

# REVISION OF THE GENUS FLOURENSIA.

By S. F. BLAKE.

## INTRODUCTION.

The genus *Flourensia*, established by De Candolle<sup>1</sup> in 1836 to include a Chilean plant described by Molina as a *Helianthus* and three new species, was divided by him into two groups—one, Chilean, including the two radiate species *F. thurifera* (Mol.) DC., with a variety *angustifolia* DC., and *F. corymbosa* (a true *Viguiera*); the other, Mexican, with the two discoid species *F. laurifolia* and *F. cernua*, both based on Berlandier's collections. In the *Genera Plantarum* of Bentham and Hooker<sup>2</sup> *Flourensia* was included under *Helianthus* with some mention of its peculiarities, while *F. corymbosa* was relegated to *Viguiera*. In 1883 Gray<sup>3</sup> discussed the genus, considering the discoid species typical, suggesting that *F. thurifera* might be included as a section "under Bertero & Colla's name (not Cassini's) of *Diomedea*"<sup>4</sup> and giving the new name *Viguiera poeppigii* to *F. corymbosa*. The genus was again referred to *Helianthus* by Baillon<sup>5</sup> in 1886, but was recognized as distinct by Hoffman<sup>6</sup> in 1890, and has been retained by all subsequent authors.

In 1870 Philippi<sup>7</sup> described *F. hispida* from Chile, and in the next decade Griesbach published three radiate species, truly referable to the genus, from Argentina. Philippi's species, however, represented in the Berlin Herbarium by an authentic but very poor specimen, is a *Viguiera* apparently identical with *V. gilliesii* (Hook. & Arn.) Hieron.

In 1891 Philippi<sup>8</sup> published *Helianthus atacamensis*, referred to *Flourensia* by Reiche<sup>9</sup> in 1905, and in 1895<sup>10</sup> several new species

<sup>1</sup> Prodr. 5: 592. 1836.

<sup>2</sup> Gen. Pl. 2: 376. 1873.

<sup>3</sup> Proc. Amer. Acad. 19: 7. 1883.

<sup>4</sup> Bertero's reference of *Helianthus thurifer* to *Diomedea* Cass. (*Borrchia*) surely does not justify the citation of a genus "*Diomedea* Bert. non Cass.", as given in all our systematic works.

<sup>5</sup> Hist. Pl. 8: 46. 1886.

<sup>6</sup> In Engl. & Prantl, Pflanzenfam. 4<sup>b</sup>: 237. 1890.

<sup>7</sup> Anal. Univ. Chile 36: 186. 1870.

<sup>8</sup> Verz. Antofag. Tarapac. Pfl. 48. 1891.

<sup>9</sup> Fl. Chil. 4: 94-95. 1905.

<sup>10</sup> Anal. Univ. Chile 90: 36-40. 1895.

of *Helianthus*, of which four were referred as species or varieties to *Flourensia* by Reiche in 1905. Only *H. atacamensis* has been examined by the writer, but from description it is clear that all Philippi's species belong to *Viguiera*, or perhaps in part to true *Helianthus*; certainly none is referable to *Flourensia*.

The genus *Flourensia*, here limited as it was redefined by the writer<sup>11</sup> in 1913, includes 23 species, nine Mexican, of which one enters the southwestern United States, the other 14 native in the Andes from central Peru to Chile and the Province of Córdoba in Argentina. All are low, more or less resinous, alternate-leaved shrubs, with few-seriate involucre of herbaceous or only basally indurate phyllaries, thickened or more or less compressed achenes, villous at least on the margin, and persistent or rarely deciduous pappus of two often trifold awns and rarely a few narrow acute squamellae. The present revision, begun at the Berlin Herbarium in the summer of 1914, has been completed by a study of the material in the British Museum, the Kew Herbarium, the Gray Herbarium, and the United States National Herbarium, in the course of which it has been possible to examine types of all the species with the exception of the original *Helianthus thurifer* of Molina, material of which is probably no longer in existence.

### SYSTEMATIC TREATMENT.

#### FLOURENSIA DC.

*Flourensia* DC. Prodr. 5: 592. 1836.

Resinous shrubs, with alternate, linear-lanceolate to ovate or oval, feather-veined leaves and cymose-panicked or solitary heads; heads small to large, many-flowered, radiate or discoid, the rays neutral or rarely styliferous but sterile, the flowers all yellow; involucre 2 to 4-seriate, graduated or subequal, the phyllaries lanceolate or linear-lanceolate to ovate, herbaceous or subherbaceous throughout, or often subindurate and more or less striate below; receptacle flattish; pales scarious or subscarious, nerved, usually obtusish, keeled, embracing and falling with the achenes; rays usually present, oval to oblong, neutral, or rarely styliferous but sterile; disk corollas with slender tube and cylindric or funnellform throat, the short limb 5-toothed; anthers with ovate terminal appendages and cordate-sagittate bases; style branches usually slender and recurved, with short, obtuse or acutish, dorsally hispidulous appendages; disk achenes somewhat compressed or strongly thickened, often striate, oblong or cuneate to obovate, silky-villous, at least on margin, rarely with narrow crustaceous margin; pappus usually persistent (rarely deciduous or altogether wanting), of two often trifold awns and rarely intermediate squamellae, the latter usually united with the awns and probably representing their decurrent ampliate bases.

Type species, as here selected, *F. laurifolia* DC.

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<sup>11</sup> Proc. Amer. Acad. 49: 348-349, 350. 1913.

## KEY TO SPECIES.

## Heads discoid.

## Leaves entire.

Leaves ovate to obovate, 2 to 6 cm. wide..... 1. *F. laurifolia*.

## Leaves 4 to 11.5 mm. wide.

Leaves narrowly lanceolate, 4 to 7.5 mm. wide..... 2. *F. retinophylla*.

Leaves ovate to oval, 6.5 to 11.5 mm. wide..... 3. *F. cernua*.

Leaves mucronate-dentate, rhombic-ovate..... 4. *F. ilicifolia*.

## Heads radiate.

Young branches densely pilose-lanate; heads numerous, in regular cymose panicles..... 5. *F. glutinosa*.

Young branches not pilose-lanate; heads solitary to several at tips of branches, not regularly cymose-paniculate.

Petioles mostly 1 to 1.5 cm. long; leaves with the secondary veinlets not prominent-reticulate beneath..... 6. *F. collodes*.

Petioles much shorter, or else leaves with the secondary veinlets prominent-reticulate.

Phyllaries 13 to 23 mm. long, with ovate or lanceolate base and elongate linear-attenuate tip..... 7. *F. pringlei*.

Phyllaries 4 to 15 mm. long, or if longer without linear-attenuate tip.

Leaves narrowly oblong-elliptic to lanceolate, very glutinous, strictly entire, thick, mainly 5 to 13 cm. long. Heads 1 to 4, axillary and terminal, 3.5 to 5.3 cm. wide, on peduncles 3 to 8 cm. long.

Phyllaries narrowly lanceolate; leaves 3.3 to 6.5 cm. long. 8. *F. resinosa*.

Phyllaries (at least the inner) with broad rhombic-obovate base and lanceolate tip; leaves 7.5 to 13 cm. long..... 9. *F. heterolepis*.

Leaves usually oval, ovate, or broadly elliptic, rarely lanceolate, not strongly glutinous.

Involucre (at least in youth) densely and usually subcanescently pilose or hispid-pilose.

Leaves densely and finely prominent-reticulate, 1.5 to 2.5 cm. long..... 10. *F. microphylla*.

Leaves loosely reticulate, 2 to 4.2 cm. long..... 11. *F. suffrutescens*.

Involucre green, subglabrous or sparsely pubescent chiefly on the margin of the phyllaries.

Leaves narrowly lanceolate, hispid-hirtous especially on margin, 4.5 to 9.5 mm. wide; branchlets hirtous..... 12. *F. hirta*.

Leaves usually ovate, oval, or elliptic, mostly more than 1 cm. wide, not hispid-hirtous; branchlets not hirtous.

Leaves usually entire, when regularly denticulate narrowly oblong-lanceolate to lanceolate.

Leaves mostly ovate or oval or, if narrowly lanceolate, strictly entire.

Leaves entire (except in *F. leptopoda*); involucre 4 to 11 mm. high, the phyllaries not lance-spatulate.

Leaves not rhombic-ovate, entire or rarely with a few irregular teeth; petioles less than one-third as long as blade.

Phyllaries narrow, linear to lanceolate, rarely with slightly dilated ovate-lanceolate bases.

Leaves 1.5 to 5 cm. long, 4 to 18 mm. wide.

Leaves strongly prominent-reticulate. 13. *F. fiebrigii*.

Leaves not prominent-reticulate.

Phyllaries narrowly lanceolate, not widened at base; leaves narrowly oblong or elliptic, 0.4 to 1 cm. wide..... 14. *F. polyclada*.

- Phyllaries linear-lanceolate or linear-spatulate from an ovate-lanceolate base; leaves ovate or oblong-ovate, 1.1 to 1.8 cm. wide . . . . . 15. *F. niederleinii*.  
 Leaves 5 to 13 cm. long, usually 2 to 5 cm. wide.  
 Heads about 2.5 cm. wide; disk flowers 16 to 23.
16. *F. campestris*.  
 Heads 3.6 to 4 cm. wide; disk flowers 29 to 40.
17. *F. riparia*.  
 Phyllaries broad, ovate or oval.  
 Outer or middle phyllaries with ovate base and abruptly narrowed tip . . . . . 18. *F. tortuosa*.  
 All the phyllaries broadly ovate to oblong, without abruptly narrowed tip . . . . . 19. *F. oolepis*.  
 Leaves rhombic-ovate, deeply repand-dentate; petioles about one-third as long as blade . . . . . 20. *F. leptopoda*.  
 Leaves elliptic to ovate or oblong-elliptic, usually coarsely repand-dentate; involucre 1 to 2 cm. high, the phyllaries usually lance-spatulate . . . . . 21. *F. thurifera*.  
 Leaves narrowly lanceolate or oblong-lanceolate, usually denticulate, 7 to 13 mm. wide . . . . . 22. *F. angustifolia*.  
 Leaves oval or oblong-oval, 2 to 4 cm. wide, regularly denticulate.  
 Phyllaries lanceolate to oblong-lanceolate, 7 to 8 mm. long.
23. *F. macrophylla*.

1. *Flourensia laurifolia* DC. Prodr. 5: 592. 1836.

*Helianthus laurifolius* Benth. & Hook.; Hook. & Jacks. Ind. Kew. 1<sup>3</sup>: 1112. 1893, as synonym.

Shrub, 1.5 to 3 meters high, much branched, resinous-viscid, especially on the younger parts, and sparsely hispidulous or puberulous on the peduncles; leaf blades 5.5 to 13 cm. long, 2 to 6 cm. wide, ovate to elliptic-ovate or obovate, acuminate or acute, rarely obtuse, mucronulate, cuneate at base, entire, resinous, shining, strigillose along costa above, otherwise glabrous, finely prominulous-reticulate on both sides (the larger lateral veins about 14 pairs); petioles sparsely strigillose, 5 to 10 mm. long; heads in cymose panicles of 3 to 7 at ends of branches and branchlets, usually overtopped by the leaves; peduncles 1.5 to 2.8 cm. long, axillary, sometimes nodding in fruit; disk in flower turbinate-hemispheric, 1.5 cm. high, 1 to 1.3 cm. wide, in fruit subglobose; involucre 3 to 4-seriate, graduated, 10 to 11 mm. high, the outermost phyllaries linear-lanceolate or lance-ovate, obtuse to acutish, coriaceous-herbaceous, green, about 6 mm. long, ciliate toward tip, the others oblong-ovate to oblong-lanceolate, narrowed above the middle to an obtusish tip, resinous, glabrous or obscurely ciliolate, blackish green with paler margin, subcoriaceous, in old fruit spreading or reflexed; disk corollase cylindrical-funnelform, 6.8 mm. long (tube 2 mm.); pales scarious laterally, resinous at the obtusish tip, 12 mm. long; achenes narrowly obovate, somewhat thickened, densely pilose, 7.5 mm. long; awns 2, pilose, often 2 or 3-fid below, about 5 mm. long; squamellae none.

TYPE LOCALITY: Between Victoria ("Vittoria") and Tula, Tamaulipas, Mexico.

ILLUSTRATION: Deless. Icon. Sel. 4: pl. 35.

SPECIMENS EXAMINED:

TAMAULIPAS: Between Victoria and Tula, "cerca las Minces," November, 1830, *Berlandier* 2205 (type collection; B, G, K, Prod.). Mountains between Victoria and Tamaulipas, 1830, *Berlandier* 785 (G). Near Victoria, altitude 320 meters, 1907, *Palmer* 32 (G, N).

SAN LUIS POTOSÍ: Minas de San Rafael, 1911, *Purpus* 4789a (B, G, N). San Luis Potosí to Tampico, 1878-79, *Palmer* 1109 (G, K).

*Flourensia laurifolia* is readily distinguished by its discoid heads and large, ovate to obovate leaves.

2. *Flourensia retinophylla* Blake in Robinson, Proc. Amer. Acad. 49: 505. 1913.

Much-branched resinous shrub, with brownish gray bark, the branchlets viscid; leaves mostly crowded toward the ends of the branchlets, their blades 2.5 to 3.5 cm. long, 4 to 7.5 mm. broad, narrowly lanceolate, acute to subacuminate at both ends, mucronulate, entire, viscid, reticulate-venulose, with very indistinct primary veins; petioles very narrowly margined, 1 to 2 mm. long; heads in racemose corymbs of 2 to 6 at tips of branchlets, exceeded by the leaves, on 1-headed 1 to 3-bracteolate peduncles 0.4 to 1 cm. long; disk 12 to 15-flowered, turbinate, 10 to 13 mm. high; involucre triseriate, graduated, 8 mm. high, the phyllaries oblong-lanceolate to subovate-lanceolate, obtusish, yellowish green, lineate-striate, glutinous; pales firm, mucronate, obtuse, about 3-nerved, 8.5 to 10 mm. long; disk corollas glutinous, 5 to 5.8 mm. long (the tube 1.1 to 1.5 mm.); achenes cuneate, slightly thickened, densely villous, 6 mm. long; awns 2, serrulate, somewhat ampliate at the base, 3 mm. long; squamellae none.

TYPE LOCALITY: Sierra de la Paila, Coahuila, Mexico.

SPECIMENS EXAMINED:

COAHUILA: Sierra de la Paila, November, 1910, *Purpus* 4728 (type collection; B, G, K, N).

This species, the type collection of which was distributed as *F. laurifolia*, is easily distinguished from that and from the other discoid species by its narrowly lanceolate, very glutinous leaves.

3. *Flourensia cernua* DC. Prodr. 5: 593. 1836.

*Helianthus cernuus* Benth. & Hook.; Hook. & Jacks. Ind. Kew. 1<sup>2</sup>: 1112. 1893, as synonym.

Much-branched shrub, 1 to 2 meters high, erect or procumbent with erect branches, the bark gray, the heads and young branches resinous; branches strigillose; leaf blades 1.7 to 2.5 cm. long, 6.5 to 11.5 mm. wide, ovate to oval, acute at both ends, mucronulate, entire, pale green, somewhat resinous, obscurely reticulate-veined, with one or two pairs of the lateral nerves sometimes conspicuous; petioles slightly strigillose, 1 to 2.5 mm. long; heads nodding, solitary in the leaf axils, forming long leafy inflorescences; peduncles short, curved, with 1 to 3 ovate or elliptic bracteoles at apex; disk subturbinate, 12 to 20-flowered, 9 to 11 mm. high; involucre 2 or 3-seriate, subequal, 4.5 to 5 mm. high, the phyllaries oblong-lanceolate, acutish, resinous; disk corollas resinous-dotted, 3.5 mm. long (tube 1 mm.); pales rather thin, scarcely nerved, widened upwardly, then abruptly pointed, yellowish with a blackish keel above, 6 to 6.5 mm. long; achenes narrowly cuneate, thickened, villous, 6 mm. long, 2 mm. wide; awns 2, ciliolate, unequal, 2.5 to 3.2 mm. long; squamellae none.

TYPE LOCALITY: Between Monterey and Lampasos, Nuevo León, Mexico.

SPECIMENS EXAMINED:

TEXAS: Big Springs, 1899, *Bray* 401 (N). El Paso, 1885, *Gray* (G). Prairies east of El Paso, 1849, *Wright* 355 (G, K). Valley of the Pecos, and hills between the Mimbres and the Rio Grande, 1851, *Wright* 1229 (B, G, K). Along the Pecos, 1850, *Thurber* 115 (G). Sierra Blanca, 1913, *Rose & Fitch* 17933 (N). Presidio and foothills of Guadalupe Mountains, 1881, *Havard* 83 (G, N). Valentine, 1904, *Bailey* 917 (N). Chenate region, 1889, *Nealley* 533 (N). Without definite locality, *Mexican Boundary Survey* 563 (N); in 1851, *Wright* 299 (G).

NEW MEXICO: Pecos Valley near Texas line, 1901, *Bailey* 722 (N). Tularosa, 1904, *Gaut* 20 (N). San Andreas Mountains, 1902, *Gaut* 29 (N). Pena Blanca, Organ Mountains, 1906, *Wootton & Standley* (N). Mesa west of Organ Mountains, Dona Ana County, 1903 and 1904, *Wootton* (N). Lake Valley, 1914, *Beals* (N). Hachita, 1908, *Goldman* 1306 (N). Las Palomas, altitude 1,280 meters, 1909, *Goldman* 1792 (N).

ARIZONA: Portal to Paradise, Cochise County, altitude 1,600 to 1,730 meters, 1914, *Eggleston* 10667, 10668 (N). About Portal, 1914, *Eggleston* 10916 (N). Mesas, Bowie Station, October, 1882, *Pringle* (G, N). Near Fort Huachuca, 1894, *Wilcox* 413, 503 (N).

SONORA: Near Monument No. 26, 1892, *Mearns* 1142 (N). San Bernardino Ranch, 1892, *Mearns* 831 (N).

CHIHUAHUA: Hills and plains near Chihuahua, 1885, *Pringle* 292 (B, G, K, N). El Paso to Chihuahua, *Thurber* 788 (G). Candelaria, 1911, *Stearns* 281 (N).

COAHUILA: Parrás, 1880, *Palmer* 740 (G, K); in 1898, *Palmer* 434 (G, N). Saltillo, 1902, *Palmer* 286 (G, N). Pena, 1905, *Purpus* 1011 (G).

NUEVO LEÓN: Monterrey, *Weber* (G). Hills near Doctor Arroyo, 1904, *Pringle* 13053 (G, N). From Monterrey to Lampasos, 1828, *Berlandier* 141 (G), 1401 (type collection; B, G, K, Prod.).

DURANGO: Mapimi, 1898, *Palmer* 434 (K, N).

SAN LUIS POTOSÍ: Foot of mountains, Real de Couturie (?), 1827, *Berlandier* 1348 (G), 1354 (G, N). Without definite locality, 1878, *Parry & Palmer* 469 (B, G, K).

ZACATECAS: Plains and low ridges, Cedros, 1907, *Lloyd* 16 (N), 30 (G).

MEXICO (Republic of): Without definite locality, *Gregg* 421, 527 (G).

This species, the only one known to occur north of the Mexican border, is easily told by its discoid nodding heads and small ovate or oval leaves. It is sometimes called "varnish bush" or "tar bush" in the Southwest. It has a hoplike odor and a bitter taste. The leaves and heads are commonly sold in the drug markets of northern Mexico, and are taken in the form of a decoction for indigestion. The native name is "hojasé" or "hojasén." Palmer notes that it is also employed as a remedy for female diseases.

#### 4. *Flourensia ilicifolia* T. S. Brandeg. *Zoe* 5: 238. 1906.

Erect much-branched shrub, with grayish brown bark, the young branchlets slightly pubescent, resin-encrusted; leaves mostly crowded toward the ends of the branchlets, their blades 1.6 to 2.4 cm. long, 1 to 1.7 cm. wide, yellowish green, rhombic-ovate, repand-dentate with 3 to 6 pairs of stiffly mucronate teeth, acute at each end, mucronate, coriaceous, glutinous, obscurely reticulate, the veins not prominulous, the lateral veins about 3 to 6 pairs; petioles flattened, puberulous and resinous, often purplish-tinged, 1.5 to 5 mm. long; heads solitary or 2 or 3 together at tips of branchlets, about 22-flowered, on puberulous, resinous, about 3-bracted peduncles 1 cm. long; disk 1.3 to 1.6 cm. high; involucre 2-seriate, subequal, 6 to 6.5 mm. high, the phyllaries oblong to oblong-ovate, obtuse, coriaceous, yellowish green, resinous and ciliate, not striate; pales broadened below the subtruncate apex, yellowish, with brown or purple-tinged apex, scarious-margined, nearly glabrous, nerved, 9 to 10.5 mm. long; disk flowers 5 or rarely 4-toothed (the teeth oblong, obtusish, 2 to 3 mm. long), 6 to 7 mm. long, the tube 1.5 to 1.8 mm. long, the throat campanulate-funnelform; achenes narrowly cuneate, blackish, silky-villous, with white crustaceous base and very narrow border, 8 to 9.5 mm. long; awns 2, broadly lanceolate, attenuate, villous-ciliate, 2.5 to 4.5 mm. long, separate or united at base by a low crown which usually develops one or two lacerate squamellæ (2 to 3 mm. long) on each side of achene.

TYPE LOCALITY: Sierra de Parrás, Coahuila, Mexico.

#### SPECIMENS EXAMINED:

COAHUILA: Sierra de Parrás, March, 1905, *Purpus* 1150 (type collection; B, G).

This very distinct species is unique in the genus in its strongly mucronate-dentate, rhombic-ovate, short-petioled leaves.

**5. *Flourensia glutinosa* (Robins. & Greenm.) Blake, Proc. Amer. Acad. 49: 374. 1913.**

*Encelia glutinosa* Robins. & Greenm. Amer. Journ. Sci. III. 50: 155. 1895.

Shrub, 3 to 5 meters high, the bark gray, furrowed, the young branches more or less pilose-lanate with whitish hairs, the axis and branches of inflorescence resinous, pubescent, striate; leaf blades 6.5 to 9 cm. long, 1.8 to 3.8 cm. wide, ovate to ovate-lanceolate, acuminate, narrowed to the base, entire, mucronate, minutely scabrous above, scabrous-pubescent along the veins beneath, pale green, rather coarsely prominulous-reticulate (the prominent lateral veins 7 to 13 pairs); petioles lanate-pilose or merely pilosulous, 4 to 12 mm. long; heads about 2.5 cm. wide, 6 to 26 in cymose panicles at ends of branches, the 1 to 5-headed peduncles leafy-bracted at base, 2 to 5 cm. long, the bracts of inflorescence oval to ovate, 6 to 12 mm. long; disk very resinous, 1.4 to 1.8 cm. high, 9 to 11.5 mm. wide; involucre 3 or 4-seriate, strongly graduated, 5 to 6.5 mm. high, often calyculate with a few bractlets at apex of peduncle, the phyllaries lanceolate, obtusish, resinous, striate, fuscous, subherbaceous-tipped; rays about 8, golden-yellow, oblong-oval, barely emarginate, glabrous but the tube pilose, 1.5 to 1.7 cm. long, 5 to 7 mm. wide; pales subcoriaceous, enlarged and crested with two scarious wings at apex, resin-encrusted, 11 mm. long; disk flowers yellow, blackish green on the teeth, slenderly funnelform, at apex resinous, 7 to 8 mm. long (tube 1.5 mm.); achenes narrowly cuneate, sometimes quadrangular, silky-pilose, 6.5 to 11 mm. long; awns 2, or rarely 4, rather easily deciduous, 7 mm. long; squamellae none, or sometimes 2 or 3 present between each pair of main awns, and about half as long.

TYPE LOCALITY: Las Hoyas Canyon, Oaxaca, Mexico.

SPECIMENS EXAMINED:

PUEBLA: Limestone hills, near Tehuacán, 1895, *Pringle* 7023 (G).

OAXACA: Las Hoyas Canyon, altitude 1,370 meters, November 2, 1894, *Pringle* 6024 (type collection; B, G, K, N). About 9.6 kilometers above Domin-guillo, altitude 1,370 to 1,675 meters, 1894, *Nelson* 1832 (G. N).

*Flourensia glutinosa* is readily distinguished by its many-headed cymose panicles and pilose-lanate branches.

**6. *Flourensia collodes* (Greenm.) Blake, Proc. Amer. Acad. 49: 373. 1913.**

*Encelia collodes* Greenm. Proc. Amer. Acad. 39: 110. 1903.

Slightly resinous shrub; branches striate, angled, rather sparsely sordid-puberulous and resin-dotted; leaf blades 6 to 10 cm. long, 2.2 to 3.8 cm. wide, ovate, long-acuminate, falcate, at base inequilaterally rounded, firm but scarcely coriaceous, entire, puberulous on costa and main veins below, otherwise nearly glabrous, finely reticulate, only the chief veinlets prominulous, the 9 or 10 pairs of lateral veins prominent; petioles puberulous above, slender, 7 to 15 mm. long; heads in cymose panicles of 4 or 5 at ends of branches, terminal and axillary, 4 cm. wide, very resinous, on sparsely sordid-puberulous pedicels 8 cm. long or less, usually bracteate; disk 1.4 to 1.6 cm. high, 1.7 to 2 cm. thick; involucre 3-seriate, graduated, 1 cm. high, the phyllaries lance-ovate, acuminate to a glandular-callous tip, subherbaceous, thickened, striate, with narrow yellowish glandular-erose margin; receptacle flattish; rays about 14, narrowly elliptic, rarely bearing a short included style, 1.5 cm. long, 5 mm. wide; disk corollas 7 mm. long (tube 1 mm.), resinous; pales blunt, subcucullate at the fuscous apex, 12.5 mm. long; immature achenes pilose-ciliate, otherwise practically glabrous, 6 mm. long; awns 2, slender, 6 mm. long; squamellae 2 pairs, free from each other but united to awns at base, linear-lanceolate, attenuate, deeply and irregularly lacinate, 3 mm. long.

TYPE LOCALITY: Between Ocuilapa and Tuxtla, Chiapas, Mexico.

SPECIMENS EXAMINED:

CHIAPAS: Along road from Ocuilapa to Tuxtla, altitude 335 to 915 meters, August 29, 1895, *Nelson* 3071 (type collection; G, N).

The structures described as squamellae in this species are evidently strictly homologous with the lateral lobes of the awns found in many other species, representing the latter in their extreme development. *F. collodes* differs from the other Mexican species in its comparatively large, ovate, obscurely reticulate leaves and few large heads.

7. *Flourensia pringlei* (A. Gray) Blake, Proc. Amer. Acad. 49: 375. 1913.

*Helianthella pringlei* A. Gray, Proc. Amer. Acad. 21: 389. 1886.

*Encelia oblonga* Robins. & Fern. Proc. Amer. Acad. 30: 118. 1894.

Stems numerous, suffrutescent, erect from a woody base, 30 to 40 cm. high, nearly simple or much branched, leafy, yellowish green becoming grayish, striate, glabrous; leaf blades 3.2 to 10 cm. long, 1.4 to 4.3 cm. wide, nearly uniform, elliptical-oblong to oblong-lanceolate, from round-tipped to acute, cuneate at base, with narrow crustaceous tuberculate-hispidulous margin, somewhat resinous, often strigillose on margin, otherwise glabrous, venose, the lateral veins 7 to 11 pairs; petioles broad, flat, 1 to 2 mm. long; heads solitary at tips of stems and branches, 2.5 to 4 cm. wide, on striate glabrous peduncles 6 to 13.5 cm. long; disk 1.3 to 1.5 cm. high, 1.5 to 2.5 cm. wide (in fruit 3 cm. wide); involucre 2-seriate, subequal or the outer phyllaries longer and overtopping the disk, often with some similar calyculate bracts at apex of peduncle, 1.3 to 2.3 cm. high, the phyllaries linear-attenuate from a thickened, ovate or lanceolate base, resinous and sparsely ciliolate; rays 14 to 20, golden-yellow, oval or oblong-oval, glabrous, 1 to 1.3 cm. long, 3.5 to 6 mm. wide; disk flowers glabrous, resinous, with short tube and long cylindrical throat, 5.5 mm. long (tube 0.8 mm.); pales broadened upwardly, resinous toward the obtuse apex, 11 mm. long; achenes at maturity strongly thickened, densely villous, striate, 11 mm. long, 3.7 mm. wide; awns 2, ciliolate, firm, often somewhat recurved, 5 mm. long, often deciduous at maturity; squamellae none.

TYPE LOCALITY: Rocky hills near Chihuahua City, Chihuahua, Mexico.

SPECIMENS EXAMINED:

CHIHUAHUA: Rocky hills near Chihuahua City, September 7, 1885, *Pringle* 646 (type collection of *H. pringlei*; B, G, K, N). Plains near Casas Grandes, October 10, 1891, *Hartman* 812 (type collection of *E. oblonga*; G, K).

DURANGO: Santiago Papasquiario, altitude 2,045 meters, 192 kilometers west of north from Durango City, 1896, *Palmer* 425 (B, G, K). El Oro to Guanacevi, 1898, *Nelson* 4730 (N).

*Flourensia pringlei*, the least shrubby member of the genus, is unique in its numerous low stems, its oblong subsessile leaves, and particularly in its characteristic phyllaries.

8. *Flourensia resinosa* (T. S. Brandeg.) Blake, Proc. Amer. Acad. 49: 375. 1913.

*Encelia resinosa* T. S. Brandeg. Zoe 5: 240. 1906.

Branching shrub, vernicose-resinous, the branches striate, brown, simple or again branched; leaf blades 3.3 to 6.5 cm. long, 1 to 1.8 cm. wide, narrowly oblong-elliptic, lance-elliptic, or lanceolate, acute at each end, mucronate, entire, resinous-punctate, pale green with yellowish costa, densely prominulous-reticulate, with about 18 pairs of weak lateral veins; petioles flattened, 2 to 4 mm. long; heads 1 to 4, terminal and axillary, 3.5 to 5.3 cm. wide, on peduncles 6 to 7 cm. long; disk 1.1 to 1.4 cm. high, 1.3 to 1.7 cm. thick; involucre 3-seriate, 7 to 9 mm. high, scarcely graduated, the phyllaries narrowly lanceolate, acuminate, herbaceous, infusate below, very resinous, slightly ciliolate; rays 10, oblong, golden, 1.3 to 2.2 cm. long, 5.5 to 9 mm. wide; disk corollas glabrous, 5.6 mm. long (tube 1 mm.); pales subacute, resinous at apex, 8.5 mm. long; immature achenes silky, 5 mm. long; awns 2, unequal, slender, at base strongly ampliate and more or less trifid, about 4.5 mm. long; squamellae none.

TYPE LOCALITY: Ixmiquilpan, Hidalgo, Mexico.



## SPECIMENS EXAMINED:

HIDALGO: Near Ixmiquilpan, 1831, *Schiede & Deppe* 1564 (Ber., photo. and fragm. G). Ixmiquilpan, *Ehrenberg* 35 (Ber.). Mountains, Ixmiquilpan, August, 1905, *Purpus* 1458 (type collection; G). Ixmiquilpan, 1905, *Rose, Painter & Rose* 9025 (N).

This apparently local species is distinguished from all except *F. heterolepis* by its narrowly oblong-elliptic to lanceolate, very glutinous, entire leaves and few long-peduncled, rather large heads. Ehrenberg's plant in the Berlin Herbarium was labeled by Schultz Bipontinus more than sixty years ago as a new species of *Flourensia*, under a name which has already been used three times for true *Flourensias* originally published under other generic names.

The number of the type collection is given as 1456 in the original description, but Mr. Brandege informs me that the correct number is 1458.

9. *Flourensia heterolepis* Blake, Contr. Gray Herb. n. ser. 54: 186. 1918.

*Viguiera* (?) *glutinosa* Rusby, Mem. Torrey Club 4: 211. 1895. Not *F. glutinosa* Blake, 1913.

Shrub; stem (or branch) slender, remotely leafy, olivaceous, round-angled, strongly resinous; leaf blades 7.5 to 13 cm. long, 1.4 to 2.5 cm. wide, lanceolate or narrowly elliptic-lanceolate, acuminate or acute at both ends, mucronate, resinous, entire, densely prominulous-reticulate, with about 13 pairs of lateral nerves and yellowish white costa; petioles marginless, 6 to 16 mm. long; heads 3 or 4, terminal and axillary toward ends of branches, about 4.5 cm. wide, on sparsely linear-bracted peduncles 3 to 8 cm. long; disk 1 to 1.2 cm. high, 1.5 to 1.7 cm. wide; involucre 3-seriate, very glutinous, 11 to 12 mm. high, the outer phyllaries somewhat shorter, lanceolate, acuminate to a callous apex, herbaceous, the inner longer, with a rhombic-obovate body (3.5 mm. wide), laterally chartaceous-coriaceous and glandular-fimbriatulate, and an abruptly narrowed lanceolate herbaceous tip; rays about 14, oblong, glutinous, glabrous, 2.2 cm. long, 7 mm. broad; disk corollas 5 mm. long (tube 0.6 mm.); pales scarious-margined and lacerate above, with slightly widened deltoid cuspidate erose apex, 8 mm. long; achenes (immature) cuneate, densely silky-pilose, 3.5 mm. long; awns 2, 2.7 mm. long; squamellae none.

TYPE LOCALITY: Cochabamba, Bolivia.

## SPECIMENS EXAMINED:

BOLIVIA: Cochabamba, 1891, *Bang* 977 (type collection; B, G, N).

This species, curiously similar in general features to the Mexican *F. resinosa*, is readily separated from it by its broad-based inner phyllaries.

10. *Flourensia microphylla* (A. Gray) Blake, Proc. Amer. Acad. 49: 374. 1913.

*Encelia microphylla* A. Gray, Proc. Amer. Acad. 15: 37. 1879.

Much-branched shrub, about 1 meter high, with grayish brown bark, the young branchlets purplish brown, striate, subcanescently hispid-pilose with incurved hairs; leaf blades 1.5 to 2.5 cm. long, 5 to 10 mm. wide, ovate to elliptic-ovate, acute at both ends, cuspidate, entire but somewhat wavy-margined, more or less scabrous-pubescent, particularly beneath and on margin, somewhat resinous, densely and finely prominulous-reticulate, with about 7 to 9 pairs of obscure lateral veins; petioles pubescent, 1.5 to 4 mm. long; heads solitary at tips of branches, 2.5 to 2.8 cm. wide, on bracteate peduncles 3 to 12 cm. long; disk 11 to 14 mm. high, 12 to 15 mm. thick; involucre 2 or 3-seriate, equal or the inner phyllaries elongate, 10 to 15 mm. high, the phyllaries ovate-lanceolate to narrow-lanceolate, acuminate, herbaceous, rather densely and subcanescently hispid-pilose, more or less glabrate in age; rays about 10, golden-yellow, oval, emarginate at apex, glabrous, 1 cm. long, 4 mm. wide; disk flowers glabrous, 6 mm. long (tube 1 mm.), the throat cylindrical or cylindrical-funneliform; pales rather thin, narrowed toward the blackish green apex, glandular on the keel, ciliate at apex, 7 to 11 mm. long; achenes oblong-obovate, flattish, densely pilose, subglabrate below,

4 to 5 mm. long; pappus of 2 slender, strigose, easily deciduous awns 3 mm. long, or sometimes wanting.

TYPE LOCALITY: Saltillo, Coahuila, Mexico.

SPECIMENS EXAMINED:

COAHUILA: Saltillo, August, 1878, *Parry & Palmer* 462 (type collection; G, K). Shady arroyos and hill slopes, Saltillo, 1898, *Palmer* 795 (G, N). Limestone hills, Carneros Pass, 1889, *Pringle* 2392 (B, G, K). Without definite locality, 1878, *Parry* 26 (G); in 1880, *Palmer* 589 (G, K).

Like *Flourensia resinosa*, this apparently local species finds its closest ally in a species of South America, in this case *F. suffrutescens*, from which it differs in its smaller, densely prominulous-reticulate leaves. From all other Mexican species with radiate heads, *F. microphylla* is at once distinguishable by its small leaves and usually subcanescent involucre. The awns of the pappus are often or usually deciduous at maturity, as in *F. pringlei*.

11. *Flourensia suffrutescens* (R. E. Fries) Blake, Proc. Amer. Acad. 49: 376. 1913.

*Encelia suffrutescens* R. E. Fries, Nov. Act. Soc. Sci. Upsal. IV. 1<sup>1</sup>: 83. pl. 6, f. 1-3. 1903.

Shrub, 20 to 30 cm. high, with decumbent-ascending branches about 30 cm. long; stem woody, thick, clothed with a grayish bark; branchlets fuscous, terete, rather densely spreading-pilose, the hairs with slightly enlarged glandular-tuberculate bases; leaf blades 2 to 4.2 cm. long, 8 to 12 mm. wide, narrowly elliptic or lanceolate to ovate, acute or subacuminate, mucronulate, at base cuneate to acuminate, entire, rigidly membranaceous, rather densely pilose on both sides with loose hairs slightly glandular-tuberculate at base, above bright green, beneath paler, obscurely triplinerved (the main veins about 4 pairs, obscurely distinguished from the intermediate veins), loosely prominulous-reticulate especially beneath; petioles pilose, 1 to 2.5 mm. long; heads solitary at apex of branches, 3.5 cm. wide; peduncles 7 to 11 cm. long, bearing one or two leaves, rather densely spreading-pilose, the hairs with slightly glandular-tuberculate bases; disk 9 mm. high, 12 mm. thick; involucre 2-seriate, equal, 12 to 13 mm. high, the phyllaries narrowly oblong-lanceolate or lanceolate, acuminate, herbaceous, not striate (at least when young), callous-mucronulate, loosely subcanescent-pilose outside, the hairs with slightly enlarged bases, within glabrous, 1-nerved; rays 12, linear-oblong or linear-elliptic, bidenticulate or often deeply and unequally 2-lobed, gland-dotted but subglabrous on back, 17 mm. long, 4 mm. wide; disk corollas glabrous, 5.2 mm. long (tube 1 mm.); pales gland-dotted and sparsely hispid-pilose at the blackish green, blunt or acutish, mucronulate apex, 9.5 mm. long; achene (very immature) densely silky-pilose, especially above, about 2.5 mm. long, the hairs at apex of achene simulating squamellae; awns 2, sometimes 3-cleft, unequal, slender, 3.5 mm. long or less; squamellae none.

TYPE LOCALITY: Moreno, Province of Jujuy, Argentina.

ILLUSTRATION: Nov. Act. Soc. Sci. Upsal. IV. 1<sup>1</sup>: pl. 6, f. 1-3.

SPECIMENS EXAMINED:

ARGENTINA: Rocky mountain slope, altitude 3,600 meters, Moreno, Province of Jujuy, December 16, 1901, *Fries* 926 (type collection; N).

Unique among South American species in its subcanescently pilose involucre.

12. *Flourensia hirta* Blake, sp. nov.

Divergently branched shrub, the younger branchlets purple-brown, hirtous, resinous-granular, the older gray, glabrate; leaf blades 3.5 to 4.3 cm. long, 4.5 to 9.5 mm. wide, narrowly lanceolate or linear-lanceolate, acuminate at each end, mucronate, entire, strongly prominulous-reticulate, scabrous-hirtous on both sides with ascending tuberculate-based hairs and more densely hirtous-ciliate; petioles scabrous-hirtous, 2 to 3 mm. long; heads 1 to 4 at apex of branches, 2 cm. wide, on

peduncles 1 to 5.5 cm. long, nodding in fruit; disk 9 mm. high, 8 mm. thick; involucre about 2-seriate, 7 mm. high, the phyllaries subequal, few (about 14), the outer linear-lanceolate, the inner ovate-lanceolate, obtuse or acute, slightly resinous-granular and very sparsely ciliolate; rays about 8, oblong, 6 to 7 mm. long, 2.5 mm. wide; disk corollas glabrous, 4 mm. long (tube 0.6 mm.); pales obtuse, resinous at apex, 6.5 mm. long; immature achenes silky, 3.5 mm. long; awns 2, slender, unequal, ciliolate, about 4 mm. long; squamellae none.

Type in the Berlin Herbarium, collected in the vicinity of Los Corrales, Sierra Famatina, Province Rioja, Argentina, February 7, 1879, by G. Hieronymus and G. Niederlein (no. 635). Photograph and fragments in the Gray Herbarium.

ADDITIONAL SPECIMENS EXAMINED:

ARGENTINA: Between El Jaguel and Los Cortaderos, Cordillera de la Rioja, February 21, 1879, *Hieronymus & Niederlein* 264 (Ber., fragm. G).

Readily separated from all other species of the genus by its hirtous leaves and branches.

**13. *Flourensia fiebrigii* Blake, Bot. Jahrb. Engler 54: Beibl. 119: 47. 1916.**

Branching shrub, probably erect, the younger branchlets brown, resinous-granulose, loosely puberulous, the older ones gray-brown, glabrate; leaf blades 2.7 to 5 cm. long, 8 to 14 mm. wide, lanceolate or elliptic-lanceolate or slightly obovate, acute to acuminate at each end, mucronate, entire, prominulous-reticulate with 10 to 12 pairs of lateral veins, resinous and especially in youth loosely hispid-pilose; petioles narrowly margined, 1.5 to 6 mm. long; heads 1 to 3 at ends of branches, 3 to 4 cm. wide; peduncles about 1.5 cm. long; disk 8 mm. high, 8 to 10 mm. thick; involucre 2 to 3-seriate, 5 mm. high, scarcely graduated, the phyllaries resinous-granular and more or less loosely pubescent and ciliate, the outer lanceolate or lance-ovate, acute or acutish, the inner oblong-ovate; rays about 10, golden, oblong-oval, 1.2 to 1.6 cm. long, 6 to 7.5 mm. wide; disk corollas glabrous, 4 mm. long (tube 0.7 mm.); pales truncate, mucronate, colorate and resinous at apex, 6 mm. long; immature achenes silky, 3.8 mm. long; awns 2, subequal, slender, ciliolate, 2 to 2.2 mm. long, sometimes unequally bifid; squamellae none.

TYPE LOCALITY: Near Paicho, west of Tarija, Bolivia.

SPECIMEN EXAMINED:

BOLIVIA: Slope, summit of pass, altitude 3,200 meters, near Paicho, west of Tarija, February 5, 1904, *Fiebrig* 3050 (type collection; Ber., photo. and fragm. G).

*Flourensia fiebrigii* is distinguished from other South American species by its narrow entire medium-sized prominulous-reticulate leaves and short involucre.

**14. *Flourensia polyclada* Blake, sp. nov.**

Low shrub, from a thick woody root, the short ascending or procumbent stems much branched; internodes short; branchlets short, resinous, pilose above, monocephalous; leaf blades 1.5 to 3.8 cm. long, 0.4 to 1 cm. wide, narrowly oblong or elliptic, acute at each end, mucronate, entire, with about 4 pairs of inconspicuous lateral veins, not reticulate, tuberculate-strigose especially on margin, scarcely revolute; petioles obsolete; peduncles terminating branchlets, 1.5 to 4.5 cm. long; heads 2.8 cm. wide; disk 8 to 12 (in fruit 16) mm. high, 10 to 12 (in fruit 20) mm. thick; involucre about 3-seriate, 6 to 8 mm. high, the phyllaries subequal or the inner slightly longer, narrowly lanceolate, subacute, resinous, rather sparsely pilose; rays 10, oblong-oval, 13 mm. long, 4.5 mm. wide; disk corollas somewhat resinous on tube and teeth, 4.5 mm. long (tube 1.1 mm.); pales obtuse, resinous on back, 9.8 mm. long; achenes cuneate-obovate, silky, 8.5 mm. long, 3.7 mm. wide; awns 2, unequal, lacerate, 3 to 4.7 mm. long; squamellae none.

Type in the Berlin Herbarium, collected between La Cueva and La Incurcijada, Sierra Famatina, Province Rioja, Argentina, January 31, 1879, by G. Hieronymus and G. Niederlein (no. 541). Photograph and fragments in the Gray Herbarium.

ADDITIONAL SPECIMEN EXAMINED:

ARGENTINA: La Incurcijada, January 29 to February 3, 1879, *Hieronymus & Niederlein* (Ber.).

From *F. niederleinii*, its only near relative, this species differs in its narrow leaves and narrowly lanceolate phyllaries, these not dilated at base.

15. *Flourensia niederleinii* Blake, sp. nov.

Branching shrub, probably procumbent or ascending, the younger branchlets resinous-granular, sparsely setose-hispidulous, the older ones gray, glabrate; leaf blades 2.3 to 3.5 cm. long, 1.1 to 1.8 cm. wide, ovate to oblong-ovate, acute, mucronate, cuneate or rounded at base, entire, with 7 to 10 pairs of lateral veins, not reticulate, resinous-granular and rather sparsely strigillose on both sides, along costa beneath sparsely hispid-pilose; petioles resinous-granular, more or less hispid, 3 to 8 mm. long; heads 1 to 3 at apex of branches, 2.5 to 3.3 cm. wide, on peduncles 2 to 4 cm. long; disk 8 to 11 mm. high, 1 to 1.3 cm. thick; involucre 2-seriate, 7.5 to 9 mm. high, the phyllaries subequal or the outer frequently longer, linear-lanceolate or linear-spatulate from a short, lance-ovate, blackish green base, resinous-granular and sparsely hispidulous; rays about 8, oblong-oval, 1.2 to 1.6 cm. long, 4.5 to 6.5 mm. wide; disk corollas glabrous, 4 mm. long (tube 0.5 mm.); pales subacute, at apex colorate, resinous, and minutely erose, 6.5 mm. long; achenes cuneate-obovate, silky, 5 mm. long, 2.5 mm. wide; awns 2, ciliolate, at base strongly ampliate and deeply lacerate, unequal, about 3 mm. long; squamellæ none.

Type in the Berlin Herbarium, collected at Cuesta Miranda, Sierra Famatina, Province Rioja, Argentina, March 10, 1879, by G. Hieronymus and G. Niederlein (no. 876). Photograph and fragments in the Gray Herbarium.

*Flourensia niederleinii* is distinguished from *F. polyclada* by its ovate or oblong-ovate leaves, and by its phyllaries, which are linear-lanceolate or linear-spatulate from an ovate-lanceolate base; from *F. campestris* and *F. riparia* by its characteristic phyllaries and its much smaller leaves.

16. *Flourensia campestris* Griseb. Abh. Ges. Wiss. Göttingen 19: 184. 1874.

*Helianthus campestris* Kuntze, Rev. Gen. Pl. 3<sup>2</sup>: 157. 1898.

Branching shrub, about 2 meters high; branches resinous-granulose, somewhat hispidulous, the older gray, glabrate; leaf blades 5 to 9 cm. long, 1.3 to 3.4 cm. wide, lanceolate to ovate or oblong-lanceolate, acuminate, mucronate, cuneate to rounded at base, entire or rarely slightly denticulate with appressed teeth, usually resinous-granulose, with about 13 pairs of lateral veins, prominulous-reticulate especially beneath; petioles 3 to 13 mm. long; heads in cymose panicles of 5 to 15 at ends of branches, on terminal and axillary leafy-bracted peduncles; pedicels 0.8 to 2.5 cm. long; heads 2.5 cm. wide; disk 8 to 11 mm. high, 7 to 10 mm. thick; involucre 2-seriate, 4 to 5 mm. high, the phyllaries lance-subulate, subobtuse, loose, resinous-granulose; rays about 8, oval to oblong-oval, 7 to 10 mm. long, 3.3 to 4.3 mm. broad; disk corollas about 16 to 23, resinous on the teeth, 4.5 mm. long (tube 0.9 mm.); pales truncate-mucronulate, resinous at apex, 8 mm. long; achenes blackish, ciliate on the whitish margin, pubescent on the sides, 5 to 6.5 mm. long; awns 2, ciliolate, 3.5 mm. long; squamellæ none.

TYPE LOCALITY: Field southeast of Córdoba, Argentina.

SPECIMENS EXAMINED:

ARGENTINA: Abundant in field southeast of Córdoba, 1871, *Lorentz* 245 (type; Ber., fragm. G). Puesto de San José, upper side of the Caleras Sierra near Córdoba, 1876, *Hieronymus* 276 (Ber., N). Sierra Chica de Córdoba, la Falda de la Pumilla, 1876, *Hieronymus* 623 (Ber., N). Between San Rouque

and Malagueña, Sierra Chica, January 13, 1871, *Hieronymus* (Ber.). Río Zeballos, Sierra Chica, January 13, 1878, *Galander* (B, Ber.). Córdoba, *Schuyder* (Ber.); September, 1892, *Kuntze* (Ber., N); *Lorentz* 664 (Ber.).

Distinguished from *F. riparia* chiefly by the smaller heads with fewer disk florets (29 to 40 in *F. riparia*). Furthermore, *F. riparia* has looser panicles with longer-peduncled heads.

**17. *Flourensia riparia* Griseb. Abh. Ges. Wiss. Göttingen 24: 196. 1879.**

*Helianthus riparia* Kuntze, Rev. Gen. Pl. 3<sup>2</sup>: 157. 1898.

Branching shrub; branches somewhat resinous, the youngest striate, puberulous; leaf blades 6 to 13 cm. long, 1.5 to 5 cm. wide, oblong-lanceolate to oblong-ovate or elliptic-ovate, acute to acuminate, acute at base, entire, rather thin, minutely puberulous, resinous-granulose, at length subglabrate, somewhat prominulous-reticulate beneath; petioles hirsutulous, 3 to 8 mm. long; heads cymose-paniculate at ends of branches, 3.6 to 4 cm. wide, nodding in fruit; pedicels resinous, puberulous, bracteate, 3 to 5.6 cm. long; disk 1 to 1.2 cm. high, 1.1 to 1.5 cm. wide; involucre 3-seriate, 5 to 6 mm. high, the phyllaries lance-subulate to lance-ovate, loose, resinous, ciliolate, subequal; rays about 10, oblong, 1.4 to 2 cm. long, 3.6 mm. wide; disk corollas 29 to 40, resinous on the teeth, 5 mm. long (tube 0.8 mm.); pales resinous at apex, subtruncate, 7 mm. long; achenes flattish, striate, villous-ciliate, sparsely puberulous above, 6 to 6.5 mm. long, 2.8 to 3 mm. wide; awns 2, ciliate, slightly widened below, unequal, 4 to 4.2 mm. long; squamellae none.

TYPE LOCALITY: Passage of the Río Turamento, Province of Salta, Argentina.

SPECIMENS EXAMINED:

ARGENTINA: Passage of the Río Turamento, Province of Salta, February, 1873, *Hieronymus* & *Lorentz* 268 (type; Ber., N, photo. and fragm. G). Sierra between El Rincón and Clavisan, fluvial district of the Río del Tala, Province of Salta, 1873, *Lorentz* & *Hieronymus* (Ber.).

This species is very closely related to *F. campestris*, but may be distinguished by its larger heads and more numerous disk florets.

**18. *Flourensia tortuosa* Griseb. Abh. Ges. Wiss. Göttingen 19: 184. 1874.**

Branching shrub, about 2 meters high; younger branches more or less flexuous, resinous-granulose, more or less pubescent, 1 to 3-capitate; leaf blades 3.2 to 10.5 cm. long, 1.3 to 3 cm. wide, lanceolate to ovate-lanceolate, ovate, or oval, acute to acuminate or obtuse, sharply mucronate, cuneate or rounded at base, entire, prominulous-reticulate (lateral veins 5 to 11 pairs), sparsely resinous-granulose, slightly puberulent especially when young, narrowed into scarcely margined petioles 2.5 to 15 mm. long; peduncles 1 to 3.8 cm. long; heads 6 to 7 cm. broad; disk 10 to (fruit) 15 mm. high, 11 to 18 mm. wide; involucre 3-seriate, 7 to 11 mm. high, the phyllaries variable, equal or unequal, broadly ovate to oblong, at least the outer with gradually or abruptly narrowed lanceolate tips, the inner acute or rarely obtusish, all striate, resinous-granular, ciliolate, the inner thinner, erose-ciliate; rays 10, broadly oblong, minutely emarginate to deeply bilobed, 1.8 to 3 cm. long, 7 to 10 mm. broad; disk corollas glabrous, 4.2 mm. long (tube 0.7 mm.); pales ampliate and resinous above, truncate and erose-ciliolate at apex, 1 cm. long; achenes (immature) silky-villous, 6 mm. long; awns 2, unequal, slender, sometimes unequally bifid, up to 3.5 mm. long; squamellae none.

TYPE LOCALITY: Between Belén and Yacutula, Province Catamarca, Argentina.

SPECIMENS EXAMINED:

ARGENTINA: Fields between Belén and Yacutula, *Lorentz* 479 (type collection; Ber., fragm. G). Yacutula, 1878, *Schickendantz* 166 (Ber., photo. G); in 1879, *Schickendantz* 4 (Ber., fragm. G). Quebrada de Villavil, 1876, *Schickendantz* 166 (Ber.). Catamarca, 1896, *Bettfreund* 1125 (Ber.). Department of Andalgalá, 1916, *Jørgensen* 1273 (G).

This species and the next are distinguished by their broadly ovate or oval phyllaries. In the present plant these are provided with abruptly narrowed tips which are wanting in *F. oolepis*.

**19. *Flourensia oolepis* Blake, sp. nov.**

Branching shrub; branchlets densely resinous-granular, 1 or 2-headed; leaf blades 5.5 to 8.5 cm. long, 2 to 3.2 cm. wide, elliptic-lanceolate or elliptic, acuminate at each end, entire or with a few acute teeth above, reticulate-venulose with about 12 pairs of lateral veins, resinous-granular and minutely puberulous with several-celled hairs chiefly along veins and veinlets; petioles about 1 cm. long, marginate above, resinous; peduncles resinous, minutely puberulous at apex, 4 to 6 cm. long; heads 3 to 3.5 cm. wide; disk 1 to 1.2 cm. high, 1.7 to 2.1 cm. thick; involucre 4-seriate, 7 to 8 mm. high, graduated, the outer phyllaries broadly ovate (5 to 5.5 mm. long, 2.5 to 4 mm. wide), the inner gradually more oblong, all more or less striate, acutish, mucronate, densely resinous-granular, ciliolate; rays 12 to 16, linear-oblong, 12 mm. long, 2.5 mm. wide; disk corollas sparsely resinous, 4.5 mm. long (tube 1 mm.); pales widened above, subtruncate and resinous at apex, strongly striatulate, 7 mm. long; achenes obovate, silky except toward margin, 5.5 to 6.5 mm. long; awns 2, strongly ampliate and deeply lacerate at base, 4 mm. long; true squamellae none.

Type in the Berlin Herbarium, collected at Cuesta de la Oyada, Sierra Achala de Córdoba, Argentina, March 22, 1876, by G. Hieronymus. Photograph and fragments in the Gray Herbarium.

ADDITIONAL SPECIMEN EXAMINED:

ARGENTINA: Foot of the Cuesta de la Chacras, near Devisaderos, Tanninga, etc., west side of the Sierra de Córdoba, February 14, 1876, *Hieronymus* (Ber.).

*Flourensia oolepis* is distinguished from its only near relative, *F. tortuosa*, by the acutish, not abruptly narrow-tipped, phyllaries.

**20. *Flourensia leptopoda* Blake, sp. nov.**

Branching shrub; younger branchlets purplish, resinous-granulose, the older ones brown; leaf blades 3 to 4.5 cm. long, 1.3 to 2.5 cm. wide, rhombic-ovate, acuminate, mucronate, cuneate at base, deeply and irregularly repand-dentate with 4 to 6 pairs of cuspidate teeth, lucid, reticulate-venose with about 10 pairs of lateral veins, glabrous or beneath resinous-granular and very slightly hispidulous; petioles slender, 8 to 12 mm. long; heads 1.5 cm. wide, racemose-paniculate on 1 to 3-headed terminal and axillary peduncles; disk 8 mm. high, 8 mm. thick; involucre 2-seriate, 4 to 5 mm. high, the phyllaries equal, lanceolate or lance-subulate, subobtuse, resinous-granular and very sparsely strigillose; rays oval, tridenticulate, 7 mm. long, 4.5 mm. wide; disk corollas glabrous, 4.5 mm. long (tube 1.2 mm.); pales resinous, obtuse, 5.5 mm. long; immature achenes silky, 3.5 mm. long; awns 2, ciliate, slightly flattened, 3 mm. long; squamellae none.

Type in the Berlin Herbarium, collected at Farrecillas (?), Province Rioja, Argentina, March 5, 1906, by J. S. Urriche. Photograph and fragments in the Gray Herbarium.

Readily distinguished by its deeply dentate rhombic-ovate leaves on long slender petioles. Like others of the same genus, this species bears the vernacular name "maravilla."

**21. *Flourensia thurifera* (Molina) DC. Prodr. 5: 592. 1836.**

*Helianthus thurifer* Molina, Sagg. Stor. Nat. Chil. 160. 1782.

*Helianthus glutinosus* Hook. & Arn. Bot. Beechey Voy. 32. 1830.

*Tithonia glutinosa* Collie; Hook. & Arn. Bot. Beechey Voy. 32. 1830, as synonym.

*Diomedea thurifera* Bertero; Colla, Mem. Accad. Sci. Torino 38: 37. pl. 31. 1835.

*Flourensia besseriana* Meyen & Walp. Nov. Act. Acad. Caes. Leop. Carol. 19: Suppl. 1: 270. 1843.

*Flourensia thurifera*  $\gamma$  *lanceolata* Remy; Gay, Fl. Chil. 4: 288. 1849.

*Helianthus besseriana* Benth. & Hook.; Hook. & Jacks. Ind. Kew. 1<sup>2</sup>: 1112. 1893, as synonym.

Erect resinous shrub, 2 meters high, the branches striate, greenish brown or yellowish brown, the young branchlets purplish brown, sparsely pubescent; leaf blades 5.5 to 10 cm. long, 1.5 to 3.5 cm. wide, elliptic or ovate to oblong-elliptic, subacuminate to obtuse at apex, mucronate, cuneate at base, shallowly repand-dentate with 4 to 7 pairs of coarse depressed-triangular mucronate teeth or rarely subentire, thickish, resinous, with a few loose hairs on midvein beneath, prominulous-reticulate with 7 to 12 pairs of conspicuous lateral veins; petioles 2 to 5 mm. long; upper leaves reduced and often entire; heads 3.5 to 7 cm. wide, 2 to 6 at ends of branches on naked or linear-bracted, terminal and axillary, 1-headed peduncles 3 to 13 cm. long; disk 10 to 14 mm. high, 1.4 to (fruit) 2.5 cm. wide; involucre 2 or 3-seriate, subequal or with the outer phyllaries shorter, 1 to 2 cm. high, the phyllaries oblong-lanceolate or lanceolate to oblong-spatulate, acute, loose, herbaceous, thickish, slightly ciliate; rays about 12, oval to oval-oblong, golden-yellow, barely emarginate, glabrous, 1.4 to 2.6 cm. long, 5 to 10 mm. wide; disk corollas 5.5 mm. long (tube 1 mm.), the throat slender-funnel-form; pales widened upwardly, scarious-margined, obtuse, often mucronate, blackish green at apex, 9 to 10 mm. long; achenes oblong-obovate, thickened, villous, 6.5 to 7.5 mm. long, 3 to 3.6 mm. wide; awns 2, stoutish, ciliate, somewhat flattened, 3 to 3.5 mm. long, one or both often split nearly or quite to base, forming 1 or 2 lateral squamelloid awns.

TYPE LOCALITY: Vicinity of Valparaiso, Chile.

ILLUSTRATION: Mem. Accad. Sci. Torino 38: pl. 31.

SPECIMENS EXAMINED:

CHILE: Coquimbo, *Gaudichaud* 84 (G). Valparaiso or vicinity, 1825, *Macrae* (K); in 1830, *Bertero* 954 (B); in 1830, *Bridges* (B, G, K); in 1831, *Cuming* 631 (B, K); in 1832, *Bridges* 234 (B, K); in 1856, *Harvey* (G, K); in 1882, *Philippi & Borchers* (B); in 1914, *Rose* 19113 (N); *Gaudichaud* 153 (G); *Wilkes Exploring Expedition* (G, N); *Moseley* (B); *Reed* (B). Santiago, 1855, *Germain* (B, K); *Philippi* 592 (B), 560 (Ber.). San Cristóbal, near Santiago, 1900, *Hastings* 137 (N). Las Esmeraldas, Department Melipilla, October, 1867, *Reed* (K). Common on hills about Llaillai, 1904, *Scott Elliot* 357 (B). Commonest shrub of foothills, Los Andes, 1904, *Scott Elliot* 415 (B). Without definite locality, *Besser* (type of *F. besseriana*; Ber., photo. and fragm. G); *Cruikshanks* 155 (K); *Gay* (G, K).

*Flourensia thurifera*, the commonest South American species in herbaria, is usually readily recognized by its large, elliptic to oblong-elliptic, coarsely but shallowly dentate leaves and large involucre of oblong-lanceolate to oblong-spatulate phyllaries. Although Molina's original account<sup>12</sup> of the species is very short, and his description of the leaves decidedly unsatisfactory, his general account of the plant and its habitat is sufficient to justify the retention of the name in the sense in which it has been used by all subsequent authors. The species bears the vernacular name "maravilla," like others of the genus, and its resin is used for incense in the churches.

## 22. *Flourensia angustifolia* (DC.) Blake.

*Flourensia thurifera*  $\beta$  *angustifolia* DC. Prodr. 5: 592. 1836.

Glutinous branching shrub, 0.5 meter high; younger branches and peduncles somewhat sordid-puberulous; leaf blades 3.5 to 7.2 cm. long, 7 to 13 mm. wide, narrowly

<sup>12</sup> "Nelle colline adiacenti al porto de Valparaiso si trova una specie di Girasole *Helianthus thurifer*(\*) di consistenza legnosa, dal quale scola ancora una sostanza resinosa, che simiglia per la forma, e per l'odora al vero incenso." (Molina, loc. cit. in text.) "(\*) *Helianthus caule fruticoso, foliis lineari-lanceolatis*." (Footnote, loc. cit.)

oblong-lanceolate or lanceolate, acute to acuminate at both ends, slightly repand-denticulate or subentire, resinous-granulose, reticulate, the 15 to 22 pairs of lateral veins scarcely prominulous; petioles margined, 2 to 3 mm. long; heads 3 to 6 at ends of branches, 3 to 4 cm. broad; peduncles axillary and terminal, 1.5 to 6.5 cm. long; disk 8 to 10 mm. high, 8 to 15 mm. thick; involucre 2 or 3-seriate, 6 to 8.5 mm. high, the phyllaries linear-lanceolate (0.8 to 1 mm. wide), subequal, subacute, gradually narrowed from base to apex, resinous-granulose, sparsely ciliate; rays 8, oblong, 1.2 to 1.9 cm. long, 4 to 7 mm. broad; disk corollas somewhat resinous-granulose, 4.5 to 5 mm. long (tube 1 to 1.2 mm.); pales obtuse, resinous-granulose, 8 mm. long; achenes scarcely thickened at maturity, densely silky-villous, 8 mm. long; awns 2, slender, subequal, 4 mm. long; squamellae none.

TYPE LOCALITY: Tarma, Peru.

SPECIMENS EXAMINED:

PERU: Tarma, *Dombey* 24 (cotype collection; Ber., photo. G., Prod.). Abundant, dry slopes, Tarma, Department of Junin, altitude 3,000 to 3,500 meters, 1903, *Weberbauer* 2385 (Ber., fragm. G).

*Dombey's* plant is labeled "Chile" in the Prodrusus Herbarium, but a specimen from *Dombey* in the Berlin Herbarium, presumably of the type collection of DeCandolle's variety, is marked as from Tarma, whence also comes *Weberbauer* 2385, the only other collection of this species examined. *Flourensia angustifolia* is distinguished from *F. thurifera* by its narrowly oblong-lanceolate or lanceolate, denticulate or subentire leaves and shorter involucre of linear-lanceolate phyllaries.

23. *Flourensia macrophylla* Blake, Bot. Jahrb. Engler 54: Beibl. 119: 47. 1916.

Branching shrub, the younger branchlets resinous, slightly puberulous; leaf blades 5 to 8.3 cm. long, 2 to 4 cm. wide, oval or oblong-oval, acute or subobtuse, mucronate, broadly cuneate at base, shallowly cuspidate-denticulate above the entire lower third with 11 to 17 pairs of teeth, strongly prominulous-reticulate with 12 to 16 pairs of lateral veins, shining, resinous-granular; petioles narrowly margined, 1.5 to 3 mm. long; heads 2 cm. wide, in cymose panicles of 1 to 3, at apex of terminal and axillary peduncles 3 to 5.5 cm. long; disk 7 to 7.5 mm. high, 8 to 11 mm. thick; involucre 3-seriate, 7 to 8 mm. high, the phyllaries subequal, lanceolate or oblong-lanceolate, not widened above, subacute, resinous-granular and very sparsely ciliate, the outer loose; rays about 8, oval, 8 mm. long, 3.5 mm. wide; disk corollas resinous on teeth, 3.5 mm. long, the tube 0.8 mm. long, gradually widened into the throat; pales colorate and resinous at apex, scarcely mucronate, 6.5 mm. long; immature achenes silky, 3.5 mm. long; awns 2, slender, ciliate, 2.2 mm. long; squamellae none.

TYPE LOCALITY: Between Matucana and Tambo de Viso, Peru.

SPECIMENS EXAMINED:

PERU: Stony places, altitude 2,370 to 2,650 meters, along Lima-Oroya Railroad, between Matucana and Tambo de Viso, December 26, 1901, *Weberbauer* 119 (type, Ber., photo. and fragm. G).

This species may be separated from *F. thurifera* and *F. angustifolia* by its oval or oblong-oval, regularly denticulate leaves, small heads, and small rays.

#### EXCLUDED SPECIES.

*FLOURENSIA ATACAMENSIS* (Phil.) Reiche, Anal. Univ. Chile 112: 146. 1903.

*Helianthus atacamensis* Phil. Anal. Mus. Nac. Chile Bot. 1891: 48. 1891.

This species, of which I have examined authentic material in the Berlin Herbarium, is identical with *Viguiera pazensis* Rusby.<sup>13</sup>

*FLOURENSIA CORYMBOSA* DC. Prodr. 5: 592. 1836.

This species is properly known as *Viguiera revoluta* (Meyen) Blake.<sup>14</sup>

<sup>13</sup> See Blake, Contr. Gray Herb. n. ser. 54: 142. 1918.

<sup>14</sup> Contr. Gray Herb. n. ser. 54: 121. 1918.



FLOURENSIA CORYMBOSA ARAUCANA (Phil.) Reiche, Anal. Univ. Chile 112: 145. 1903.

*Helianthus araucanus* Phil. Anal. Univ. Chile 90: 39. 1895.

Identical with *Viguiera revoluta* (Meyen) Blake.

FLOURENSIA CORYMBOSA LANCEOLATA (Meyen) Reiche, Anal. Univ. Chile 112: 144. 1903.

*Helianthus lanceolatus* Meyen, Reise um die Erde 1: 311. 1834.

A synonym of *Viguiera revoluta* (Meyen) Blake.

FLOURENSIA GAYANA (Phil.) Reiche, Anal. Univ. Chile 112: 145. 1903.

*Helianthus gayanus* Phil. Anal. Univ. Chile 90: 39. 1895.

Apparently this plant is identical with *Viguiera revoluta* (Meyen) Blake, in which the phyllaries are sometimes appressed as here described by Philippi.

FLOURENSIA HISPIDA Phil. Anal. Univ. Chile 36: 186. 1870.

Identical with *Viguiera gilliesii* (Hook. & Arn.) Hieron.<sup>16</sup>

FLOURENSIA NAVARRI (Phil.) Reiche, Anal. Univ. Chile 112: 145. 1903.

*Helianthus (Flourensia) navarri* Phil. Anal. Univ. Chile 90: 37. 1895.

From Philippi's and Reiche's descriptions this is probably a *Wedelia*, but no specimen has been seen by the writer and the status of the species is uncertain. It can not be a *Flourensia* in any case.

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<sup>16</sup> See Blake, Contr. Gray Herb. n. ser. 54: 120. 1918.