; bracts all appressed (except the very tips in *C. Xanthiana*).

Involucral bracts acuminate; receptacle usually bristly.

Heads broadly turbinate, often 1 cm. broad; squamellae of the central flowers half as long as the corollas.

Heads narrowly turbinate, 5-6 mm. broad; squamellae all very short.

Involucral bracts obtuse or merely acute.

Leaves bipinnatifid; involucre in age glandular-puberulent.

Segments linear or filiform; squamellae of the central flowers as least two thirds as long as the corollas.

Segments oblong or short-linear; squamellae all very short.

Leaves simply pinnate, with few linear divisions, or simple.

Marginal flowers much enlarged; squamellae equal or nearly so.

Squamellae 4, rarely 5 or 6; plant rather simple, erect; leaves, or their segments, linear-filiform.

Squamellae 10; plant low, diffusely branched; leaves spatulate-linear, fleshy.

Marginal flowers scarcely enlarged; bracts with somewhat foliaceous tips; principal squamellae 4 with 2-4 smaller outer ones.

1. *C. artemisiaefolia*.

2. *C. lacera*.

3. *C. lanosa*.

4. *C. glabriuscula*.

5. *C. denudata*.

8. *C. tenuifolia*.

9. *C. aurea*.

10. *C. gracilentia*.

11. *C. Orcuttiana*.

12. *C. Nevii*.

6. *C. heterocarpha*.

7. *C. tanacetifolia*.

13. *C. carphoclinia*.

14. *C. attenuata*.

15. *C. stevioides*.

16. *C. brachypappa*.

17. *C. Fremontii*.

18. *C. Cusickii*.

19. *C. Xanthiana*.

- Stamens included; some of the outer bracts spreading above.
- Perennials or biennials; corollas all alike; squamellae 8-15, linear, lanceolate or oblong, with no smaller outer ones. (MACROCARPHUS.)
- Plants not suffrutescens; leaves bipinnatifid or pinnatifid with lobed divisions.
- Leafy-stemmed plants.
- Plant densely white-floccose, usually somewhat villous.
- Leaves mostly basal, broadly obovate in outline, with approximate divergent divisions; branches of the inflorescence mostly diverging at the base and curved upwards.
- Leaves scattered, ovate or lanceolate in outline; branches of the inflorescence erect or ascending, strict.
- Plant 1-3 dm. high, not fruticulose; leaves regularly pinnatifid.
- Plant 3-4 dm. high.
- Leaves narrow, almost regularly pinnatifid; plant often fruticulose at base.
- Leaves broader, interruptedly pinnate with smaller segments interposed between the larger ones; plant not fruticulose.
- Plant sparingly floccose, in age glabrate and greener.
- Squamellae about half as long as the corollas; low perennials, 1-2 dm. high, branched at the caudex.
- Squamellae at least two-thirds as long as the corollas.
- Bracts shorter than the disk; stem 2-4 dm. high; biennials or perennials with a persistent caudex.
- Outer bracts not spreading; stout biennial, usually simple below.
- One or two of the outer bracts more or less spreading; slender perennial with branched caudex.
- Bracts equaling the disk; stem 1-2 dm. high, from a caespitose rootstock.
- Subscapose perennials, with rosulate leaves and nearly naked peduncles.
- Leaves oblanceolate, elliptic or linear in outline; plants with a caespitose caudex.
- Leaves oblanceolate or elliptic in outline, sparingly floccose.
- Inner bracts acuminate; leaf-blades narrowly lanceolate in outline.
- Inner bracts barely acute; leaf-blades broadly ovate or obovate in outline.
- Involucre floccose and glandular-puberulent, not subtended by smaller bracts.
- Involucre densely glandular hirsute, subtended by one or two shorter and looser bracts.
- Leaves linear in outline, densely white-woolly.
- Leaves obovate, cuneate, or flabelliform in outline, villous; plant with a caespitose rootstock.
- Involucre 12-15 mm. high and broad; bracts linear, the inner acute.
- Involucre about 8 mm. high and broad; bracts linear-spatulate, rounded at the apex.
- Plants suffrutescens; leaves pinnate with linear, usually entire divisions.
- Leaf-segments short; involucre 12-13 mm. high; squamellae 13-15.
- Leaf-segments long; involucre 18-20 mm. high; squamellae 8-12.
20. *C. macrantha*.
21. *C. brachiata*.
22. *C. achilleaeifolia*.
23. *C. imbricata*.
24. *C. cheilanthoides*.
25. *C. humilis*.
26. *C. Douglasii*.
27. *C. rubricaulis*.
28. *C. peduncularia*.
29. *C. minuscula*.
30. *C. alpina*.
31. *C. pumila*.
32. *C. santolinoides*.
33. *C. nevadensis*.
34. *C. Evermannii*.
35. *C. Parishii*.
36. *C. suffrutescens*.

1. *Chaenactis artemisiaefolia* A. Gray, Proc. Am. Acad. 10: 74. 1874.

Acarphaea artemisiaefolia Harv. & Gray; A. Gray, Mem. Am. Acad. II. 4: 98. 1849.

Acicarphaea artemisiaefolia Walp. Ann. 2: 877. 1852.

A branched annual; stem striate, 3-5 dm. high, scurfy-pubescent when young, glandular-puberulent above; leaves 5-10 cm. long, scurfy when young, more or less glandular, especially beneath, bi- or tri-pinnatifid with linear or oblong, divergent and irregular divisions; heads loosely cymose; peduncles 3-10 cm. long, glandular; involucre about 10 mm. high and 15-20 mm. broad; bracts linear, acuminate or acute, densely glandular-puberulent and viscid-hirsute; corollas ochroleucous, 6 mm. long; tube glandular-puberulent; marginal corollas only slightly enlarged; achenes somewhat compressed, finely striate, somewhat clavate; pappus wanting, represented by a callous margin.

TYPE LOCALITY: California.

DISTRIBUTION: Southern California and Lower California.

ILLUSTRATION: Bot. Mex. Bound. Surv. pl. 32.

2. *Chaenactis lacera* Greene, *Pittonia* 1: 291. 1889.

An annual, scurfy-canescens when young; stem 3-5 dm. high, branched, glandular-puberulent in the inflorescence; leaves 5-10 cm. long, ovate-lanceolate in outline, bi- or tri-pinnate into linear divaricate and flexuose segments; heads corymbose; involucre hemispheric, 12-13 mm. high, 12-15 mm. broad; bracts 15-18, linear, acute or acuminate, glandular-puberulent and viscid-hirsute; corollas all alike, white, 6 mm. long; achenes clavate-linear, compressed, hispidulous and glandular-granuliferous; squamellae 8-10, lanceolate, acute, lacerate.

TYPE LOCALITY: Bay of San Bartolomé, Lower California.

DISTRIBUTION: Lower California.

3. *Chaenactis lanosa* DC. *Prodr.* 5: 659. 1836.

Chaenactis glabriuscula lanosa H. M. Hall, *Univ. Calif. Publ. Bot.* 3: 192. 1907.

A winter annual; stem 2-3 dm. high, branched from the base, the first peduncles scapiform, floccose, the branches sometimes branching above and bearing 2-3 peduncles; peduncles naked or with simple leaves, 5-20 cm. long, thickish, simply pinnatifid with narrowly linear divisions; involucre 8-10 mm. high, 12-20 mm. broad; bracts 20-25, linear, acutish, densely floccose; corollas yellow, pubescent, the central ones 6 mm. long, the marginal ones usually moderately ampliate, a little longer; achenes 5-6 mm. long; squamellae of the central flowers lanceolate, acute, nearly as long as the corollas, those of the margin scarcely half as long and obtuse.

TYPE LOCALITY: California.

DISTRIBUTION: Central and southern California; lower California.

4. *Chaenactis glabriuscula* DC. *Prodr.* 5: 659. 1836.

Chaenactis glabriuscula megacephala A. Gray, in *Torr. Pacif. R. R. Rep.* 4: 104. 1857.

A leafy annual; stem 1.5-5 dm. high, commonly branched above; branches ascending; leaves once or twice pinnately divided into linear lobes or the upper entire, 5-10 cm. long, thinly floccose, in age glabrate; peduncles 3-8 cm. long; involucre 8-10 mm. high, 10-15 mm. broad; bracts 15-18, broadly linear or oblong, obtuse, thinly floccose; corollas yellow, pubescent, the central ones about 6 mm. long, the marginal with ampliate palmate limb, 4-5 mm. long; achenes about 5 mm. long, hirsute; squamellae of the central flowers linear-lanceolate, acute, nearly as long as the corollas, those of the marginal flowers usually less than half as long and obtuse.

TYPE LOCALITY: California.

DISTRIBUTION: Washington to southern California.

5. *Chaenactis denudata* Nutt. *Proc. Acad. Phila.* 4: 21. 1848.

A leafy winter annual; stem 3-4 dm. high, much-branched, sparingly floccose, soon glabrous, decidedly glandular above; leaves 5-8 cm. long, once or twice pinnately divided into linear divisions, sparingly floccose; peduncles 3-15 cm. long, decidedly glandular-hispid as well as slightly floccose; involucre about 10 mm. high, 15-20 mm. broad; bracts 25-50, linear, obtuse, densely glandular-hispidulous; corollas yellow, the central ones 6 mm. long, pubescent, the marginal ones with ampliate palmate limbs, 4-5 mm. long; achenes 5 mm. long, sparingly hirsute; squamellae lanceolate, acute, nearly equaling the corollas, those of the marginal flowers obtuse, only 1 or 2 mm. long.

TYPE LOCALITY: Los Angeles, California.

DISTRIBUTION: Southern California.

6. *Chaenactis heterocarpha* A. Gray, *Mem. Am. Acad.* II. 4: 98. 1849.

A rather simple annual; stem 1-2 dm. high, leafy throughout, with 1-3 heads, rather densely floccose; leaves 5-8 cm. long, once or twice pinnatifid into linear segments, rather densely floccose; peduncles 3-5 cm. long; involucre 10-12 mm. high, 12-18 mm. broad; bracts

linear, densely floccose; corollas yellow, the central ones 6 mm. long, pubescent, the marginal ones with palmately dilated limb, 4–5 mm. long; achenes 5 mm. long, hirsute; pappus of the disk-achenes of 4 lanceolate squamellae nearly as long as the corolla, and 1–4 smaller intermediate ones, which are 1–2 mm. long and obtuse; squamellae of the marginal achenes usually all short and blunt.

TYPE LOCALITY: [In the Sacramento Valley] California.
DISTRIBUTION: Sacramento Basin.

7. *Chaenactis tanacetifolia* A. Gray, Proc. Am. Acad. 6: 545. 1865.

A low annual; stem 1 dm. high or less, branched at the base, loosely floccose; branches usually monocephalous; leaves mostly basal, bipinnatifid, 3–5 cm. long, with short oblong divisions; involucre sparingly floccose, 7 mm. high, 8–10 mm. broad; corollas yellow, the central ones 6 mm. long, puberulent, the marginal with a slightly dilated limb which is 3 mm. long; achenes 4 mm. long, sparingly hirsute; squamellae of the disk-flowers obtuse, about 3 mm. long, often with outer short obtuse squamellae; squamellae of the marginal flowers all short, about 1 mm. long.

TYPE LOCALITY: Near Clear Lake, Lake County, California.
DISTRIBUTION: Lake County, California.

8. *Chaenactis tenuifolia* Nutt. Trans. Am. Phil. Soc. II. 7: 375. 1841.

Chaenactis filifolia Harv. & Gray; A. Gray, Mem. Am. Acad. II. 4: 98. 1849.
Chaenactis glabriuscula tenuifolia H. M. Hall, Univ. Calif. Publ. Bot. 3: 191. 1907.

A slender winter annual; stem simple up to the inflorescence, sparingly floccose; leaves 4–6 cm. long, bipinnatifid into linear-filiform divisions; peduncles 1–5 cm. long; involucre 5–6 mm. high, 8–10 mm. broad; bracts 20–25, narrowly linear, acute, rather thick, floccose as well as glandular-granuliferous; corollas yellow, the central ones about 5 mm. long, those of the margin somewhat enlarged, with obliquely funnellform, 5-lobed limb; squamellae lanceolate to ovate, acute or obtuse, those of the central flowers 3–4 mm. long, those of the marginal ones much shorter (*C. filifolia* is a slender form with shorter pappus).

TYPE LOCALITY: St. Diego, California.
DISTRIBUTION: Southern California and Lower California.

9. *Chaenactis aurea* Greene, sp. nov.

An annual; stem branched at the base, with ascending branches, about 2 dm. high, more or less floccose and purple-tinged; leaves alternate, 3–5 cm. long, pinnatifid with linear, entire or cleft divisions, usually decidedly floccose; heads at the ends of branches 3–6 cm. long; involucre broadly turbinate, about 8 mm. high and 10 mm. broad; corollas golden-yellow, 5 mm. long, the marginal ones only slightly enlarged and oblique; achenes 4.5 mm. long, appressed-hirsute; squamellae lanceolate, unequal, 3–5 mm. long.

Type collected on Wilson's Peak, California, 1901, *Le Roy Abrams 1890* (herb. E. L. Greene).
DISTRIBUTION: Southern California.

10. *Chaenactis gracilentia* Greene, Fl. Franc. 447. 1897.

Chaenactis heterocarpha A. Gray, Syn. Fl. N. Am. 1²: 339, mainly, 1884.
Chaenactis heterocarpha curta A. Gray, Syn. Fl. N. Am. ed. 2. 1²: 452. 1886.

Erect slender annual; stem 1–3 dm. high, branched, more or less flexuose, sparingly floccose when young; leaves pinnate or bipinnate with short linear divisions, sparingly floccose; peduncles 2–5 dm. long; involucre about 7 mm. high, 8–10 mm. broad; corollas yellow, the central ones 5 mm. long, those of the margin with moderately ampliate, obliquely funnellform limb; achenes 4–5 mm. long, sparingly hirsute; squamellae unequal, oblong or obovate, obtuse and erose, less than one half as long as the corolla.

TYPE LOCALITY: Napa Valley, California.
DISTRIBUTION: California.

11. *Chaenactis Orcuttiana* (Greene) Parish, *Erythea* 6: 92. 1898.*Chaenactis tenuifolia Orcuttiana* Greene, W. Am. Sci. 3: 157. 1887.*Chaenactis glabriuscula Orcuttiana* H. M. Hall, Univ. Calif. Publ. Bot. 3: 190. 1907.

Low winter annual; stem 1–3 dm. high, divaricately branched, leafy, floccose when young, decidedly glandular in the inflorescence; leaves 4–6 cm. long, bipinnatifid with very short obtuse divisions, floccose when young; involucre 6 mm. high, 10–12 mm. broad; bracts about 25, linear, slightly floccose and decidedly glandular; corollas yellow, 4–5 mm. long, puberulent, the marginal ones moderately dilated, funnellform; achenes 4 mm. long, sparingly hirsute; squamellae of the disk-flowers about 3 mm. long, lanceolate, acute, those of the marginal flowers shorter and obtuse.

TYPE LOCALITY: San Diego, California.

DISTRIBUTION: Sea beaches, southern California and Lower California.

12. *Chaenactis Nevii* A. Gray, Proc. Am. Acad. 19: 30. 1883.

A low annual; stem 1–2 dm. high, branched, puberulent and decidedly glandular above, scarcely floccose; leaves 5–8 cm. long, nearly glabrous, somewhat fleshy, bipinnatifid with linear divisions; peduncles 2–5 cm. long; involucre 7–8 mm. high, about 1 cm. broad; bracts rather broadly linear, acute, glandular-puberulent; corollas yellow, decidedly glandular, 4 mm. long, those of the margin only slightly enlarged; achenes 4 mm. long; pappus of minute callous squamellae.

TYPE LOCALITY: Idaho.

DISTRIBUTION: Idaho and Oregon.

13. *Chaenactis carphoclinia* A. Gray, in Torr. Bot. Mex. Bound.

Surv. 94. 1859.

Chaenactis paleolifera A. Nelson, Bot. Gaz. 47: 434. 1909.

A slender annual; stem 1–3 dm. high, puberulent, copiously branched; leaves once or twice pinnatifid into filiform divisions, 4–7 cm. long, puberulent; peduncles 2–6 cm. long; involucre 5–6 mm. high, 5–10 mm. broad; bracts 15–30, narrowly linear, caudate-attenuate, glandular-puberulent and sometimes somewhat hispid; receptacle more or less beset with filiform bristles, as long as the bracts; corollas whitish, 5 mm. long, villosulous, the marginal ones slightly dilated; achenes 4 mm. long, villous; squamellae of the central flowers ovate-lanceolate, at least half as long as the corollas, those of the marginal flowers small and obtuse.

TYPE LOCALITY: Fort Yuma.

DISTRIBUTION: New Mexico to Nevada, southern California, and Lower California.

14. *Chaenactis attenuata* A. Gray, Proc. Am. Acad. 10: 73. 1874.*Chaenactis carphoclinia attenuata* M. E. Jones, Proc. Calif. Acad. II. 5: 699. 1895.

A slender annual; stem 2–3 dm. high, glabrous, branched above; leaves alternate, 3–4 cm. long, pinnatifid into narrow, filiform divisions, puberulent or glabrate; peduncles 3–5 cm. long, with small bract-like leaves; involucre narrowly turbinate, about 7 mm. high, 5–6 mm. broad; bracts 12–18, linear-subulate, caudate and ending in a bristle-tip, puberulent and reddish; receptacle somewhat bristly; corollas whitish, 5 mm. long, villosulous, the marginal ones scarcely dilated; achenes 4 mm. long, villous; squamellae all short and obtuse, less than 1 mm. long.

TYPE LOCALITY: Ehrenberg, Arizona.

DISTRIBUTION: Arizona and southern California.

15. *Chaenactis stevioides* H. & A. Bot. Beech. Voy. 353. 1838.*Chaenactis floribunda* Greene, Pittonia 3: 168. 1897.

A freely branched annual; stem 1–2 dm., seldom 3 dm. high, floccose when young, glabrate in age, glandular-puberulent above; leaves 5–8 cm. long, once or twice pinnatifid into linear spreading divisions; peduncles 1–5 cm. long, glandular-puberulent; involucre 8–9 mm. high, 10–15 mm. broad; bracts linear, obtusish, with faint midrib, glandular-puberulent; corollas

white, 5 mm. long, those of the marginal flowers only moderately enlarged but irregularly 5-toothed; achenes 5 mm. long, hirsute; squamellae of the central flowers oblong-lanceolate, two-thirds to three-fourths as long as the corolla, those of the marginal flowers shorter, unequal, some often very small.

TYPE LOCALITY: Snake County, Idaho.

DISTRIBUTION: Wyoming to Idaho, southern California, Sonora, and New Mexico.

16. *Chaenactis brachypappa* A. Gray, Proc. Am. Acad. 8: 390. 1872.

Chaenactis stevioides brachypappa H. M. Hall, Univ. Calif. Publ. Bot. 3: 194. 1907.

A branched annual; stem 1–2 dm. high, floccose when young; branches ascending; leaves 3–5 cm. long, bipinnatifid with oblong or linear, divaricate obtuse divisions, floccose when young; peduncles 1–5 cm. long; involucre 7–8 mm. high, 10–12 mm. broad; bracts broadly linear, glandular-puberulent, obtuse; corollas dull-white, about 4 mm. long, those of the marginal flowers with scarcely dilated limb obliquely 5-toothed; achenes nearly 5 mm. long, hirsutulous; squamellae 4, all short, obtuse. [Seems to grade into *C. stevioides*.]

TYPE LOCALITY: Pahranaagat Mountains, Nevada.

DISTRIBUTION: Southern Nevada and southern California.

17. *Chaenactis Fremontii* A. Gray, Proc. Am. Acad. 19: 30. 1883.

A branched annual; stem 2–4 dm. high, glabrate, with many ascending branches; leaves pinnatifid into 3–6 linear-filiform divisions or simple; involucre 8–10 mm. high, 12–15 mm. broad; bracts linear, acute, in age perfectly glabrous; corollas pale-flesh-colored or white, about 6 mm. long, those of the margin with dilated, palmate limb; achenes 5 mm. long, hirsute; squamellae 4, lanceolate, nearly equaling the corolla, acute, or those of the marginal flowers shorter and some of them obtuse.

TYPE LOCALITY: Mohave Desert, California.

DISTRIBUTION: Southern California, Nevada, and Arizona.

18. *Chaenactis Cusickii* A. Gray, Syn. Fl. N. Am. ed. 2. 1²: 452. 1886.

A low annual, diffusely branched at the base; stem decumbent, 1 dm. high or less, sparingly floccose-tomentulose, soon glabrate; leaves rather fleshy, entire, spatulate-linear, 2–3 cm. long; peduncles short; involucre subtended by a linear leaf, hemispheric, 7–8 mm. high and 10–12 mm. broad; bracts thick, broadly linear, with obscure midrib; corollas 5–6 mm. long, white, the marginal ones not enlarged; achenes 6 mm. long, hirsute; squamellae of the pappus 10, about 3 mm. long, linear-oblong, nearly equal, about equaling the corolla-tube.

TYPE LOCALITY: Sandy hills of the Malheur, Oregon.

DISTRIBUTION: Oregon and Idaho.

19. *Chaenactis Xanthiana* A. Gray, Proc. Am. Acad. 6: 545. 1865.

Chaenactis glabriuscula megacephala A. Gray, Proc. Bost. Soc. Nat. Hist. 7: 146, in part. 1859.

Chaenactis Xanthiana integrifolia A. Gray, Proc. Am. Acad. 6: 545. 1865.

A rather stout and simple annual; stem 1–4 dm. high, with erect branches, striate, sparingly floccose when young, soon glabrate; leaves somewhat fleshy, pinnatifid into linear-filiform divisions or sometimes entire and filiform, 4–6 cm. long; involucre 12–13 mm. high, 15–20 mm. broad; bracts linear, acute, floccose when young, with more or less foliaceous hirsutulous tips; corollas whitish or flesh-colored, 7–8 mm. long, the marginal ones scarcely enlarged; achenes 7–8 mm. long, hirsute; squamellae 4, lanceolate, a little shorter than the corolla, and usually as many short outer ones, obovate, only 1 mm. long.

TYPE LOCALITY: Fort Tejon, southern California.

DISTRIBUTION: Southern Oregon to Arizona and southern California.

20. *Chaenactis macrantha* DC. Eaton, in S. Wats. Bot. King's Expl. 171. 1871.

A low annual; stem 1–2 dm. high, branched near the base, floccose when young; leaves 3–5 cm. long, once or twice pinnatifid with oblong obtuse divisions; peduncles 2–5 cm. long;

involucre 12–13 mm. high, 10–15 mm. broad; bracts floccose when young, linear, a few of the outer ones with spreading or recurved tips, acute; corollas white or flesh-colored, decidedly pubescent, about 10 mm. long, the marginal ones not much larger than the central ones; anthers included; achenes 5–6 mm.; squamellae 4, linear-oblong, about half as long as the corolla, and 2–4 outer oblong cuneate much smaller ones.

TYPE LOCALITY: Foothills, western Nevada.

DISTRIBUTION: Utah, Arizona, Nevada, and eastern California.

ILLUSTRATION: S. Wats. Bot. King's Expl. *pl.* 18, *f.* 1–5.

21. *Chaenactis brachiata* Greene, Leaflets 2: 224. 1912.

A short-lived perennial; stem 2–4 dm. high; leaves mostly at the base of the stem, 3–4 cm. long; blades obovate or broadly oval, pinnatifid into 15–19, approximate, spreading divisions, again pinnatifid or toothed, white-tomentose; stem-leaves few and somewhat smaller; heads 3–6, corymbose; lateral peduncles 5–10 cm. long, usually spreading at the base and curved upwards with erect heads; involucre turbinate, about 12 mm. high, 12–15 mm. broad, viscid-hirsute; bracts linear, acute or the outer obtuse; corollas dull-white, 6–7 mm. long, puberulent; achenes 7 mm. long, puberulent; squamellae 8, oblong, unequal, obtuse, 3–4 mm. long.

TYPE LOCALITY: Springdale, Utah.

DISTRIBUTION: Utah.

22. *Chaenactis achilleaefolia* H. & A. Bot. Beech. Voy. 354. 1838.

Macrocarphus achilleaefolius Nutt. Trans. Am. Phil. Soc. II. 7: 376. 1841.

Chaenactis Douglasii achilleaefolia A. Nelson; Coult. & Nels. Man. 557. 1909.

Chaenactis angustifolia Greene, Leaflets 2: 223. 1912.

A low perennial with a tap-root; stem 1–2 dm. high, rarely 2.5 dm. high, permanently white-tomentose, almost villous, few-leaved, with 1–3 heads; leaves mostly lanceolate in outline, 2–5 cm. long, permanently white-tomentose, pinnatifid with oblong or obovate, lobed short divisions; peduncles 1–2 cm. long; involucre 7–9 mm. high, 8–10 cm. broad; bracts linear, obtuse, glandular-puberulent, when young floccose; corollas flesh-colored, 5–6 mm. long, puberulent; achenes 5–5.5 mm. long, hirsute; squamellae about 8, linear, unequal, obtuse, 3–5 mm. long.

TYPE LOCALITY: Plains of the Snake Country, Idaho.

DISTRIBUTION: Wyoming to Oregon and Nevada.

ILLUSTRATION: Stansb. Expl. Utah Bot. *pl.* 6.

23. *Chaenactis imbricata* Greene, Leaflets 2: 222. 1912.

A perennial, fruticulose and branched at the base; stems strict, about 3 dm. high, leafy, terete, floccose; leaves ascending, 5–10 cm. long, lanceolate in outline, with 9–21 again pinnatifid or toothed narrow divisions, yellowish and loosely but rather densely floccose; heads several in a rather narrow leafy inflorescence; peduncles 2–5 cm. long; involucre broad, somewhat turbinate-campanulate, 10–12 mm. high, 12–15 mm. broad, viscid-pubescent; bracts linear, obtuse; corollas flesh-colored or white, 6–7 mm. long, puberulent; achenes 6 mm. long, hirsutulous; squamellae about 8, oblong, obtuse, 4–5 mm. long.

TYPE LOCALITY: Wenatche Flats, Washington.

DISTRIBUTION: Washington, Oregon, and Idaho.

24. *Chaenactis cheilanthoides* Greene, Leaflets 2: 225. 1912.

A perennial or biennial with a taproot; stem about 3 dm. high, tomentose; leaves 4–8 cm. long, rather permanently white villous-tomentose, lanceolate in outline, interruptedly pinnate, the larger divisions again pinnatifid, with short oblong divisions; heads several, corymbose; involucre about 8 mm. high and 10 mm. broad, floccose and glandular-puberulent; bracts linear or somewhat narrowly linear-spatulate, obtuse; corollas whitish, 6 mm. long, puberulent; achenes 5–6 mm. long, hirsute; squamellae about 8, linear, 5–6 mm. long, or those of the marginal flowers 2–4 mm. long.

TYPE LOCALITY: Fayette River, Idaho.

DISTRIBUTION: Idaho, Oregon, and Washington.

25. *Chaenactis humilis* Rydberg, sp. nov.

A low perennial with a taproot; stems several from the crown or branched near the base, floccose when young; leaves 2-5 cm. long, floccose, in age glabrate, oblanceolate in outline, pinnatifid with oblong round-lobed small divisions; involucre turbinate, 7-8 mm. high, 5-10 mm. broad; bracts 15-20, narrowly linear, obtuse, unequal, glandular-puberulent; corollas whitish, all alike, 6 mm. long, glandular-puberulent; achenes 5 mm. long, hirsute; squamellae about 8, oblong, obtuse, somewhat unequal, about 3 mm. long.

Type collected in Franklin Basin, Bear River Range, Idaho, July 24, 1910, *C. P. Smith 2273* (herb. N. Y. Bot. Gard.).

DISTRIBUTION: Western Wyoming and eastern Idaho.

26. *Chaenactis Douglasii* (Hook.) H. & A. Bot. Beech. Voy. 354.
1838.

Hymenopappus Douglasii Hook. Fl. Bor. Am. 1: 316. 1833.

Hymenopappus scabiosaeus Dougl.; Hook. Fl. Bor. Am. 1: 316, as synonym. 1833.

Hymenopappus scabioneus Dougl.; Steud. Nom. Bot. ed. 2. 1: 784. 1840.

Macrocarphus Douglasii Nutt. Trans. Am. Phil. Soc. II. 7: 376. 1841.

A biennial or short-lived perennial; stem 2-4 dm. high, floccose when young, usually simple below, corymbosely branched above, or rarely a few stems from the crown of the taproot; leaves 5-10 cm. long, bipinnatifid with spreading oblong, entire or toothed, short divisions, floccose when young, in age glabrate; heads several; peduncles 1-3 cm. long; involucre about 10 mm. long, 10-15 mm. wide, at first floccose, glandular-hirsute; bracts in 3 series, linear, obtuse, all appressed, the outer shorter; corollas white, all alike, glandular-puberulent, 6-7 mm. long; achenes 6-7 mm. long, hirsute; squamellae about 8, linear-obtuse, unequal in length, 3-5 mm. long.

TYPE LOCALITY: Sandy ground of the Columbia, from the Great Falls to the Rocky Mountains [Washington].

DISTRIBUTION: Alberta and British Columbia to New Mexico and California.

27. *Chaenactis rubricaulis* Rydberg, sp. nov.

A slender perennial with short branched caudex; stems 1-3 dm. high, soon glabrate, somewhat glandular-puberulent above, usually tinged with red; leaves 2-5 cm. long, obovate or oblanceolate in outline, soon glabrate, bipinnatifid with short oblong divisions; heads several on ascending branches; involucre turbinate, about 1 cm. high and broad, green, glandular-puberulent; bracts 12-18, linear, acutish, some of the outer ones shorter and usually with spreading tips, obtuse; corollas all alike, pinkish, 6 mm. long, glandular-puberulent; achenes 6 mm. long, hirsute and viscid; squamellae about 8, linear, obtuse, about 5 mm. long.

Type collected in Deer Park, Placer County, California, June 22, 1910, *Miss H. A. Walker 2170* (herb. N. Y. Bot. Gard.).

DISTRIBUTION: Mountains of California to Oregon.

28. *Chaenactis peduncularia* Greene, Pittonia 4: 98. 1899.

Chaenactis Douglasii montana M. E. Jones, Proc. Calif. Acad. II. 5: 700. 1895.

A low perennial with a branching rootstock; stems 1-1.5 dm. high, floccose when young, more or less hirsute above; leaves 3-5 cm. long, pinnatifid with oblong lobed obtuse divisions, floccose when young, the lower rather approximate, those of the stem rather scattered; peduncles 1-3 cm. long; involucre 12-15 mm. long, 15-18 mm. broad, floccose when young, and hirsute; bracts linear, acutish; corollas whitish, 6-7 mm. long, glandular-puberulent, all alike; achenes 6 mm. long, sparingly hirsute and glandular; squamellae 6-8, linear, obtuse, about 5 mm. long.

TYPE LOCALITY: Above La Plata, southern Colorado.

DISTRIBUTION: Colorado.

29. *Chaenactis minuscula* Greene, Leaflets 2: 223. 1912.

A scapose perennial with cespitose rootstocks; leaves basal, crowded, 2-3 cm. long; blades lanceolate in outline, pinnatifid or bipinnatifid with short entire or toothed divisions,

nearly glabrous; peduncles 1–3 cm. long, slender; involucre turbinate, 1 cm. high or less, and about as broad; bracts linear, acute or the inner acuminate, finely glandular-puberulent; corollas white, minutely puberulent, 6 mm. long; achenes 5 mm. long, puberulent; squamellae oblong, obtuse, 3 mm. long.

TYPE LOCALITY: Top of Mount Parks, Idaho.

DISTRIBUTION: Known only from the type locality.

30. *Chaenactis alpina* (A. Gray) M. E. Jones, Proc. Calif. Acad. II.
5: 699. 1895.

Chaenactis Douglasii alpina A. Gray, Syn. Fl. N. Am. 1²: 341. 1884.

Chaenactis leucopsis Greene, Leaflets 2: 221. 1912.

Chaenactis rubella Greene, Leaflets 2: 222. 1912.

A subcaulescent perennial with a caespitose caudex or rootstock; leaves crowded at the base, 3–5 cm. long, oblanceolate or elliptic in outline, pinnatifid with oblong, crenate or lobed, crowded divisions, finely floccose when young, glabrate in age; peduncles 3–6 cm. long, rarely with 1 or 2 leaves, glandular-puberulent; involucre 8–10 mm. high, 10–15 mm. broad; bracts linear, obtuse, at first somewhat floccose; glandular-puberulent, tinged with purple; corollas all alike, flesh-colored, glandular-puberulent, 6 mm. long; achenes 6 mm. long, hirsute, purplish; squamellae about 8, linear or oblong, obtuse, 3–5 mm. long. (*C. leucopsis* is a more floccose form.)

TYPE LOCALITY: "Alpine region of Rocky and Cascade Mountains in Colorado and Wyoming."

DISTRIBUTION: Colorado to Montana, California and Oregon.

31. *Chaenactis pumila* Greene, Leaflets 2: 223. 1912.

? *Chaenactis Mainsiana* Nelson & Macbride, Bot. Gaz. 56: 477. 1913.

A scapose perennial with a rootstock; leaves crowded at the base, broadly obovate in outline, 2–4 cm. long, twice pinnatifid with divergent, crowded segments, sparingly floccose, or in age glabrate, except the rachis; peduncles 2–4 cm. long, densely glandular; involucre turbinate, decidedly acute at the base, 10–12 mm. long and as broad, densely glandular-hirsute, dark-red; bracts linear, acute, with 1 or 2 linear looser and shorter bracts below; corollas flesh-colored, about 6 mm. long; achenes 6–7 mm. long, hirsutulous; squamellae 4 mm. long, oblong, obtuse, unequal, the longer 4 mm. long.

TYPE LOCALITY: Sonora Pass, California.

DISTRIBUTION: Sierra Nevada, California; mountains of eastern Oregon (and Idaho?).

32. *Chaenactis santolinoides* Greene, Bull. Torrey Club 9: 17.
1882.

A subcaulescent perennial with caespitose caudex; stems scapiform, 1–2 dm. high; leaves basal, tufted, 5–8 cm. long, densely white-woolly, linear or linear-lanceolate in outline, pinnately lobed with short oblong or rounded toothed segments; scape glandular-puberulent; involucre 8–10 mm. high, about 10 mm. broad; bracts linear, obtuse, densely glandular; corollas white or flesh-colored, 6–7 mm. long, glandular-puberulent, those of the margins not dilated; anthers only slightly protruding; achenes 7 mm. long, densely hirsute; squamellae 8–10, linear, obtuse, about 5 mm. long.

TYPE LOCALITY: San Bernardino Mountains, California.

DISTRIBUTION: Southern California.

33. *Chaenactis nevadensis* (Kellogg) A. Gray, Bot. Calif. 1: 391.
1876.

Hymenopappus nevadensis Kellogg, Proc. Calif. Acad. 5: 46. 1873.

A subcaulescent perennial with creeping caespitose rootstocks; leaves all near the base, 2–4 cm. long, obovate, cuneate, or flabelliform in outline, once or twice pinnatifid into obovate or spatulate lobes, densely villous; scapes 1 dm. long or less, glandular-puberulent; involucre 12–15 mm. high and as broad; bracts linear, obtuse, densely glandular; corollas 7 mm. long,

white, all alike; anthers slightly protruding; achenes 6 mm. long, densely hirsute; squamellae about 8, linear, obtuse, about 5 mm. long.

TYPE LOCALITY: [Sierra Nevada].

DISTRIBUTION: Sierra Nevada, California.

34. **Chaenactis Evermannii** Greene, Leaflets 2: 224. 1912.

A subscapose perennial with long cespitose creeping rootstocks; leaves 1-2 cm. long, spatulate, 3-5-toothed or -lobed above the middle, loosely floccose or in age glabrate; peduncles 1-3 cm. long, floccose; involucre turbinate, 6-8 mm. high and as broad, puberulent; bracts linear-spatulate, rounded at the apex, rather few and unequal; corollas flesh-colored or white, 5 mm. long; achenes 5 mm. long, hirsutulous; squamellae 8, unequal, oblong, obtuse, the longer 4-5 mm. long.

TYPE LOCALITY: Near Sawtooth, Idaho.

DISTRIBUTION: Known only from the type locality.

35. **Chaenactis Parishii** A. Gray, Proc. Am. Acad. 20: 299. 1885.

Chaenactis suffrutescens A. Gray, Syn. Fl. N. Am. 1²: 341, in part. 1884.

A suffruticose perennial; stem 3-4 dm. high, light-green, sparingly floccose when young; leaves 3-5 cm. long, pinnate with short linear divisions; stem-leaves gradually reduced upwards, the uppermost small and bractlike; heads 1-5 on erect peduncles 5-10 cm. long; involucre 12-13 mm. high, 15-20 mm. broad; bracts narrowly linear, acute, slightly floccose; corollas about 7 mm. long, puberulent, apparently ochroleucous; achenes 7 mm. long; squamellae 13-15, narrowly linear.

TYPE LOCALITY: Southern border of California.

DISTRIBUTION: Southern California and northern Lower California.

36. **Chaenactis suffrutescens** A. Gray, Proc. Am. Acad. 16: 100.
1880.

A suffruticose perennial; stem 3-4 dm. high from a decumbent woody base, white-floccose; leaves 5-10 cm. long, white-floccose, pinnatifid or sometimes bipinnatifid into linear divisions; peduncles 1-2 dm. long, glandular-puberulent; involucre 18-20 mm. high and about as broad; bracts linear, attenuate, glandular-puberulent; corollas whitish, 7 mm. long, all alike, puberulent; achenes 6 mm. long, densely hirsute; squamellae 8-12, linear, 5 mm. long.

TYPE LOCALITY: Rocky banks of the Sacramento below Mt. Shasta.

DISTRIBUTION: Valleys of northern California.

47. **OROCHAENACTIS** Coville, Contr. U. S. Nat. Herb. 4: 134.
1893.

Annual herbs, branched from the base. Leaves linear, entire, alternate or the lower opposite. Heads discoid, sessile at the ends of the branches or in the upper axils. Involucre campanulate; bracts about 4, equal, slightly concave, distinct. Ray-flowers none. Disk-flowers few, hermaphrodite, fertile, greenish-yellow, glandular-granuliferous; tube very short; throat trumpet-shaped. Anthers sagittate. Style-branches linear, without appendages, obtuse, short-hispidulous. Achenes terete, striate, linear, slightly clavate. Pappus of several obtuse membranous erose squamellae, united at the base and falling off together.

Type species, *Chaenactis thysanocarpha* A. Gray.

1. **Orochaenactis thysanocarpha** (A. Gray) Coville, Contr. U. S. Nat.
Herb. 4: 134. 1893.

Chaenactis thysanocarpha A. Gray, Proc. Am. Acad. 19: 30. 1883.

Bahia Palmeri S. Wats. Proc. Am. Acad. 24: 83. 1889.

A low and slender annual; stem 5-15 cm. high, minutely puberulent; leaves narrowly linear, 1-3 cm. long, the lower opposite, the upper alternate; heads sessile in the axils; involucre campanulate, 5-7 mm. high; bracts oblanceolate, acutish, glandular-puberulent;

corollas 4-10, glandular-granuliferous; tube 1 mm. long; throat trumpet-shaped, 2 mm. long; lobes oblong, unequal; achenes oblong-obconic, 3 mm. long, striate, glandular-granuliferous; pappus of a crown of 8-17 thin, spatulate, erose squamellae 1 mm. long, thickened and slightly united at the base and falling off together.

TYPE LOCALITY: Southern part of Sierra Nevada, California.

DISTRIBUTION: Southern Sierra Nevada, California.

ILLUSTRATION: Contr. U. S. Nat. Herb. 4: *pl. 10*.

Subtribe 9. **BLENNOSPERMATANAE**. Heads radiate. Involucre hemispheric or depressed; bracts equal, herbaceous, partly membranous and colored, plane, united at the base. Receptacle flat. Ray-flowers pistillate and fertile, ligulate, yellow, or without corolla. Disk-flowers numerous, with narrow tube and campanulate throat, hermaphrodite, but the pistil rudimentary, and sterile. Achenes oblong-pyriform, not angled, 8-10-ribbed, papillate on the surface. Pappus wanting.

A single genus.

48. BLENNOSPERMA.

48. **BLENNOSPERMA** Less. Syn. Comp. 267. 1832.

Apalus DC. Prodr. 5: 507. 1836.

Coniothele DC. Prodr. 5: 531. 1836.

Annual glabrous herbs. Leaves alternate, pinnatifid. Involucre hemispheric or depressed; bracts 5-12. Ligules present, or wanting in about every alternate ray-flower, oblong or elliptic, sessile on the ovary, *i. e.*, the corolla without a tube. Style-branches flat, linear or oblong. Disk-flowers 20 or more; tube slender; throat broadly campanulate; lobes 4 or 5. Anthers oval. Style undivided, capitate or peltate; ovary abortive. Papillae of the achenes producing each two mucous filaments when wetted.

Type species, *Blennosperma chilense* Less.

1. **Blennosperma californicum** (DC.) T. & G. Fl. N. Am.

2: 272. 1842.

Coniothele californica DC. Prodr. 5: 531. 1836.

A glabrous annual, branched from the base; stem 1-2 dm. high, glabrous or nearly so; heads at the ends of the branches; peduncles 2-6 cm. long; leaves alternate, pinnately dissected into linear, usually entire divisions; involucre 5-6 mm. high, 10-12 mm. broad; ligules usually present, 6-7 mm. long, 2 mm. broad; achenes oblong-elliptic, 2.5 mm. long, nearly 1 mm. broad.

TYPE LOCALITY: California.

DISTRIBUTION: California.

Subtribe 10. **BAERIANAE**. Heads radiate or discoid. Involucre campanulate, turbinate, or hemispheric; bracts herbaceous, mostly flat, often more or less united. Receptacle high, commonly conic, usually with raised points bearing the flowers. Ray-flowers pistillate and ligulate, or wanting. Disk-corollas with campanulate throat, equaling or slightly longer than the tube. Achenes narrow, oblong or linear or somewhat clavate, round-angled, often somewhat flattened, slightly nerved or nerveless. Pappus of squamellae or awns, or both, or wanting.

Bracts of the involucre flat, or somewhat carinate below; rays ligulate; leaves opposite.

Bracts distinct or united merely at the base.

Bracts united at least halfway up.

Bracts of the involucre strongly concave throughout; marginal flowers tubular, with 2 or 3 short teeth, shorter than the style; leaves alternate.

49. BAERIA.

50. LASTHENIA.

51. AMBLYOPAPPUS.

49. *BAERIA** Fisch. & Mey. Ind. Sem. Hort. Petrop. 2: 29. Ja 1836.

Burrielia DC. Prodr. 5: 663. 1836.

Ptilomeris Nutt. Trans. Am. Phil. Soc. II, 7: 381. 1841.

Dichaeta Nutt. Trans. Am. Phil. Soc. II, 7: 383. 1841.

Plants mostly annual, glabrous or pubescent. Leaves opposite, sessile, narrow, entire to lacinate-pinnatifid. Heads mostly many-flowered, pedunculate. Involucre cylindric to hemispheric, consisting of 3-15 distinct or slightly united herbaceous bracts, these either nearly plane or becoming somewhat carinate below, often with a tendency to embrace their achenes. Receptacle from subulate to hemispheric, mostly conic, muricate, or scrobiculate and the depressions conforming to the bases of the achenes. Ray-flowers present, but the ligules sometimes minute, yellow. Disk-corollas with narrow tube, campanulate throat, and 5-lobed limb, yellow. Style-tips truncate-capitate to ovate, with or without a central apiculation. Achenes 4-angled, or somewhat flattened and each face then 1-nerved, clavate-linear or narrowly cuneate. Pappus of awns or squamellae, sometimes of both awns and squamellae, not infrequently wanting.

Receptacle subulate. (*BURRIELIA*.)

Heads apparently discoid, the ligules shorter than the style or wanting; involucre nearly cylindric.

Heads radiate, the ligules 2-5 mm. long; involucre turbinate to campanulate.

Leaves nearly filiform; anther-tips subulate.

Leaves linear to lanceolate; anther-tips only acute.

Receptacle conic to subglobose.

Herbage neither glandular nor viscid; receptacle muricate.

Pubescence hirsutulous or strigulose; leaves mostly ciliate towards the base and entire or nearly so. (*EUBAERIA*.)

Plants biennial or perennial, with thickened roots; pappus of few bristles or none.

Plants annual; pappus of squamellae (either awned or awnless) or none.

Leaves narrowly linear, acute; bracts of the involucre oblong-ovate, acute.

Leaves broadly linear or oblong, obtuse; bracts of the involucre round-ovate, somewhat obtuse.

Pubescence all soft or woolly, often sparse or almost none; leaves entire to pinnately parted.

Involucre turbinate, its bracts keeled by the strong midrib; pappus uniform or wanting. (*PLATYCARPHA*.)

Involucre hemispheric, its bracts not keeled; pappus dimorphous. (*DICHAETA*.)

Receptacle conic, not hirsute.

Ligules of the ray-flowers elliptic-oblong, mostly 4-8 mm. long, exceeding the disk.

Ligules of the ray-flowers oval, mostly 1-3 mm. long, scarcely equaling the disk.

Receptacle dome-shaped, obtuse, densely hirsute as well as muricate.

Herbage more or less glandular or viscid; receptacle usually scrobiculate; pappus paleaceous or none. (*PTILOMERIS*.)

1. *B. microglossa*.

2. *B. leptalea*.

3. *B. debilis*.

4. *B. macrantha*.

5. *B. chrysostoma*.

6. *B. hirsutula*.

7. *B. platycarpha*.

8. *B. uliginosa*.

9. *B. maritima*.

10. *B. Fremontii*.

11. *B. aristata*.

1. *Baeria microglossa* (DC.) Greene, Fl. Fran. 438. 1897.

Burrielia microglossa DC. Prodr. 5: 664. 1836.

Lasthenia microglossa Greene, Man. Bay Reg. 205. 1894.

Pentachaeta laxa Elmer, Bot. Gaz. 41: 318. 1906.

Annual, 0.5 to 2 dm. high, usually much branched, the stems weak and slender but erect, sparsely pubescent with soft and somewhat appressed hairs; leaves linear, entire, rarely more than 3 mm. wide, usually much narrower; peduncles 1-4 cm. long; involucre cylindric, 5-8 mm. high, its 3 or 4 bracts oblong and acute; receptacle subulate; ray-flowers (pistillate) 1-3, their ligules shorter than the styles or wanting; disk-flowers not more than 15; style-tips short-ovate; achenes slightly compressed, nearly linear but narrowed below, rough with scattered upwardly pointing minute bristles; pappus of 2-4 very narrow but flattened squamellae attenuate into subulate awns, sometimes wanting in the ray-flowers.

TYPE LOCALITY: California.

DISTRIBUTION: Shaded or grassy places in western and middle California, extending to the borders of the Mojave and the Colorado deserts.

ILLUSTRATION: E. & P. Nat. Pfl. 4^o: f. 124, H.

* By HARVEY MONROE HALL.

2. *Baeria leptalea* A. Gray, Syn. Fl. N. Am. 1²: 325. 1884.

Burrielia leptalea A. Gray, Proc. Am. Acad. 6: 546. 1865.

Annual, 1.5 dm. or less high, simple-stemmed or with few branches, slender, erect, glabrous below but minutely puberulent on peduncles and involucre; leaves nearly filiform, entire; peduncles 0.5–4 cm. long; involucre almost turbinate, 3–4 mm. high, its 4–6 bracts oblong and rather obtuse; receptacle subulate; ray-flowers 4 or 5, the ligules 3–4 mm. long; anther-tips filiform; style-tips ovate, with a subulate appendage; achenes clavate-linear, pale, sparsely dotted with minute inflexed hairs; pappus in both ray and disk of 1–3 scabrous awns gradually dilated at base.

TYPE LOCALITY: Santa Lucia Mountains, along the Nacimiento River, California.

DISTRIBUTION: Coast ranges, from Monterey County to Lake County, California.

3. *Baeria debilis* Greene; A. Gray, Syn. Fl. N. Am. 1²: 325. 1884.

Annual, 1–2 dm. high; stems simple to freely branched, weak, sometimes reclining, soft-pubescent throughout; leaves plane, linear or lanceolate, 1–5 mm. wide, entire or rarely with a few minute teeth; peduncles 2–7 cm. long; involucre campanulate, 4–6 mm. high, its 5 or 6 bracts rhombic-oblong and broadly acute; receptacle subulate; ray-flowers 6–10, the ligules 2–5 mm. long; anther-tips ovate-lanceolate; style-tips ovate, subulate-appendaged; achenes nearly black, linear-clavate, pubescent with minute appressed hairs; pappus of 3 or 4 ovate awned squamellae about as long as the disk-corollas or sometimes wanting.

TYPE LOCALITY: Plains of Fresno County, California.

DISTRIBUTION: San Joaquin Valley, California, and neighboring slopes of the Sierra Nevada.

4. *Baeria macrantha* A. Gray, Proc. Am. Acad. 19: 21. 1883.

Burrielia chrysostoma macrantha A. Gray, in Torr. Pacif. R. R. Rep. 4: 106. 1857.

Baeria chrysostoma macrantha A. Gray, Proc. Am. Acad. 9: 196. 1874.

Baeria macrantha pauciaristata A. Gray, Proc. Am. Acad. 19: 21. 1883.

Lasthenia macrantha Greene, Man. Bay Reg. 205. 1894.

Biennial or perennial with thickened roots, 1–5 dm. high, simple or branched, rather stout, short-hispid, especially on the leaf-margins and involucre; leaves usually linear and 5–10 (or even 20) cm. long, rarely oblong and only 2–6 cm. long, entire, acute or obtuse; peduncles 5–20 cm. long; involucre broadly hemispheric, 8–12 mm. high, its numerous bracts broad-ovate and acute; receptacle conic, muricate; ray-flowers 7–12, the ligules 1–2 cm. long; disk-flowers numerous; achenes clavate, smooth and glabrous or microscopically pubescent; pappus none or of 1–4 bristles. (A form from Dillons Beach has very obtuse spatulate leaves 1 cm. wide and peduncles 5 cm. or less long.)

TYPE LOCALITY: Hills near Point Reyes, California.

DISTRIBUTION: Coast of California north of San Francisco Bay.

5. *Baeria chrysostoma* Fisch. & Mey. Ind. Sem. Hort. Petrop.
2: 29. Ja 1836.

Burrielia gracilis DC. Prodr. 5: 664. 1836.

Burrielia tenerrima DC. Prodr. 5: 664. 1836.

Burrielia longifolia Nutt. Trans. Am. Phil. Soc. II. 7: 380. 1841.

Burrielia hirsuta Nutt. Trans. Am. Phil. Soc. II. 7: 381. 1841.

Burrielia parviflora Nutt. Trans. Am. Phil. Soc. II. 7: 381. 1841.

Baeria chrysostoma T. & G. Fl. N. Am. 2: 379. 1842.

Baeria gracilis A. Gray, Proc. Am. Acad. 9: 196. 1874.

Baeria Palmeri A. Gray, Bot. Calif. 1: 376. 1876.

Baeria gracilis aristosa A. Gray, Proc. Am. Acad. 19: 21. 1883.

Baeria gracilis paleacea A. Gray, Proc. Am. Acad. 19: 21. 1883.

Baeria curta A. Gray, Proc. Am. Acad. 19: 21. 1883.

Baeria Clevelandii A. Gray, Proc. Am. Acad. 19: 22. 1883.

Baeria gracilis tenerrima A. Gray, Syn. Fl. N. Am. 1²: 326. 1884.

Baeria Palmeri clementina A. Gray, Syn. Fl. N. Am. ed. 2. 1²: 452. 1886.

Lasthenia chrysostoma Greene, Man. Bay Reg. 205. 1894.

Lasthenia gracilis Greene, Man. Bay Reg. 206. 1894.

Baeria aristosa Howell, Fl. NW. Am. 1: 354. 1900.

Baeria chrysostoma gracilis H. M. Hall, Univ. Calif. Publ. Bot. 1: 170. 1907.

Annual, low and with simple stems when growing in poor or dry soil, becoming robust, profusely branched, and 1–2.5 dm. high under favorable conditions, more or less hirsute or

strigulose; leaves linear to filiform, entire, acute; peduncles 1–15 cm. long; involucre broadly hemispheric, 3–6 mm. high, its 10–18 bracts oblong-ovate and acute; receptacle acutely conic, muricate; ray-flowers as many as the bracts (both bracts and ray-flowers few in number in depauperate plants); ligules 4–8 mm. long, often distinctly paler on the upper half; achenes linear-clavate and with slightly rounded summit in the typical form, either perfectly smooth and shining or with minute rounded papillae; pappus none in the typical form. (In var. *gracilis* and its forms the achenes are truncate at summit, more or less strigose-pubescent, and usually but not always bear a pappus of 2–5 awns or squamellae of varying shape.)

TYPE LOCALITY: Vicinity of Bodega Bay, California.

DISTRIBUTION: Southern Oregon to Lower California, east to Arizona; abundant on the plains and lower foothills in California.

ILLUSTRATIONS: Sert. Petrop. *pl.* 7; Sweet, Brit. Fl. Gard. II. *pl.* 395; Bot. Mag. *pl.* 3758; M. E. Parsons, Wild Fl. Calif. 129.

6. *Baeria hirsutula* Greene, Fl. Fran. 438. 1897.

Lasthenia hirsutula Greene, Man. Bay Reg. 206. 1894.

Annual with thick but weak branching stems 0.5–2 dm. high, strigose and also short-hirsute; leaves broadly linear to oblong-spatulate, entire or dentate, obtuse; peduncles 1–6 cm. long; involucre broad-hemispheric, 5–7 mm. high, its bracts broadly elliptic or roundish ovate and obtuse or barely acutish; receptacle conic, muricate; ray-flowers 12–15, the oblong ligules 7–10 mm. long; achenes linear-clavate, not rounded at the summit, somewhat angled, smooth or usually conspicuously papillate but not strigose; pappus of 2–4 slender bristles slightly widened at the base, or entirely wanting.

TYPE LOCALITY: Rocky and grassy hills along the seacoast, from Marin County southward in California.

DISTRIBUTION: Near the coast, in western middle California.

7. *Baeria platycarpha* A. Gray, Proc. Am. Acad. 9: 196. 1874.

Burrielia platycarpha A. Gray, in Torr. Bot. Mex. Bound. Surv. 97. 1859.

Baeria carnososa Greene, Bull. Torrey Club 10: 86. 1883.

Lasthenia platycarpha Greene, Man. Bay Reg. 205. 1894.

Lasthenia carnososa Greene, Man. Bay Reg. 205. 1894.

Annual, erect, usually with several purplish wiry branches from the base, about 1.5 dm. high, glabrous except for some fine deciduous woolliness, the foliage and involucre slightly succulent; leaves all entire and narrowly linear, or some irregularly pinnatifid into nearly filiform segments; peduncles 1–6 cm. long; involucre campanulate, 6–7 mm. high, the 7–9 bracts elliptic or oblong-lanceolate and acute, each bract 3-nerved at base, the middle nerve carinately thickened; receptacle narrowly conic, acute, strongly muricate; ray-flowers 7–9 or perhaps more numerous, the elliptic ligules about 8 mm. long; disk-corollas glabrous or only granular; achenes slenderly clavate, angled, scabrous or strigose with upwardly pointing hairs; pappus of 4–7 ovate squamellae each tapering to a slender awn, or wanting.

TYPE LOCALITY: Valley of the upper Sacramento River, California.

DISTRIBUTION: Salt marshes and alkaline plains, western middle California to the Mojave Desert.

8. *Baeria uliginosa* (Nutt.) A. Gray, Proc. Am. Acad. 9: 197. 1874.

Dichaeta uliginosa Nutt. Trans. Am. Phil. Soc. II. 7: 383. 1841.

Dichaeta tenella Nutt. Trans. Am. Phil. Soc. II. 7: 383. 1841.

Baeria uliginosa tenella A. Gray, Proc. Am. Acad. 9: 197. 1874.

Baeria uliginosa tenera A. Gray, Proc. Am. Acad. 19: 22. 1883.

Lasthenia uliginosa Greene, Man. Bay Reg. 205. 1894.

Lasthenia tenella Greene, Man. Bay Reg. 205. 1894.

Baeria tenella Greene, Fl. Fran. 439. 1897.

Annual, 1–3 dm. high, at length loosely branched and diffuse, sometimes prostrate; herbage somewhat succulent, villous-tomentose or even woolly when young, commonly glabrate; leaves broadly ligulate, with few or several salient linear lobes, the rachis usually 4–10 mm. broad, or the leaves entire and linear in slender plants; peduncles often shorter than the upper leaves, sometimes 5 cm. long; involucre broad-hemispheric, 5–7 mm. high, its 10–15 bracts ovate or lanceolate, acutish; receptacle conic, acute, muricate, not pubescent; ray-flowers 10–15, the

oblong-elliptic ligules 4–8 mm. long; achenes nearly prismatic but narrowed below, angled, strigose; pappus of 2–4 awns and about 6 truncate-fimbriate intervening squamellae, or rarely wanting and the achenes then glabrous. (Var. *tenella* is the slender form with small heads and ligules and mostly entire leaves; it grows in lighter and scarcely alkaline soil.)

TYPE LOCALITY: Santa Barbara, California.

DISTRIBUTION: Low moist or saline ground, from Bodega Bay, California, to San Quentin, Lower California.

9. *Baeria maritima* A. Gray, Proc. Am. Acad. 9: 196. 1874.

Burrielia maritima A. Gray, Proc. Am. Acad. 7: 358. 1868.

Annual, with weak and reclining stems, succulent, woolly or loosely villous, especially on the margins of the involucre bracts, but often glabrate; leaves oblong-linear, 3–20 mm. wide, entire or some sparingly dentate or incised; peduncles often very short but usually 1–5 cm. long; involucre hemispheric, about 5 mm. high, its 5–7 bracts broadly elliptic, rather obtuse; receptacle conic or rarely somewhat hemispheric, acute, strongly muricate, not pubescent; ray-flowers 6–8, the oval ligules rarely exceeding 3 mm. long and scarcely equaling the disk; achenes linear-clavate, the surface completely covered by the dense appressed pubescence; pappus of 3–5 subulate awns and as many intervening laciniate squamellae.

TYPE LOCALITY: Farallone Islands, off the coast of middle California.

DISTRIBUTION: Coast and adjacent islands of middle California, north to Vancouver Island.

10. *Baeria Fremontii* (Torr.) A. Gray, Proc. Am. Acad. 9: 196. 1874.

Dichaeta Fremontii Torr.; A. Gray, Mem. Am. Acad. II. 4: 102. 1849.

Burrielia Fremontii Benth. Pl. Hartw. 317. 1849.

Baeria Burkei Greene, Bull. Calif. Acad. 2: 151. 1886.

Lasthenia conjugens Greene, Pittonia 1: 221. 1888.

Lasthenia Fremontii Greene, Man. Bay Reg. 204. 1894.

Lasthenia Burkei Greene, Man. Bay Reg. 204. 1894.

Annual, very slender, or sometimes slightly succulent, simple to freely branched, erect, 0.8–3 dm. high, nearly glabrous below, densely and finely pubescent on peduncles and involucre; leaves mostly parted into linear lobes but some of the upper nearly filiform and entire, rarely all entire in slender plants; peduncles much exceeding the upper leaves; involucre hemispheric, 4–6 mm. high; bracts 10–12, broadly ovate, acute, overlapping, usually distinct but occasionally united near the base (*Lasthenia conjugens*), not keeled, strigose-pubescent at least near the margins, inclined to be deciduous with their achenes at maturity; receptacle subglobose or dome-shaped, low-muricate, densely hirsute; ray-flowers about 10–12, the ligules elliptic and 3–6 mm. long; disk-corollas 2.5–3 mm. long, the tube hirsutulous and glandular; achenes scarcely more than 1 mm. long, prismatic or slightly compressed, black, upwardly scabrous; pappus of 1–4 slender awns and 4 or more short quadrate lacerate squamellae, or the pappus wanting and the achenes then smooth and shining.

TYPE LOCALITY: California.

DISTRIBUTION: Middle California, especially in the Sacramento Valley.

11. *Baeria aristata* (Nutt.) Coville, Proc. Biol. Soc. Wash. 13: 121. 1899.

Ptilomeris aristata Nutt. Trans. Am. Phil. Soc. II. 7: 382. 1841.

Ptilomeris coronaria Nutt. Trans. Am. Phil. Soc. II. 7: 382. 1841.

Ptilomeris mutica Nutt. Trans. Am. Phil. Soc. II. 7: 382. 1841.

Ptilomeris anthemoides Nutt. Trans. Am. Phil. Soc. II. 7: 382. 1841.

Hymenoxys californica Hook. Bot. Mag. pl. 3828. 1841.

Hymenoxys californica coronaria T. & G. Fl. N. Am. 2: 380. 1842.

Hymenoxys mutica T. & G. Fl. N. Am. 2: 381. 1842.

Hymenoxys calva T. & G. Fl. N. Am. 2: 381. 1842.

Ptilomeris tenella Nutt. Proc. Phila. Acad. 4: 20. 1848.

Ptilomeris affinis Nutt. Proc. Phila. Acad. 4: 20. 1848.

Actinolepis coronaria A. Gray, Proc. Am. Acad. 9: 197. 1874.

Actinolepis anthemoides A. Gray, Proc. Am. Acad. 9: 197. 1874.

Actinolepis mutica A. Gray, Proc. Am. Acad. 9: 198. 1874.

Actinolepis tenella A. Gray, Proc. Am. Acad. 9: 198. 1874.

- Baeria affinis* A. Gray, Proc. Am. Acad. 19: 23. 1883.
Baeria tenella A. Gray, Proc. Am. Acad. 19: 23. 1883.
Baeria coronaria A. Gray, Proc. Am. Acad. 19: 23. 1883.
Baeria mutica A. Gray, Proc. Am. Acad. 19: 23. 1883.
Baeria anthemoides A. Gray, Syn. Fl. N. Am. 1²: 328. 1884.
Baeria Parishii S. Wats. Proc. Am. Acad. 24: 83. 1889.
Baeria aristata mutica H. M. Hall, Univ. Calif. Publ. Bot. 3: 173. 1907.
Baeria aristata anthemoides H. M. Hall, Univ. Calif. Publ. Bot. 3: 174. 1907.
Baeria aristata affinis H. M. Hall, Univ. Calif. Publ. Bot. 3: 174. 1907.
Baeria aristata Parishii H. M. Hall, Univ. Calif. Publ. Bot. 3: 175. 1907.

Annual, simple to diffusely much branched, erect, 0.5–3 dm. high, minutely glandular-pubescent throughout and often also loosely villous especially towards the heads; leaves mostly once or twice pinnately parted into linear-filiform divisions, rarely all entire on small plants; peduncles 1–10 cm. long, exceeding the upper leaves; involucre hemispheric, 3–5 mm. high; bracts 8–12, ovate, acute, with prominent midrib, at length deciduous with their achenes; receptacle acutely conic, usually scrobiculate but varying to muriculate, either glabrous or hirsute; ray-flowers 8–13, the oblong ligules 3–10 mm. long; disk-corollas about 2 mm. long, the tube glandular; achenes about 2 mm. long, slightly compressed, each face with 1 or 2 nerves, scabrous; squamellae 6–12, some or all of them tapering into awns, or all truncate and erose and then either awned or awnless, or the pappus entirely wanting.

TYPE LOCALITY: Near San Diego, California.

DISTRIBUTION: Southern California and Lower California; and (as a waif?) in Sacramento County, California.

ILLUSTRATION: Bot. Mag. pl. 3828.

50. LASTHENIA* Cass. Opusc. 3: 88. 1834.

- Rancagua* Poepp. & Endl. Nov. Gen. & Sp. 1: 15. 1835.
Hologymne Bartl. Ind. Sem. Hort. Gott. 1837: 4. 1837.
Xantho Remy, Ann. Sci. Nat. III. 12: 191. 1849.

Glabrous or slightly puberulent succulent annuals. Leaves opposite, sessile, entire or merely dentate, narrow, often connate and sheathing at base. Heads on slender peduncles terminating the branches or simple stems. Involucre of a single series of herbaceous bracts connate into a 5–15-toothed or -lobed cup. Receptacle conic, muriculate. Ray-flowers present, the ligules yellow, very short in one species. Disk-corollas with slender glandular tube, dilated throat, and 4–5-lobed limb, yellow. Achenes obtusely 2–4-angled, or somewhat compressed, narrowly obovate to nearly linear but always narrowed at base. Pappus paleaceous or none.

Type species, *Lasthenia obtusifolia* Cass.

Heads apparently discoid, the ligules not exerted from the involucre; pappus conspicuous.

Heads radiate, the ligules conspicuous; pappus none.

1. *L. glaberrima*.
2. *L. glabrata*.

1. *Lasthenia glaberrima* DC. Prodr. 5: 664. 1836.

L. minima Suksd. Allg. Bot. Zeits. 12: 7. 1906.

Stems simple or with few branches, commonly rooting from the lower nodes, weak and succulent, either erect or ascending from a decumbent base, 1–3 dm. high, glabrous throughout, or loosely and sparsely puberulent near the heads; leaves linear, entire, obtuse, 4–8 cm. long in average plants, some pairs connate and sheathing at base; peduncles sometimes all very short, sometimes 15 cm. long, turbinate-thickened at summit; heads often nodding in fruit; bracts of the involucre united nearly to the summit into a cup 5–7 mm. high, with acute ciliate teeth; ray-flowers inconspicuous, their ligules not exerted from the involucre; disk-corollas glandular, 1 mm. long, much shorter than the achenes, about equaling the pappus; achenes compressed, nearly linear, appressed-pubescent with short ferruginous hairs; pappus of 5–10 rigid squamellae, some of them pointed or short-awned, the others erose or lacinate. (*L. minima* is a dwarf form with puberulent peduncles.)

TYPE LOCALITY: California.

DISTRIBUTION: Wet or muddy ground near the coast, from western Oregon to middle California.

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