

NEW AMERICAN ASTERACEAE.

By S. F. BLAKE.

INTRODUCTION.

The new species of Asteraceae described in this paper are for the most part the result of several years' work in the identification of material of this family in the National Herbarium. A few are based on material in the Gray Herbarium, the herbarium of the Field Museum of Natural History, and the herbarium of the New York Botanical Garden. In most cases the new species have been worked up in connection with the preparation of preliminary keys for the genera concerned or keys to the species of definite regions, particularly Mexico and northern and western South America.

VERNONIEAE.

Vernonia durangensis Blake, nom. nov.

Eremosis ovata Gleason, Bull. Torrey Club 40: 331. 1913. Not *Vernonia ovata* Less. 1829.

Vernonia gleasoni Blake, Contr. Gray Herb. n. ser. 52: 17. 1917. Not *V. gleasonii* Ekman, Ark. för Bot. 13¹⁵: 54. 1914.

Vernonia stellata (Spreng.) Blake.

Conyza stellata Spreng. Neu. Entd. 2: 142. 1821.

Vernonia oppositifolia Less. Linnaea 4: 273. 1829.

Excellent specimens of this species, remarkable for its opposite leaves, are in the National Herbarium, collected in the State of Rio de Janeiro, Brazil, in 1921 by E. W. D. and Mary M. Holway (nos. 1036, 1168, 1233).

EUPATORIEAE.

Jaliscoa pappifera Blake, sp. nov.

Herbaceous above, 1.6 to 2.5 meters high; stem rather stout, ternately branched above, obscurely appressed-puberulous; leaves ternate on the stem, opposite on the branches; petioles slender, naked, obscurely puberulous, 3 to 25 mm. long; leaf blades ovate or broadly ovate, 5 to 15.5 cm. long, 2.2 to 10.5 cm. wide, acuminate, at base cuneate, membranaceous, crenate-serrulate with rounded or acute mucronulate teeth above the base, above obscurely puberulous on the nerves and sometimes on surface, beneath equally green, obscurely incurved-puberulous along the veins or subglabrous, triplinerved above the base, the chief veins prominulous beneath; heads very numerous at apex of stem and branches, the individual dense cymose panicles 4 to 8 cm. wide; pedicels slightly puberulous, 3 mm. long or less; heads about 9 mm.

high, 14 or 15-flowered; involucre sub-2-seriate, 3.5 mm. high, subequal, the phyllaries linear, greenish, obtuse or acutish, incurved-puberulous and ciliolate; corollas whitish (?), glabrous, 4.8 mm. long; achenes linear-prismatic, 4-angled, hispidulous above, 2.5 mm. long; pappus a lacerate-fimbriate crown about 0.3 mm. high.

Type in the U. S. National Herbarium, no. 460316, collected on bluffs of a barranca near Cuernavaca, Morelos, Mexico, altitude 1,370 meters, November 23, 1902, by C. G. Pringle (no. 9931). Also collected by Pringle (no. 6158) in the same locality, November 10, 1895, at an altitude of 1,525 meters.

The only species of the genus previously known, *Jaliscoa pringlei* S. Wats., which has been found only at Guadalajara, Jalisco, is distinguished by its sharply serrate leaves, which are loosely glandular-puberulous beneath, and by the reduction of its pappus to an obscure entire callous border. When more specimens are collected, *J. pappifera* may prove to connect with *J. pringlei*, but the material now at hand shows no sign of intergradation. The stems of both species are always more or less riddled by elliptical holes, undoubtedly made by weevils, which sometimes extend quite through the stem.

***Ageratum elassocarpum* Blake, sp. nov.**

Herbaceous above, probably suffrutescent below, the base not seen; stem slender, simple or branched above, 40 cm. high and more, terete, densely puberulous with incurved hairs with somewhat swollen subglandular bases; internodes 1.5 to 8.5 cm. long; leaves opposite, or the upper sometimes alternate; petioles naked, flattened above, densely incurved-puberulous, mostly 7 to 17 mm. long; leaf blades ovate or triangular-ovate, 4 to 7 cm. long, 1.5 to 3 cm. wide, narrowed to an obtuse apex, cuneate at base, crenate-serrate (teeth blunt, about 10 pairs), firm-papery, above dull green, densely scabrid-puberulous with subtuberculate-based, mostly deciduous hairs, beneath dull green, densely dotted with dull glands and minutely puberulous (the hairs longer along the veins), impressed-veined above, triplinerved above the base and loosely prominulous-reticulate beneath; peduncles terminating stem and branches, 2 to 6 cm. long, bearing 11 to many heads in a close cymose panicle 2 to 4.5 cm. wide, the incurved-puberulous and somewhat glandular pedicels 2 to 6 mm. long; heads about 5 mm. high, 2 mm. thick, about 31-flowered; involucre 2-seriate, equal, 3 mm. high, the firm linear phyllaries strongly 2-ribbed, incurved-puberulous, acuminate, callous-pointed; receptacle paleaceous, the pales narrowly linear, acuminate, somewhat glandular, sparsely lacerate-ciliate, 3 mm. long; corollas sparsely glandular-pubescent, 2 mm. long; achenes prismatic, 5-angled, narrowed at base, glabrous, blackish, 1.3 mm. long; pappus coroniform, denticulate, 0.2 mm. long.

Type in the U. S. National Herbarium, no. 567021, collected on the Sierra de Tonalá, Chiapas, Mexico, September, 1913, by C. A. Purpus (no. 6628).

A member of the section *Coelestina*, related to *Ageratum salicifolium annectens* Blake, but readily separated by its ovate, merely crenate leaves. From *A. paleaceum* and *A. albidum*, the two Mexican species of *Coelestina* with paleaceous receptacle included in Robinson's revision of the genus,¹ it is readily distinguished by the fact that the leaves are not tomentose beneath. The type was distributed as *A. corymbosum* Zuccagni.

***Ageratum salicifolium annectens* Blake, subsp. nov.**

Receptacle paleaceous except in the center with linear-subulate pales, these about 5 mm. long, 0.3 mm. wide, bearing a few hairs toward tip; otherwise exactly as in the typical form.

Type in the U. S. National Herbarium, no. 382086, collected on mountain side above Cuernavaca, Morelos, Mexico, altitude 1,830 meters, October 19, 1900, by C. G. Pringle (no. 9045).

¹ Proc. Amer. Acad. 49: 468. 1913.

An interesting form, connecting the two primary groups into which the section *Coelestina* is divided by Dr. B. L. Robinson in his revision of the genus. The specimen of the same number in the Gray Herbarium has the naked receptacle characteristic of true *A. salicifolium* Hemsl., but is indistinguishable from the specimen in the National Herbarium in any other character that I have been able to discover. Apparently the case is strictly comparable with that of the presence or absence of pappus in otherwise indistinguishable forms found in various genera of Asteraceae, and particularly in the Verbesininae.

Stevia flourensioides Blake, sp. nov.

Shrub 35 cm. high and probably much more, oppositely branched, strongly viscid, the stem stoutish, brownish-barked, glabrous below, incurved-puberulous with sordid hairs above especially in the region of the inflorescence; leaves opposite, often bearing short leafy branches in their axils; blades elliptic or oblong-elliptic, 3.5 to 6 cm. long, 5 to 16 mm. wide, acute to obtuse, cuneately narrowed into a petioliform, narrowly margined base 1.5 to 4 mm. long, entire, thick, coriaceous, dotted, obscurely feather-veined, glabrous except for a light ciliation; heads in dense clusters at the tips of the ternately arranged branches of the panicle, forming a flattish or convex corymbiform panicle usually 4.5 to 6.5 cm. wide, bracted with small leaves; involucre 7 to 8 mm. high, the phyllaries 5, firm, greenish, brownish toward apex, linear-oblong, obtuse to acute or short-acuminate, viscid and sparsely ciliate toward apex; flowers 5 or 6; corollas white, 7 to 8 mm. long, glandular essentially throughout; achenes (scarcely mature) 5-angled, hispidulous, 3 to 3.8 mm. long; pappus a crown of fimbriatulate, more or less united squamellae 0.2 mm. long or less.

Type in the U. S. National Herbarium, no. 570301, collected on Mount Ixtaccihuatl, State of Mexico, Mexico, altitude 3,355 to 3,660 meters, on rocks, January, 1906, by C. A. Purpus (no. 1470).

The type collection was distributed as *Stevia vernicosa* Greenm., which has smaller serrulate leaves and a pappus of squamellae and long awns. *S. flourensioides* is readily distinguished by its entire, very viscid, subsessile leaves and its very short pappus.

Stevia integra Blake, sp. nov.

Fruticose, 25 cm. high or less, with few opposite branches; stem brownish, incurved-puberulous above especially in the inflorescence, glabrous below; leaves opposite, or the upper alternate; blades elliptic or elliptic-obovate, 17 to 25 mm. long, 4.5 to 9 mm. wide, acute or obtusish, narrowed into a narrowly margined petioliform base 5 to 8 mm. long, thick, entire, triplinerved or 1-nerved, dotted, at first sparsely incurved-pubescent, soon glabrous or sparsely pubescent merely on the costa beneath; peduncle 2.5 to 3.5 cm. long; panicles dense, flattish, corymbiform, 1 to 2.8 cm. wide; heads 9 mm. high, 5-flowered; involucre 6 mm. high, the phyllaries 5, linear-elliptic, obtuse, green, sparsely puberulous with glanduliform hairs; corollas white, stipitate-glandular chiefly below, 6 to 6.5 mm. long; achenes 5-angled, hispidulous, 3.8 mm. long; pappus of about 7 oblong, obtuse, sparsely denticulate, more or less united squamellae 0.5 to 1.4 mm. long, rarely also with a single awn 4.8 mm. long.

Type in the U. S. National Herbarium, no. 842014, collected on the Sierra de la Paila, Coahuila, Mexico, October, 1910, by C. A. Purpus (no. 4722).

Distinguished among the shrubby species of the genus by its small, elliptic or elliptic-obovate, strictly entire leaves with obscure veins, and by the lack of any marked viscosity.

Stevia pelophila Blake, sp. nov.

Slender perennial herb, erect, 30 cm. high, simple below the inflorescence; root apparently short, with many elongate fibrous rootlets; stem glabrous below, sparsely appressed-puberulous above; middle internodes 1.8 to 4 cm. long; leaves opposite below the inflorescence, linear, 2.5 to 3.8 cm. long, 1 to 1.8 mm. wide, obtuse, sessile, fleshy, entire, glabrous, 1-nerved, mostly erect; heads 2 to 5 at apex of stem and of

the few short branches, on pedicels 2 to 12 mm. long; heads slender, 14 mm. high, 5-flowered; involucre subequal, 7 mm. high, the phyllaries 5, linear-oblong, obtuse to subacuminate, obscurely ciliolate, otherwise glabrous, purplish-tinged, with indurate center and thin margins, 3-nerved; corollas flesh-colored, 8.5 mm. long, the tube and throat tubular-funnelform, sparsely glandular and pubescent, the tube 0.5 mm., the throat 5 mm. long, pilose within at apex with several-celled hairs, the 5 teeth oval-ovate, obtuse, 2-nerved, 3 mm. long, 1.2 mm. wide; achenes (submature) slender, hispidulous above, 5.5 mm. long; pappus of 3 narrowly subulate, hispidulous, purplish-tinged awns 5 mm. long, narrowly paleaceous-margined toward base, and about 7 unequal oblong lacerate squamellae about 0.8 mm. long.

Type in the U. S. National Herbarium, no. 1,038,785, collected in the State of Durango, Mexico, altitude 100 meters, in mud, by P. Ibaña García (no. 387).

Stevia tephrophylla Blake, sp. nov.

PLATE 54.

Shrub about 25 cm. high, oppositely branched, the stem stout, like the branches densely cinereous-tomentulose; leaves opposite, longer than the internodes, often with fascicles in their axils, the blades ovate to oval, 15 to 20 mm. long, 7 to 13 mm. wide, obtuse, cuneately and rather abruptly narrowed into margined petioles 3 to 5 mm. long, crenulate, thick-herbaceous, triplinerved or penninerved with the nerves conspicuous especially beneath, above cinerascens green, lightly tomentulose, glabrescent, beneath very densely cinereous-tomentulose; peduncles short, about 1.5 cm. long; heads very numerous and densely crowded, the cymose panicles convex, about 2.8 cm. wide; heads 6.5 mm. high, 7 or 8-flowered; involucre 4.8 mm. high, the phyllaries 6 to 8, densely cinereous-tomentulose, somewhat unequal, linear, acute to obtuse or apiculate; corollas white, glandular throughout, 4 mm. long; achenes brownish black, 5-angled, hispidulous on the angles, 1.4 to 1.8 mm. long; pappus of about 6 lacerate squamellae 0.3 mm. long, and 2 or 3 bristle-like, unequal or equal awns about 3 mm. long.

Type in the U. S. National Herbarium, no. 470841, collected at Los Pinos, Chiapas, Mexico, June 2, 1904, by E. A. Goldman (no. 1047).

Readily distinguished among the shrubby species of the genus by its small leaves, which are densely canescent-tomentulose beneath, and its densely canescent-tomentulose involucre.

EXPLANATION OF PLATE 54.—*Stevia tephrophylla*, from the type specimen. Natural size.

Fleischmannia standleyi Blake, sp. nov.

Herbaceous perennial, with procumbent stem and ascending branches 25 to 50 cm. high, rather densely pilose with loose several-celled wide-spreading hairs, and stipitate-glandular; leaves alternate; petioles narrowly margined above, pubescent like the stem, 1.5 to 3 cm. long; blades ovate, 2 to 4 cm. long, 1.7 to 2.7 cm. wide, acute or obtuse, mucronulate, at base rounded or cuneate-rounded and often unequal, unequally 4 to 6-toothed on each side or sometimes 3-lobed (the lobes oblong to deltoid, few-toothed, with mucronulate teeth), membranaceous, equally green both sides, quintuplinerved at base, sparsely and loosely pilose chiefly on the costa and margin; heads solitary in the axils and at tip of stem, on stipitate-glandular and sparsely pilose peduncles 3 to 10.5 cm. long; disk subhemispheric, 8 to 9 mm. high, 8 to 11 mm. thick; involucre 6 to 7 mm. high, graduate, about 5-seriate, the phyllaries ovate to (innermost) linear-lanceolate, acuminate, with green or sometimes purplish-tinged, about 3-ribbed central portion, and narrower pale scarious margins, glabrous or the outermost slightly glandular-puberulous; flowers very numerous; corollas white or purplish-tinged, glabrous, 4.8 mm. long, very slender; styles exerted about 3 mm.; achenes (immature) sparsely hispidulous, 1.7 mm. long; awns 5 to 7, bristle-form, minutely hispidulous, about 4.5 mm. long, alternating with several minute bristle-form squamellae.

Type in the U. S. National Herbarium, no. 635891, collected high up in the Sierra de los Álamos, Sonora, Mexico, March 19, 1910, by J. N. Rose, P. C. Standley, and P. G. Russell (no. 13073).

ADDITIONAL SPECIMEN EXAMINED:

SINALOA: In moist places, Cerro de la Silla, San Ignacio, altitude 1,100 meters, April 20, 1918, *Montes & Salazar* 288.

***Kuhnia triplinervis* Blake, sp. nov.**

Herb 65 cm. high, erect-branched above the middle, the root not seen; stem stoutish, minutely appressed-puberulous, leafy; leaves alternate, often with fascicles in their axils; petioles 3 mm. long to none; leaf blades lanceolate, the larger 6 to 7.5 cm long, 1 to 2 cm. wide, acuminate, often falcate, acutely cuneate at base, entire or sparsely serrate, submembranaceous, above deep green, scabrid with minute tuberculate-based hairs (somewhat larger toward the margin), somewhat gland-dotted, beneath equally green, minutely hispidulous along the veins, gland-dotted, triplinerved above the base, the veins prominulous beneath; heads numerous, in subumbellate clusters of 2 to 8 at tips of branches, nodding, about 24-flowered, the pedicels 5 to 10 mm. long, densely and minutely puberulous, setaceous-bracted; disk about 1.5 cm. high, 1 cm. thick; involucre about 4-seriate, graduate, 10 mm. high, the phyllaries lance-subulate (outer) to linear, attenuate (outer) to acuminate or acute, the inner sometimes apiculate, green or purplish, with 2-nerved central portion and narrow thin margins, on back minutely puberulous or the inner subglabrous, ciliolate, the extreme tips rather loose; corollas apparently pale yellowish, glabrous, cylindrical, 6.5 to 7.5 mm. long (tube 2.2 to 2.8 mm., throat 4 to 4.2 mm., teeth ovate, obtuse, 0.5 to 0.8 mm.); anthers coherent; achenes nearly linear, hispidulous, about 15-striate, 6 mm. long; pappus bristles about 25, plumose, golden brown at least at base, flexuous, 6 mm. long.

Type in the U. S. National Herbarium, no. 332873, collected 15 miles south of Guadalupe y Calvo, Sierra Madre of southwestern Chihuahua, Mexico, altitude 2,285 to 2,440 meters, August 22, 1898, by E. W. Nelson (no. 4825).

Distinguished from its nearest relative, *Kuhnia oreithales* Robinson, by its comparatively broad triplinerved leaves and larger heads, with more numerous flowers. The heads tinge the water in which they are boiled a pale yellow.

ASTEREAE.

***Gutierrezia digyna* Blake, sp. nov.**

Suffrutescent perennial, several-stemmed, 30 cm. high; stems slender, striatulate, somewhat granular, simple below the inflorescence; internodes 4 to 7 mm. long; leaves alternate, often with small fascicles in their axils, the lower oblanceolate, 2.5 to 3.5 cm. long, 3 to 4.5 mm. wide, acute or acutish, callous-apiculate, narrowed to the sessile base, subcoriaceous, 1-nerved, glandular-punctate, sparsely tuberculate on margin, the middle and upper chiefly linear, 1.3 to 3 cm. long, 1 to 2.5 mm. wide; heads subcylindric, 3.5 to 5 mm. high, 1.5 mm. thick, in flattish-topped, densely fastigate, cymose panicles 3.5 to 6 cm. wide, the pedicels usually wanting, at most 2.5 mm. long; involucre about 4-seriate, graduate, 3.5 mm. high, the phyllaries few (about 9), broadly ovate (outer) to oblong, obtuse to truncate, with indurate body, subscarios margin, and thicker, pale green apex, at apex glandular-granular and often sparsely ciliate; receptacle convex, fimbriate; rays 2, yellow, the lamina oval, entire, revolute, 2 to 2.8 mm. long, 1.3 mm. wide; disk corollas 2 to 4, yellow, funnelform, glabrous, 3.8 mm. long; ray achenes (immature) turbinate, silky-pilose, 1.3 mm. long, their pappus of about 12 unequal lacerate squamellae, up to 0.8 mm. long; disk achenes apparently infertile, their pappus up to 1.1 mm. long; style branches of disk flowers linear, obtuse, hispidulous, without evident stigmatic lines.

Type in the U. S. National Herbarium, no. 233050, collected at base of the San Luis Mountains, up to 1,830 meters altitude, in Sonora, Mexico, along the Arizona-Sonora boundary line, September 5, 1893, by E. A. Mearns (no. 2100).

Nearest *Gutierrezia glomerella* Greene, which has linear-filiform leaves 1 mm. wide or less, and glomerulate heads with one ray and one or two disk flowers.

Gutierrezia dracunculoides (DC.) Blake.

Brachyris dracunculoides DC. Mém. Soc. Phys. Hist. Nat. Genève 7: 265. pl. 1. 1836; Prodr. 5: 313. 1836.

Brachyris dracunculoides β *angustissima* DC. Mém. Soc. Phys. Hist. Nat. Genève 7: 268. 1836; Prodr. 5: 313. 1836.

Brachyris ramosissima Hook. Icon. Pl. 2: pl. 142. 1837.

Amphiachyris dracunculoides Nutt. Trans. Amer. Phil. Soc. n. ser. 7: 313. 1840.

Gutierrezia lindheimeriana Scheele, Linnaea 22: 351. 1849.

The genus *Amphiachyris* of Nuttall,² based on the section of *Brachyris* described by DeCandolle³ under the same name, was founded on this species. The genus was later extended by Gray⁴ to include the plant earlier described as *Amphipappus fremontii* Torr. & Gray, and as thus constituted was distinguished from *Gutierrezia* by no essential characters beyond its sterile disk florets and pappus of subaristiform paleae more or less dilated and united at base. Of the two species included by Gray, one, *A. fremontii*, offers strong differential characters in habit, heads, involucre, and pappus, and should be restored to independent rank (*Amphipappus* Torr. & Gray), as has been done by Rydberg in his Flora of the Rocky Mountains and Adjacent Plains, and by the writer in his manuscript treatment of the Asteraceae for Mr. Ivar Tidestrom's flora of the States of Utah and Nevada. The other, *A. dracunculoides*, type of the genus *Amphiachyris*, seems best referred to *Gutierrezia*. It has precisely the habit and involucre of the annual species of that genus, and the supposedly diagnostic characters above mentioned break down when all the species of *Gutierrezia* are considered. In various species of the latter genus the disk achenes are more or less completely infertile, as for instance in *G. digyna* above described. In *G. sphaerocephala* A. Gray, although the pappus consists of squamellae rather than awns, these are connate at base for often half their length or more. On the whole, the lack of any sharply diagnostic characters which can be considered of generic value, and the entire agreement in habit with *Gutierrezia*, show that *Amphiachyris* should be referred to *Gutierrezia*.

Gutierrezia grandis Blake, sp. nov.

PLATE 55.

Suffrutescent, 30 cm. high and more, sparsely erect-branched; stem slender, gray-barked, glabrous; branches greenish, striatulate, finely tuberculate, leafy; leaves alternate, often with fascicles in their axils, oblanceolate or linear-oblanceolate, 2 to 5 cm. long, 2 to 6 mm. wide, callous-apiculate at the obtuse or acute apex, narrowed to the sessile base, entire, subcoriaceous, evenly but rather sparsely tuberculate-hispidulous all over or only on margin and veins, triplinerved (the lateral pair weak), glandular-punctate; heads turbinate or cylindrical-turbinate, about 10 mm. wide, solitary at tips of branches and branchlets on pedicels 5 to 10 mm. long, or more often densely cymose-panicled and sessile or on shorter pedicels, in glomerules of 2 to 5, the panicles 1.5 to 4.5 cm. wide; disk 6 to 7 mm. high, 2 to 4 mm. thick; involucre about 5-seriate, graduate, 5 to 6 mm. high, the phyllaries ovate-oblong (outer) to oblong, obtuse or the inner acutish, appressed, with indurate body, thinner subscarios margins, and rather conspicuous short green tip, glandular-viscid at apex, the inner sometimes slightly ciliate; receptacle alveolate; rays 5 to 9, yellow, the

² Trans. Amer. Phil. Soc. n. ser. 7: 313. 1840.

³ Mém. Soc. Phys. Hist. Nat. Genève 7: 268. 1836.

⁴ Proc. Amer. Acad. 8: 632. 1873.

lamina oval, entire, 4 mm. long, 2 mm. wide; disk corollas 3 to 7, yellow, funnel-form-campanulate, glabrous, 4 mm. long; ray achenes turbinate, densely pilose, 1.7 mm. long, their pappus of about 10 oblong obtuse fimbriate squamellae, about 0.8 mm. long; disk achenes similar, fertile, 1.5 mm. long, their pappus similar, 1 mm. long.

Type in the U. S. National Herbarium, no. 573304, collected at head of Cañon de las Barretas, in the Sierra Madre, near Icamole, Nuevo León, Mexico, February 3, 1907, by W. E. Safford (no. 1257).

ADDITIONAL SPECIMEN EXAMINED:

COAHUILA: Sierra de Parrás, altitude 2,745 to 3,050 meters, July and October, 1910, *Purpus* 4564.

Distinct in its comparatively large heads and relatively broad, distinctly triplinerved leaves. The two collections made by Purpus were distributed as *G. euthamiae* Torr. & Gray [= *G. sarothrae* (Pursh) Britton & Rusby], which has much narrower leaves and smaller heads.

EXPLANATION OF PLATE 55.—*Gutierrezia grandis*, from the type specimen. Natural size.

***Laestadia costaricensis* Blake, sp. nov.**

Fruticulose, caespitose, prostrate and rooting, branched, the slender, very leafy, sparsely incurved-puberulous and subglandular stems 6 to 25 cm. long; leaves alternate, narrowly spatulate or linear-oblongate, 6 to 11 mm. long, 0.8 to 2.5 mm. wide, acute or acutish and callous-apiculate, gradually narrowed into a petiole-like base, entire, somewhat fleshy, often slightly ciliate, with a few long several-celled hairs on both surfaces, glandular-punctate; peduncles terminal becoming apparently axillary, monocephalous, pubescent like the stem, sparsely bracted, 2 to (maturity) 6.5 cm. long; heads depressed-subglobose, disciform, 3 mm. high, 6 mm. thick; involucre about 3-seriate, subequal, 3 mm. high, the phyllaries linear, acute or the inner obtusish, appressed, glandular, somewhat lacerate-ciliate, the outer subherbaceous, with dark midrib and very narrow thin margins, the inner broadly scarious; outer flowers numerous, pistillate, their corollas densely covered with club-shaped glandular hairs, 0.9 mm. long (tube 0.3 mm., throat campanulate, 0.3 mm., teeth lance-ovate, recurved, 0.3 mm. long), their achenes oblong-obovoid, about 6-ribbed, glandular at base and apex, 1.3 to 1.5 mm. long, bearing at the somewhat contracted apex a thick callous cup 0.2 mm. high; disk corollas numerous, stipitate-glandular, 2.2 mm. long (tube cylindrical, 1.2 mm., throat and limb globose-campanulate, the 5 teeth ovate, acutish, 0.6 mm. long), their achenes (sterile?) similar to those of pistillate flowers, 6 or 8-ribbed, 1 mm. long.

Type in the U. S. National Herbarium, no. 939349, collected on the Cerro de las Vueltas, Costa Rica, altitude 3,000 meters, January, 1897, by H. Pittier (no. 10500).

Nearest to *Laestadia lechleri* Wedd., as which it has been identified, but that is described as having the leaves and involucre glabrous. The genus has apparently not previously been recorded from Central America.

***Bellis garciae* Blake, sp. nov.**

Perennial, several-stemmed; stems simple, monocephalous, erect or ascending, 25 cm. high, hispid-pilose with ascending or appressed hairs; leaves alternate, the lowest very narrowly linear-oblongate, 4 cm. long, including the margined petiole, 3 mm. wide, sparsely strigose; other leaves linear, gradually reduced above, 1.5 to 2.5 cm. long, 1 to 2 mm. wide, acute, subsessile, hispid-ciliate, otherwise essentially glabrous, 1-nerved; peduncles about 5 cm. long, naked or bearing 1 or 2 filiform bracts; heads 1.8 to 2.3 cm. wide; disk subglobose, 6 mm. high, 10 mm. thick; involucre 3-seriate, 4 mm. high, subequal, the phyllaries linear-lanceolate, acuminate, sparsely hispid, with dark center and narrow, somewhat lacerate-ciliate, scarious margin, sometimes purplish-tinged at apex; rays about 100, white, the lamina 6 to 8 mm. long, 0.5 to 0.7 mm. wide, bidentate; disk corollas yellow, becoming purplish on the teeth in age, pubescent toward base of throat, 2.2 mm. long;

achenes obovoid, 1 mm. long, compressed, sparsely hispidulous, whitish, with thickened margins, epappose.

Type in the U. S. National Herbarium, no. 1,038,782, collected in the State of Durango, Mexico, altitude 1,000 meters, by P. Ibaña García (no. 310).

Related to *Bellis purpurascens* Robinson, which has elliptic to obovate-elliptic leaves 6 to 12 mm. wide, fewer and broader phyllaries, these very sparsely pubescent on the midline, and much fewer and broader rays.

***Bellis mima* Blake, sp. nov.**

Herbaceous perennial, few-stemmed, 38 to 50 cm. high, the root not seen; stems rather stout, simple, greenish, striatulate, very sparsely pilose with chiefly spreading hairs; basal leaves few, their petioles essentially glabrous, 6 to 9 cm. long, the blades elliptic or obovate-elliptic, 10 to 11.5 cm. long, 2.3 cm. wide, obtuse, apiculate, long-cuneate at base, entire, fleshy, subpergamantaceous when dried, glabrous, marginate, equally green on both sides, feather-veined, the veins 4 or 5 pairs, anastomosing, scarcely prominulous; stem leaves 8 to 14, linear-lanceolate or linear, hirsute-ciliate and often with a few hairs beneath, the lower 5 to 6 cm. long, 4 to 6 mm. wide, gradually reduced above, the uppermost about 1 cm. long, 1 mm. wide; peduncles solitary, terminal, monocephalous, elongate, spreading-pilose, somewhat enlarged just below the heads; heads 3.2 to 4.5 cm. wide; disk 7 to 10 mm. high, 1.2 to 2 cm. thick; involucre about 2-seriate, equal, 7 mm. high, the phyllaries linear, acute or acuminate, with thickened midrib, subherbaceous, thin-margined below, with erect or spreading purplish-tinged tips, rather sparsely pilose, ciliate above; rays about 60, white, fertile, the tube sparsely pilose with several-celled subglandular hairs, the lamina linear, 3-denticulate, about 12 mm. long, 1.8 mm. wide; disk corollas yellow, sparsely pilose with several-celled subglandular hairs, 3.5 mm. long (tube 0.8 mm., throat funnellform, 2 mm., teeth ovate, with a vertical apical crest, 0.7 mm. long); achenes of ray and disk similar, oblong, compressed, 2-nerved, glabrous, subtruncate, 2 mm. long; pappus none; style branches of hermaphrodite flowers with triangular acute hispidulous appendages equaling the stigmatiferous portion.

Type in the U. S. National Herbarium, no. 332836, collected in the Sierra Madre, 30 miles north of Guanacevi, Durango, Mexico, altitude 2,440 to 2,745 meters, August 18, 1898, by E. W. Nelson (no. 4786).

This species, very distinct in its great size, large and entire, glabrous basal leaves, much smaller, ciliate stem leaves, and large heads, is named from its superficial resemblance to *Aplopappus stoloniferus* DC.

***Erigeron maxonii* Blake, sp. nov.**

PLATE 56.

Suffrutescent, subsimple or sparsely branched, about 30 cm. high, the base not seen; stem ascending, stoutish, purplish, sparsely hirsute-pilose and puberulous with mostly appressed or ascending hairs, leafy; leaves alternate, often with fascicles in their axils, spatulate-ob lanceolate or oblanceolate, 2 to 4.5 cm. long, 3 to 10 mm. wide, obtuse or acute, callous-apiculate, cuneately narrowed into the petioliform base, remotely serrate-lobed about to middle (the teeth 2 to 3 pairs, obtuse or acute, callous-tipped), firm, somewhat fleshy, rather pale green, evenly but not densely hirsute-pilose on both sides and ciliate (the hairs of the upper surface with small tuberculate bases), weakly penninerved, the upper usually much smaller, linear, entire; peduncles 1 to 3 at tips of stem and branches, monocephalous, pubescent like the stem, 1 to 2 cm. long; heads about 2 cm. wide; disk 5 to 6 mm. high, 1 to 1.2 cm. thick; involucre about 3-seriate, slightly graduate, 5 to 7 mm. high, the phyllaries linear, acuminate, appressed, subherbaceous with very narrow thin margins, often purplish-tinged, rather sparsely hirsute-pilose especially at base with several-celled loosely ascending hairs, somewhat lacerate-ciliate, glandular-lineate; rays "purplish," when dried white or lavender-tinged, about 76, the lamina linear, 2 or 3-denticulate, 3-nerved, 5 mm. long, 0.6 to 0.8 mm. wide; disk corollas yellow.

lowish, glabrous, slender, 4 mm. long (tube 1.5 mm., throat 2 mm., teeth ovate, obtusish, 0.5 mm. long, with a low papillose apical crest); achenes of ray and disk similar, somewhat compressed, 2-nerved, hispid, 1.5 to 1.8 mm. long; pappus bristles about 20, fragile, 1-seriate, 3 to 4 mm. long.

Type in the U. S. National Herbarium, no. 675662, collected on open brushy slopes, Cuesta Grande, eastern slope of Chiriquí Volcano, Panama, altitude 2,600 to 2,990 meters, March 11 to 13, 1911, by William R. Maxon (no. 5306).

ADDITIONAL SPECIMENS EXAMINED:

PANAMA: Chiriquí Volcano, April, 1899, *Sapper*. Sunny places around El Potrero Camp, Chiriquí Volcano, altitude 2,800 to 3,000 meters, March 10 to 13, 1911, *Pittier* 3090.

Near *Erigeron irazuensis* Greenm., of Volcán de Irazú, Costa Rica, in which the apparently procumbent stem is densely hirsute-pilose with longer wide-spreading hairs.

EXPLANATION OF PLATE 56.—*Erigeron maxonii*, from the type specimen. Natural size.

Baccharis alamosana Blake, sp. nov.

Dioecious, shrubby, branched, 40 cm. high and probably much more; stem and branches slender, striate, glabrous, somewhat glutinous; internodes 0.7 to 2.5 cm. long; petioles 2 to 4 mm. long; leaf blades lanceolate, 1.5 to 3 cm. long, 4 to 9 mm. wide, acuminate, acutely cuneate at base, closely and sharply serrulate (the teeth 12 to 22 pairs), papery, glabrous, punctate, obscurely triplinerved; pistillate panicles small, about 2.5 cm. wide, terminating the branches, several to many-headed, glandular-granular, the pedicels 2 to 5 mm. long; involucre about 4-seriate, graduate, 2.5 mm. high, the phyllaries lanceolate (outer) to linear, obtuse, with indurate, narrowly dark-centered body and narrow scarious margins, glandular-granular, toward apex lacerate-ciliate; pistillate heads tiny, 3.2 mm. high, 2.2 mm. thick, 11-flowered, the filiform corollas obliquely truncate, surpassed by the styles; achenes 5-nerved, glabrous, 1.5 mm. long; pappus scanty, whitish, 1-seriate, 2.2 mm. long.

Type in the U. S. National Herbarium, no. 42951, collected in the Sierra de los Álamos, Sonora, Mexico, March 25 to April 8, 1890, by Edward Palmer (no. 291).

A well-defined species, unfortunately represented only by two sheets of over-mature material. The tiny heads and small, lanceolate, closely serrulate leaves characterize the species.

Baccharis occidentalis Blake, sp. nov.

Dioecious; stems numerous from a thick deep root, suffrutescent, slender, junci-form, 0.6 to 1 meter high, striate-angled, rather sparsely erect-branched; lower internodes 1 to 4 cm. long, the upper elongate; leaves linear to linear-ob lanceolate, 2 to 5.5 cm. long, 1 to 4.5 mm. wide, acuminate at each end, sessile, subcoriaceous, entire to remotely sharp-serrulate (teeth sometimes aristiform and 2 mm. long), tripli- or quintuplinerved with prominulous veins or essentially veinless, the upper bracteiform and remote; branches elongate, bearing at tip 3 to 9 loosely cymose-panicked heads, the pistillate on pedicels 1 to 7 cm. long, the staminate on pedicels 3 to 20 mm. long or sometimes glomerate in glomerules of about 3 heads; pedicels glandular-granular; pistillate heads 9 to 10 mm. high, 6 to 10 mm. thick, about 23-flowered; staminate heads 6 mm. high, 5 mm. thick, about 18-flowered; pistillate involucre 4 or 5-seriate, graduate, 5 to 5.5 mm. high, appressed, the phyllaries linear or linear-lanceolate, obtuse to acute, with greenish midline and scarious margins, slightly glandular-granular, ciliate above; staminate involucre similar but about 3-seriate and with acute or acuminate phyllaries, 4.5 mm. high; teeth of the staminate corollas slightly longer than throat, the style branches linear, obtuse, hispidulous, the bristles of pappus dilated toward apex; pistillate achenes 5-striate, somewhat glandular, 3.5 mm. long the rather scanty brownish-tinged pappus about 2-seriate, 8 mm. long.

Type in the U. S. National Herbarium, no. 42952, collected on hillsides near Guadalajara, Jalisco, Mexico, July 19, 1893, by C. G. Pringle (no. 4460).

ADDITIONAL SPECIMENS EXAMINED:

TEPIC: Between Pedro Paulo and San Blasito, foothills of the Sierra Madre, August 4, 1897, *Rose* 1996. Between Dolores and Santa Gertrudis, Sierra Madre, August 7, 1897, *Rose* 2050.

The type collection, distributed as a "large-flowered form" of *Baccharis potosina* A. Gray, includes both sexes. Rose's no. 1996 is pistillate, his no. 2050 staminate. The species differs from *B. potosina* in its less branched, essentially herbaceous stems, longer involucre and considerably larger heads on longer pedicels, and longer pappus. *Baccharis potosina* has been little known since its description. The following specimens, agreeing with the type collection—*Schaffner* 355/779, *Schumann* 100, *Purpus* 4663 and 4482 (49827), and *Palmer* 413 of 1904—extend its range to Coahuila.

INULEAE.

Achyrocline crassiceps Blake, sp. nov.

PLATE 57.

Suffrutescent, 25 to 50 cm. high; stem stout, simple below the inflorescence or with few erect branches, very leafy, densely tomentose-lanate with cinereous or fuscous hairs, beneath the wool minutely glandular-puberulent; leaves alternate, crowded, elliptic, oblong-elliptic, or obovate-elliptic, 1.5 to 3.5 cm. long, 6 to 12 mm. wide, obtuse or acutish, sessile by a broad rounded or cordate base (concealed beneath the tomentum), not decurrent, densely tomentose-lanate like the stem with cinereous, ochroleucous, or fuscous wool, beneath the wool densely sordid-pilose with spreading several-celled subglandular hairs, 5-plinerved from base (the veins entirely concealed by the tomentum); heads 5 mm. high, sessile, very numerous in the few dense, ternately arranged, subglobose glomerules terminating stem and branches, these 1.5 to 3.5 cm. thick; involucre 5 mm. high, whitish or rufid-tinged, the phyllaries subequal, about 11, oval-oblong or oblong, obtuse or rounded, or the inner usually apiculate, scarious, nerveless, pilose-lanate toward base; heads 5-flowered, the pistillate flowers 2 or 3, the hermaphrodite 2 or 3; pistillate corollas filiform, 4-denticulate, sparsely short-pubescent at tip, 3 mm. long; hermaphrodite corollas slender-cylindric, 5-denticulate, sparsely pubescent at apex, 3.2 mm. long, achenes ellipsoid, glabrous, 1 mm. long; pappus readily deciduous, the bristle; whitish, 3.5 mm. long.

Type in the U. S. National Herbarium, no. 888688, collected at Bogotá, Colombia, by Brother Ariste Joseph (no. A 17).

ADDITIONAL SPECIMENS EXAMINED:

COLOMBIA: Region of Bogotá, 1919, *Ariste Joseph*. Open rocky mountain slope, altitude 3,000 to 3,100 meters, Chapinero, near Bogotá, September, 1917, *Pennell* 2016. Dry places, foot of the Despeñadero de la Cruz, altitude 2,800 meters, 1918, *Ariste Joseph* A258.

This species is distinct in its densely leafy stem, comparatively large and thickly lanate leaves, and dense glomerules of whitish heads.

EXPLANATION OF PLATE 57.—*Achyrocline crassiceps*, from the type specimen. Natural size.

HELIANTHEAE.

Nocca media Blake, sp. nov.

Suffrutescent, simple below the inflorescence, 90 cm. high and more, the base not seen; stem stoutish, brown, spreading-hirtellous, very sparsely spreading-hirsute near the nodes, glabrescent; leaves opposite, very remote, the internodes 10 to 14.5 cm. long; lowest leaves on broad naked petioles 2.5 mm. long, the others sessile by a narrowed clasping base; blades ovate, 6 to 9 cm. long, 2.5 to 4 cm. wide, acute, rather abruptly narrowed about 1 cm. above the base into a subcordate-clasping

lower portion about 8 mm. wide, serrate with depressed bluntish teeth, firmly pergamentaceous, nearly equally green on both sides, densely and harshly hispidulous on both sides (the hairs of upper surface mostly deciduous except along the veins and with persistent strongly tuberculate bases, those of lower surface persistent and with less conspicuously tuberculate bases), triplinerved about 1.5 cm. above the base, loosely prominulous-reticulate on both sides; inflorescence about 35 cm. long, its branches elongate, erect, densely glandular-hispidulous, pilose toward apex, the bracts small, lance-elliptic, 1.5 to 2 cm. long; glomerules globose-campanulate, subtended by 5 or 6 elliptic bracts 1.3 to 1.8 cm. long; proper involucre 1-flowered, densely silky-villous throughout, the tube 4.5 mm. long, the 5 or 6 teeth very unequal, triangular-subulate or elongated-triangular, acuminate, 1 to 4 mm. long, 1 to 3-nerved; corollas hispid-pilose especially on the teeth, 10 mm. long; achenes (immature) glabrous, 2 mm. long; pappus a lacerate-ciliate crown about 0.3 mm. high, with 1 or 2 subulate pilose-ciliate awns about 0.8 mm. high.

Type in the U. S. National Herbarium, no. 566238, collected between Tixila and Chilpancingo, Guerrero, Mexico, altitude 1,830 to 2,135 meters, December 16, 1894, by E. W. Nelson (no. 2178).

Intermediate between *Nocca pringlei* Robinson and *N. helianthifolia* (H. B. K.) Cass., combining the elongate and comparatively naked inflorescence and the leaf shape of the former with (in the upper leaves) the clasping leaf-bases of the latter. The leaves, however, are green and scabrid on both sides, not densely short-hispid-pilose above and griseous-pilose beneath, as they are in *N. pringlei*.

***Nocca pteropoda* Blake, sp. nov.**

Herbaceous at least above, probably tall; stem glabrescent below, the young branchlets densely spreading-villous and stipitate-glandular; internodes of main stem 13.5 cm. long, those of the branchlets about 1 cm. long; leaves (only those of branchlets seen) opposite, the lower on flattish naked petioles 5 mm. long, the others sessile but not clasping; blades rhomboid-ovate or the lower oval, 4.5 to 10 cm. long, 2.5 to 4 cm. wide, acuminate or sometimes obtuse, cuneate at base, sharply serrate above the entire lower portion or subentire, subpergamentaceous, above densely and harshly hispidulous with mostly deciduous hairs with persistent tuberculate bases, beneath slightly paler green, rather densely, finely, and softly spreading-pilosulous and sparsely pilose, and along the veins stipitate-glandular, triplinerved 1 to 2 cm. above the base, at maturity prominulous-reticulate beneath; inflorescence trichotomously divided, short and dense, about 23 cm. wide, the bracts ovate, strongly reticulate, 3 to 4.5 cm. long; glomerules campanulate, subtended by foliaceous bracts; proper involucre 1-flowered, silky-villous especially below the apex, the tube 6 mm. long, the usually 6 teeth very unequal, 1 to 2.5 mm. long, the 1 or 2 largest oblong, acuminate, the others quadrate to broadly triangular, obtuse or apiculate to short-acuminate; corollas hispidulous, 1.3 cm. long (tube 3.5 mm., throat 7 mm., teeth oval-ovate, obtuse, 2.5 mm.); achenes (submature) glabrous except at the hispidulous apex, 4.5 mm. long; pappus a fimbriate crown 0.7 mm. long, of chiefly united, blunt squamellae, the 2 on the angles narrower and acute but scarcely longer than the others.

Type in the U. S. National Herbarium, no. 1,038,731, collected at Cuyamecala, District of Cuicatlán, Oaxaca, Mexico, April 14, 1919, by C. Conzatti and I. C. Gómez (no. 3470).

Nearest *Nocca helianthifolia* (H. B. K.) Cass., with which it agrees in its trichotomous flattish inflorescence, but lacking the clasping leaf bases of that species.

***Clibadium propinquum* Blake, nom. nov.**

Wulffia sodiroi Hieron. Bot. Jahrb. Engler 29: 34. 1900. Not *Clibadium sodiroi* Hieron. 1900.

Fragments of the type, supplied by the Berlin Herbarium, show that this species is a *Clibadium* near *C. eggersii* Hieron., from which it differs in its smaller heads and

fewer pistillate flowers. Hieronymus gives the number of pistillate flowers as 16, and the hermaphrodite 4; but in a head from the type dissected by the writer the pistillate flowers were 29, and the hermaphrodite 9.

***Clibadium pentaneuron* Blake, sp. nov.**

Presumably frutescent; stem stout, fuscous, subterete, evenly strigose and strigillose with tightly appressed hairs; leaves opposite, or alternate toward the inflorescence; petioles 10 to 16 mm. long, strigose and strigillose; blades oval-ovate, 8 to 14 cm. long, 3.5 to 7.5 cm. wide, acuminate, at base cuneate or rounded-cuneate, thick-pergamentaceous, serrate with 12 to 20 pairs of subremote salient teeth about 1 mm. high, deep green on both sides, above sparsely and harshly strigose (the hairs with lepidote-tuberculate bases), in age smoothish, beneath evenly but sparsely strigillose with subtuberculate-based hairs, quintuplinerved within 2 cm. of the base, the primary and secondary veins prominulous above, the tertiary impressed, all the veins and veinlets prominent-reticulate beneath; leaves subtending the inflorescence smaller, elliptic-ovate or lance-ovate, 7 to 9 cm. long, 2.5 to 3 cm. wide; panicles terminating stem and branches, concave, about 9 cm. wide, tiny-bracted, the heads irregularly approximate toward the tips of the branches; heads sessile, subglobose to obovoid-subglobose, 4 to 5 mm. high, 3.5 to 4 mm. thick; phyllaries 3, suborbicular to suborbicular-ovate, 3.5 to 4 mm. long, 2.8 to 3.2 mm. wide, obtuse or acutish, greenish white, at maturity erubescens, strigillose chiefly above and short-ciliate, about 5-nerved; pistillate flowers 5 or 6, the hermaphrodite 7 or 8, all paleate; outer pistillate pales similar to the phyllaries, the inner oblong-oval, acute, 4 mm. long, 2.2 mm. wide, the hermaphrodite pales oblong or obovate-oblong, scarious, 2.5 mm. long, 1.2 to 2 mm. wide, truncate or rounded, lacerate-ciliate above; pistillate corollas reddish purple, glabrous, 3-toothed, 1.8 mm. long, the ovaries densely pilose above, obovate, 2.4 mm. long, 1.5 mm. wide, the mature achenes not seen; hermaphrodite corollas reddish purple, hispidulous above, 2.8 mm. long, the tube 0.7 mm. long, the sterile ovaries turbinate, densely pilose at apex, sparsely so below, 1.4 mm. long.

Type in the Gray Herbarium, collected presumably in Colombia by C. F. Lehmann, and distributed under the Bentham Trustees No. 1256. Photograph and fragments in the National Herbarium. Duplicates in the herbarium of the New York Botanical Garden (labeled B. T. 855 and B. T. 1256).

This species is a member of the section *Trixidium*, characterized by having all the flowers of the head subtended by pales, and is related to *C. terebinthaceum* (Swartz) DC. In that species the leaves are membranaceous, merely serrulate, with the hairs of the under surface somewhat spreading, the phyllaries are acute or subacuminate, and the pistillate corollas are pubescent on the teeth.

***Clibadium parviceps* Blake, sp. nov.**

Shrub; branches slender, striatulate or striate, evenly but not densely strigose and strigillose, glabrescent; leaves opposite throughout; petioles slender, strigose and strigillose, 1.3 to 2.7 cm. long; blades ovate, 8 to 11.5 cm. long, 2.8 to 5.5 cm. wide, acuminate, at base acute or acuminate, serrulate (teeth 10 to 20 pairs, very small, acute, callous-tipped), membranaceous, above deep green, evenly but not densely scaberulous-strigillose, the hairs more or less deciduous in age leaving the lepidote bases, beneath scarcely paler green, similarly pubescent, 3-plinerved or somewhat 5-plinerved above the base, the chief veins prominulous beneath; panicles terminal, trichotomous, many-headed, 4.5 to 8 cm. wide, the axis and branches densely strigose or hispid-strigose with appressed or ascending hairs, the heads irregularly clustered, not glomerate, sessile or subsessile; heads obovoid or in fruit subglobose-obovoid, 3 mm. thick, in flower 8 mm. high (including the exerted stamens), in fruit 3.5 mm.; phyllaries 3, suborbicular-ovate, 3.2 to 3.7 mm. long, 2.5 to 2.8 mm. wide, acute to obtusish, 5 to 9-nerved, greenish, strigillose above and short-ciliate; pistillate flowers 5, all paleate, the hermaphrodite 5, all but the 1 or 2 innermost paleate; pistillate pales

similar to the phyllaries, acutish to obtuse, the innermost smaller; hermaphrodite pales oblong, obtuse, ciliate, 2 mm. long; pistillate corollas white, tridenticulate, minutely hispidulous above, 2.2 to 2.6 mm. long, the ovaries densely pubescent toward apex, the achenes obovate or suborbicular-obovate, similarly pubescent, 2 mm. long, 1.2 mm. wide; hermaphrodite corollas white, obovoid-campanulate, hispidulous above, 5-denticulate, 3.8 mm. long (tube 0.8 mm., limb 2.5 mm., with 10 glandular-vittate veins, teeth deltoid, 0.5 mm.), the ovaries pilose except toward base, 1.8 mm. long.

Type in the Gray Herbarium, collected at Colonia Tovar or vicinity, Venezuela, 1856-57, by A. Fendler (no. 1967). Photograph and fragments in the U. S. National Herbarium.

This species is closely related to *C. acuminatum* Benth., of which I have examined a good specimen (Stewart 326) in the Gray Herbarium from the type locality, Cocos Island, about 300 miles off the western coast of Costa Rica. In that species the phyllaries in several heads dissected are always 2, narrower than in *C. parviceps* (ovate or broadly ovate) and acute or subacuminate, the 3 to 5 hermaphrodite flowers are all paleate, or only the central one is epaleate, the heads are slightly smaller, the pistillate corollas are stipitate-glandular and only 1.8 mm. long, and the hermaphrodite corollas are only 2.5 mm. long. In other features the two species are very similar.

Olibadium grandifolium Blake, sp. nov.

Habit unknown; upper part of stem stout, herbaceous, 4 to 6 mm. thick, strigose and strigillose; leaves opposite; petioles of the leaves just below the inflorescence 5 to 11 cm. long, sulcate above, narrowly wing-margined throughout, the wing 1 mm. wide or less; blades of the leaves just below the inflorescence broadly ovate or rotund-ovate, 15 to 28 cm. long, 12 to 23 cm. wide, short-pointed, truncate-rounded at base and then short-cuneate into the petiole, serrulate (teeth 40 to 80 pairs, depressed, mucronulate, 0.5 to 1.5 mm. high), papery, above deep green, scabrid with minute erectish hairs with lepidote-tuberculate bases and sparsely hispidulous-strigillose, beneath nearly equally green and evenly strigillose, triplinerved above the base, the veins and veinlets slightly prominulous on both sides; leaves subtending the lowest branches of the inflorescent ovate, 10 to 15 cm. long, 7.5 cm. wide, acuminate, at base cuneate, irregularly serrate and serrulate, on petioles about 3 cm. long; panicle terminal, 17 to 24 cm. wide, ternately divided, with innumerable heads; heads irregularly approximate, sessile, oval-oblong to subglobose, 4.8 to 6.5 mm. high, 3 to 4.5 mm. thick; phyllaries 2 or 3, ovate to deltoid-ovate or broadly oval-ovate, 3.2 to 4.5 mm. long, 2.5 to 3.5 mm. wide, acute or the outermost acuminate, whitish, 3 to 9-nerved, strigillose especially near apex and short-ciliate; pistillate flowers 8 to 11, all paleate, the hermaphrodite 9 or 10, 2 to 8 of them paleate; outer pistillate pales suborbicular-ovate to oblong-ovate, acute, the inner oblong, acute to acuminate, lacerate-ciliate, 4.5 mm. long, 2 mm. wide; hermaphrodite pales ovate-oblong or oblong, lacerate-ciliate, 2 mm. long; pistillate corollas white, glabrous, 3-denticulate, 2.3 mm. long, the ovaries densely pilose above, the achenes obovate-suborbicular, pilose above, 2.2 mm. long, 1.8 mm. wide; hermaphrodite corollas white, hispidulous above, 3.8 to 4 mm. long (tube 0.6 to 1 mm., throat 2.8 mm., teeth 0.4 mm.), the sterile ovaries densely pilose throughout, 1 to 2.2 mm. long.

Type in the U. S. National Herbarium, no. 355188, collected along the Río Pacuare, Llanuras de Santa Clara, Costa Rica, altitude 150 meters, April, 1896, by J. D. Smith (no. 6614).

ADDITIONAL SPECIMEN EXAMINED:

COSTA RICA: Along the Río Zent, altitude 100 meters, January, 1900, Pittier 16068 (Gray Herbarium).

The closest relationships of this species appear to be with *C. caudatum* and *C. appressipilum* Blake, from both of which it differs in the character of its leaves and in the fact that several or most of its hermaphrodite flowers are provided with pales, as

well as in its acute phyllaries. Both of the specimens were originally determined as *C. erosum* (Swartz) DC., a West Indian species of the section *Trixidium*.

***Clibadium caudatum* Blake, sp. nov.**

Evidently frutescent, about 3 meters high; stem stout, subterete, striate-costate above, densely griseous-strigose with closely appressed hairs; leaves opposite; petioles densely strigose, 1 to 2 cm. long; blades of the stem leaves ovate, 17.5 cm. long, 8.5 cm. wide, caudate-attenuate, at base abruptly short-cuneate into the petiole, thick-papery, coarsely serrate with about 28 pairs of unequal triangular mucronulate teeth about 3 mm. high, above dark green, harshly strigillose with lepidote-based hairs and along the ribs hispid-strigose, beneath paler green, evenly short-strigose on veins and surface, triplinerved about 1 cm. above the base, the veins and veinlets impressed above, prominulous-reticulate beneath; panicles terminating stem and branches, about 10 cm. wide, irregularly ternate-divided, many-headed, their branches very densely hispidulous-pilosulous with sordid spreading hairs; heads irregularly approximate toward tips of branches of inflorescence, on pedicels 1 mm. long or sessile, subglobose or oblong-oval, 5 to 6 mm. high, 4 to 4.5 mm. thick; phyllaries 3, suborbicular or suborbicular-ovate, 4 to 4.5 mm. long, 3.5 to 4.5 mm. wide, obtuse, whitish, viridescent below, 12 to 16-nerved, evenly strigillose and ciliate; pistillate flowers 9 to 11, paleate, the hermaphrodite 11 or 12, epaleate; outer pistillate pales similar to the phyllaries but only 7 to 11-nerved, the inner obovate-oblong, 3 or 4-nerved, 4.5 mm. long; pistillate corollas white, 3-toothed, hispidulous at apex, 2 mm. long, the achenes blackish olive, oval-obovate, 2.5 mm. long, 1.8 mm. wide, pilose toward apex; hermaphrodite corollas white, hispidulous at apex, 3.2 mm. long (the obscure tube 0.4 mm. long), the ovaries densely villous except at base, 1.2 to 2.4 mm. long.

Type in the U.S. National Herbarium, no. 675137, collected in alluvial bottom near Bohío, Canal Zone, Panama, altitude 10 to 20 meters, February 12, 1911, by William R. Maxon (no. 4767).

This species is related to *Clibadium arboreum* Donn. Smith and *C. surinamense* L., both of which have only 3 to 6 female florets, while the present species has 9 to 11. In both these species the pubescence of the stem is spreading or curved-ascending, not tightly appressed as in *C. caudatum*.

***Clibadium appressipilum* Blake, sp. nov.**

Suffruticose, 2 to 3 meters high, the stem up to 2.5 cm. thick below; stem (above) stoutish, subterete, densely and cinereously strigose and strigillose with closely appressed hairs; leaves opposite; petioles slender, densely strigose and strigillose, 1 to 4 cm. long; blades broadly ovate, 8.5 to 15.5 cm. long, 4 to 9.5 cm. wide, acuminate or caudate-acuminate, at base cuneate to broadly rounded, serrulate with about 16 pairs of depressed mucronulate teeth, papyraceous, above dull green, strigillose or strigose and strigillose with tuberculate-based hairs, beneath paler green, evenly strigillose on veins and surface, triplinerved 1 to 2 cm. above the base, the veins and veinlets impressed above, more or less prominulous beneath; panicles terminating stem and branches, convex, about 5 cm. wide, many-headed, hispid-strigose with appressed or closely ascending hairs, ternately divided; heads approximate, subsessile, subglobose, 4.5 to 5 mm. high, 4 to 5 mm. wide; phyllaries 3, orbicular to oval-orbicular, 3 to 3.3 mm. long, 2.4 to 3 mm. wide, greenish white, very obtuse, 9 to 11-nerved, rather densely short-strigose and short-ciliate; pistillate flowers 8 or 9, all paleate, the hermaphrodite 10 to 15, only one or none paleate; outer pistillate pales similar to the phyllaries, the inner oblong-obovate, acutish, 3.8 mm. long, 5 to 7-nerved; hermaphrodite pale similar to the inner pistillate; pistillate corollas white, 3-denticulate, hispidulous above, 1.8 to 2 mm. long, the ovaries sparsely or rather densely hairy at apex, the achenes blackish, oval-obovate, 2 to 2.2 mm. long, 1.8 to 2 mm. wide, at apex pilose to very sparsely puberulous or

essentially glabrous; hermaphrodite corollas white, 3.2 to 3.8 mm. long, hispidulous above, the outer with distinct tube 0.8 mm. long and funnellform throat, the sterile ovaries densely villous especially above, 1.2 to 2 mm. long.

Type in the U. S. National Herbarium, no. 678224, collected at Boca de Cupe, Panama, April 13, 1908, by R. S. Williams (no. 698). Duplicate in herbarium of the New York Botanical Garden.

ADDITIONAL SPECIMENS EXAMINED:

PANAMA: Banks of Mamoni River, above Chepo, Province of Panama, altitude 20 meters, October, 1911, *Pittier* 4730. Along the Río Culebra, above Santa Isabel, Province of Colón, near sea level, August 10, 1911, *Pittier* 4157.

The nearest ally of this species is *C. caudatum*, described above, in which the leaves are coarsely serrate, the branches of the inflorescence densely hispidulous-pilosulous with spreading hairs, and the phyllaries 12 to 16-nerved.

Clibadium grande Blake, sp. nov.

Stem not seen; petiole stout, channeled above, glabrescent, 21 cm. long; leaf blade broadly ovate, about 31 cm. long, 30 cm. wide, acute, at base broadly rounded, unequally dentate-serrate (teeth about 70 pairs, depressed-deltoid, apiculate, about 3 mm. high), papery, above dull green, minutely scabrid-strigillose, beneath green, evenly but not densely strigillose over whole surface, along the veins strigillose or strigose and more densely sordid-tomentulous, triplinerved and with 2 pairs of weaker veins below the main nerves, the chief veins prominent beneath, the smaller ones prominent; peduncle 14.5 cm. long and more, strigose and sordid-tomentulose with matted hairs; panicle similarly pubescent, about 9 cm. long, 11 cm. wide, many-headed, the heads sessile, irregularly approximate, not glomerate; heads in flower oblong-cylindric, 5.5 mm. high, 2.5 mm. thick, in fruit subglobose, 3 to 3.5 mm. high and thick; phyllaries 3, broadly ovate (outermost) to suborbicular-ovate, 3.5 to 3.8 mm. long, 2.6 to 3 mm. wide, acute or the outermost subacuminate, strigillose chiefly above and short-ciliate, 5 to 8-nerved; pistillate flowers 6, all paleate, the hermaphrodite 8 or 9, naked or only one paleate; pistillate pales similar to the phyllaries but smaller; hermaphrodite pale ovate-oblong, 2 mm. long or less, lacerate-ciliate, acute; pistillate corollas white, 2 or 3-denticulate, glabrous, 2.1 mm. long, the ovaries densely pilose above, the achenes suborbicular, pilose at apex, with short abrupt stipelike base, 2 mm. long, 1.8 mm. wide; hermaphrodite corollas white, hispidulous at apex, 3.3 mm. long (tube 0.8 mm., throat 2.2 mm., teeth 0.3 mm.), the sterile ovaries densely hispid-pilose throughout, 1.2 mm. long.

Type in the Gray Herbarium, collected at La Florida, along the Atlantic Railway, Costa Rica, altitude 80 meters, June 18, 1897, by H. Pittier (no. 11280). Photograph and fragments in U. S. National Herbarium.

Although the material examined consists only of an inflorescence and a detached leaf, probably from the lower part of the stem, it is sufficient to show that it represents a new species. *Clibadium grande* resembles *C. grandifolium* Blake in its large long-petioled leaves, but is readily distinguished by its fewer flowers, somewhat different pubescence, smaller heads, and nearly or quite naked disk. From *C. arboreum* Donn. Smith and *C. pueblanum* Blake it is distinguished by the lack of long spreading pubescence on the stem and inflorescence.

Clibadium pueblanum Blake, sp. nov.

Upper portion of stem herbaceous, stout, 6 mm. thick, subterete, striatulate, densely strigillose with persistent hairs, and hispid-pilose with several-celled, spreading, at length deciduous hairs; leaves opposite, or the uppermost alternate; petioles 1.5 to 4.5 cm. long, slender, densely strigillose and hispid-pilose; blades ovate to broadly ovate, 10.5 to 14.5 cm. long, 5.5 to 11.5 cm. wide, acuminate, cuneate at base, serrulate above the subentire base with about 20 pairs of mucronulate teeth, papery, above dull green, very harshly tuberculate-hispidulous and sparsely hispid-pilose with

deciduous hairs, especially along the veins, beneath slightly paler green, densely hispidulous and hispid with spreading curved hairs (these longer along the veins), triplinerved and prominulous-reticulate beneath; panicles terminating stem and branches, 7 to 16 cm. wide, very many-headed, densely pubescent like the stem; heads rather closely aggregate, sessile, subglobose, 3 to 4 mm. high, 2.5 to 3.5 mm. in diameter; phyllaries 3 to 4, suborbicular-ovate to suborbicular, 2.5 to 3.5 mm. long, 2.2 to 3.5 mm. wide, abruptly acutish, whitish, ciliate, sparsely short-strigose toward apex or essentially glabrous, 4 to 8-nerved; pistillate flowers 6 or 7, paleate, the hermaphrodite 7 or 8, epaleate; pales of the pistillate flowers similar to the phyllaries, the inmost oblong-ovate, acute, 3.8 mm. long; pistillate corollas white, 4-toothed, hispidulous at apex, 2.2 mm. long, the achenes broadly obovoid, densely pilose at apex, 1.8 to 2 mm. long, 1.5 to 1.7 mm. wide; hermaphrodite corollas white, hispidulous above, 3.2 to 3.5 mm. long, the tube 0.5 mm. long, the sterile ovaries linear, densely pilose chiefly above the middle, at maturity 2.5 mm. long.

Type in the U. S. National Herbarium, no. 1,038,790, collected at Pahuatlán, District of Huauhinango, Puebla, Mexico, October 4, 1914, by F. Salazar.

This species finds its nearest relative in *Clibadium arboreum* Donn. Smith, which has larger heads (5 to 6 mm. long), phyllaries densely strigillose at least above, and achenes 2.8 to 3 mm. long.

Olibadium schulzii Blake, sp. nov.

Oppositely branched shrub; stem striate-angulate, densely pilose-tomentose with dull ascending hairs, glabrescent, the young branchlets slender, 6-angulate, densely pilose-tomentose with yellowish white spreading-ascending hairs, glabrescent; leaves opposite; petioles 3 to 11 mm. long, densely pubescent like the young branchlets; blades lance-ovate, 6 to 9.5 cm. long, 2.2 to 3.2 cm. wide, acuminate, at base acutely cuneate, papyraceous, serrulate with about 17 pairs of depressed mucronulate teeth, triplinerved about 1 cm. above the base, above evenly but not densely strigose with persistent hairs, in age smooth to the touch, beneath much paler, in youth densely fuscous-pilose with subappressed hairs, at maturity densely and rather softly griseous-pilose with ascending hairs, the veins and veinlets somewhat impressed above, prominulous-reticulate beneath; peduncles terminating stem and branches, 1 to 4 cm. long, pubescent like the stem, once or twice 3-forked, the panicles 3 to 6 cm. wide, rather dense, about 50-headed; heads approximate, on pedicels 2 mm. long or less, subglobose, 3.5 to 4 mm. high and thick; phyllaries 3, suborbicular-oval to broadly ovate, 3.8 to 4.4 mm. long, 2.8 to 3.2 mm. wide, obtuse to acutish, with callous apex, at maturity coriaceous-herbaceous (especially the outermost) and blackish green, ciliate, essentially glabrous dorsally, obscurely 8 or 9-nerved; pistillate flowers 5 or 6-paleate, the hermaphrodite 12 to 14, epaleate; pales of the pistillate flowers similar to the phyllaries but less coriaceous, the innermost subscarious, acute, lacerate-ciliate; pistillate corollas glabrous, whitish, 3-toothed, 2.4 mm. long, the achenes obovoid with slender base, 2.5 mm. long, 1.8 mm. wide, blackish-olive, sparsely pilose at apex; hermaphrodite corollas not seen, the sterile ovaries densely villous above the middle, linear, 3.5 mm. long.

Type in the U. S. National Herbarium, no. 577501, collected in thickets at Copey, Costa Rica, altitude 1,800 meters, March, 1898, by A. Tonduz (no. 11915).

In his revision of *Clibadium*, O. E. Schulz referred⁵ the type number of this species to *Clibadium anceps* Greenm., the type number of which he had evidently not examined. His description of *C. anceps* is entirely that of the plant here named *C. schulzii*, although his key characters are taken from Greenman's description. Because of its small heads, coriaceous-herbaceous phyllaries, and ultimately smooth leaves, the true relationship of *C. schulzii* is evidently with *C. sylvestre* (Aubl.) Baill. (*C. vargasii* DC. of Schulz's revision⁶), which has griseous-strigose branches, much broader ovate

⁵ Bot. Jahrb. Engler 46: 621. 1912.

⁶ See Blake, Contr. Gray Herb. n. ser. 52: 4. 1917.

leaves, strigillose or strigose beneath, and rather densely strigillose phyllaries. *C. schulzii* is very similar in appearance and pubescence to *C. leiocarpum* Steetz, of which there are good specimens in the National Herbarium collected by Pittier (no. 3136) on Chiriquí Volcano, the type locality; but in that species the fertile ovaries are glabrous or merely papillose at apex even in the flowering stage, the pistillate corollas are hardly 2 mm. long, the sterile ovaries at maturity only 2.4 mm. long or less, and the achenes suborbicular-obovoid, without the distinct stipe-like base of *C. schulzii*. As the phyllaries and outer pales in *C. leiocarpum* are whitish and thin in flower, but in fruit coriaceous-herbaceous, it is probable that a similar variation will be found in *C. schulzii* when its flowering stage becomes known. Owing to Schulz's misinterpretation of *C. anceps* Greenm., he has placed the latter species in a wrong position in his key. It belongs in the group of *C. leiocarpum* and *C. micranthum*, with glabrous ovaries, and may readily be distinguished by its oblong heads 5 to 6 mm. high, collected in groups of about 6 into glomerules 10 to 12 mm. in diameter.

***Clibadium sychnocephalum* Blake, sp. nov.**

Presumably shrubby; upper part of stem terete, rather sparsely strigose, soon glabrate, slightly pustulate from the subpersistent bases of the hairs; leaves opposite, or subopposite above; petioles slender, 1 to 2.5 cm. long, hispid above with tuberculate-based hairs; blades ovate, 9 to 12.5 cm. long, 3.2 to 5.5 cm. wide, slenderly acuminate, at base acutely cuncate, thin, sharply serrate or serrulate above the base with 9 to 15 pairs of lanceolate or deltoid usually falcate-acuminate teeth 2.5 mm. long or less, triplinerved about 1 cm. above the base, bright green and somewhat shining above, evenly but sparsely tuberculate-hispidulous with incurved hairs, along the chief nerves hispidulous and hispid-pilose, soon glabrate and smoothish on surface, beneath nearly equally green, in youth densely and subsericeously pubescent, at maturity evenly but sparsely hispid-pilose with ascending hairs, the secondary and tertiary veinlets mostly impressed above, prominulous beneath; peduncles one or two at tips of branches, 4 cm. long or less, densely hispid-pilose with dull several-celled spreading hairs, bearing about 3 glomerules; bracts about 8 mm. long; glomerules very dense, 10 to 12 mm. thick, subglobose, subsessile or on partial peduncles 14 mm. long or less; heads sessile, subglobose, 4.5 to 5.5 mm. high, 5 to 6 mm. in diameter; phyllaries 4 or 5, ovate, 5.5 mm. long, 3 mm. wide, hispid-strigose especially above the base and ciliate, with indurate base and shorter, distinctly herbaceous (in age erubescens), acute to acuminate, reflexed apex; pistillate flowers 10 to 12, paleate, the hermaphrodite 10 or 11, only the outermost paleate; pales subtending the pistillate flowers similar to the phyllaries, the inner with erect tips; hermaphrodite pales oblong, obtuse, sparsely ciliate, 3 mm. long; pistillate corollas white, 3-toothed, glabrous, 2.8 mm. long, the achenes (not mature) suborbicular-oval, pubescent at apex, 2 mm. long; hermaphrodite corollas white, hispid at apex, 4 mm. long, the sterile ovaries oblong or linear-oblong, bearing a very few hairs at apex, 1.2 to 2 mm. long.

Type in the U. S. National Herbarium, no. 531405, collected in clearings near Río Flautas, in the Río Paez Valley, Tierra Adentro, Cauca, Colombia, altitude 2,900 meters, January 26, 1906, by H. Pittier (no. 1211).

This very distinct species may be distinguished from its nearest ally, *Clibadium trianae* (Hieron.) Blake, by its larger heads, squarrose phyllaries and pistillate pales, more numerous flowers, and much larger corollas.

***Espeletia argentea phaneractis* Blake, subsp. nov.**

Characters of *E. argentea*; heads radiate, the rays "yellow," numerous, about 3-seriate, the tube 1 to 1.3 mm. long, densely spreading-pubescent with short several-celled hairs, the lower of these with a narrower elongate terminal cell, the lamina oblong, 3.5 to 4.5 mm. long, 1.5 mm. wide, unevenly tridenticulate; disk corollas 4.5 mm. long, the tube and base of throat with a few hairs like those of the rays, the

teeth sparsely stipitate-glandular on back and sometimes with a few longer several-celled hairs.

Type in the U. S. National Herbarium, no. 1042324, collected on a dry páramo on a mountain west of Zipaquira, Department of Cundinamarca, Colombia, altitude 3,100 to 3,200 meters, October 20 to 24, 1917, by F. W. Pennell (no. 2522).

ADDITIONAL SPECIMEN EXAMINED:

COLOMBIA: Andabaleos and Santa Rosa, Department of Cundinamarca, altitude 3,200 to 4,000 meters, January 13, 1883, *Lehmann* 2405 (sketch and fragm., Gray Herb.).

This plant differs from typical *Espeletia argentea* H. B. K., to which I refer Pennell's no. 2687 from Río San Cristóbal, near Bogotá, in the characters above enumerated, but agrees in pubescence and apparently all other features. In *E. argentea*, as exemplified by *Pennell* 2687, the heads are disciform, with the 4 or 5-seriate pistillate flowers provided with tubular, irregularly 3-toothed, densely hispid-pilose corollas 1.3 to 2.3 mm. long, and the teeth of the disk corollas are densely long-hirsute dorsally.

***Polymnia apus* Blake, sp. nov.**

Herbaceous above, probably tall, the lower portion not seen; stem rather stout, striate and 4-sulcate, rather densely spreading-pilose with loose crisped many-celled hairs about 1.5 mm. long, and stipitate-glandular especially above; internodes 6 to 16 cm. long; leaves opposite, sessile, broadly rhombic or rhombic-suborbicular, 13.5 to 25.5 cm. long, 8.5 to 25 cm. wide, acute or short-acuminate, abruptly contracted about 1 cm. above the base into cordate-clasping connate bases 2.2 cm. wide or more, repand-dentate and denticulate nearly to base (teeth low, bluntly callous-tipped, 3 to 10 mm. apart), submembranaceous, above deep green, evenly but not densely short-pilose on surface with many-celled loose sordid hairs with subglandular bases, densely so along the veins, beneath densely griseous-pilosulous with loose hairs, tripinerved 2 to 6 cm. above the base and loosely reticulate; uppermost pair of leaves, much smaller, ovate, 9 cm. long, 3 cm. wide; peduncles ternate at apex of stem and solitary in the upper axils, 1 or (abnormally) 2-headed, densely stipitate-glandular, 6 to 8 cm. long, naked or with a pair of small bracts; heads about 4 cm. wide; disk about 1.3 cm. high, 1.8 cm. thick; involucre 2-seriate, the outer phyllaries 5, lance-ovate, bluntly callous-tipped, 1.7 to 2.5 cm. long, 5 to 9 mm. wide, herbaceous, loosely spreading, with somewhat reflexed margins, densely stipitate-glandular and somewhat sordid-pilose, the inner (subtending the rays) 10, ovate-lanceolate, acuminate, with inflexed margins, 11 mm. long, stipitate-glandular and especially below and on margin pilose with many-celled hairs; rays 10, yellow, fertile, the lamina oblong, tridentate (the central tooth largest), about 17 mm. long, 5 mm. wide; disk flowers sterile, their corollas yellow, sparsely pilose especially toward apex of tube and on teeth, 8.5 mm. long (tube 4 mm., throat 3 mm., teeth 1.5 mm.); pales lance-ovate 7 mm. long, acuminate, spreading at apex, stipitate-glandular especially toward apex and on margin; ray achenes (immature) plump, glabrous, apparently obcompressed, 5 mm. long, 3 mm. wide.

Type in the U. S. National Herbarium, no. 300979, collected in the Sierra Madre between Santa Gertrudis and Santa Teresa, Tepic, Mexico, August 8, 1897, by J. N. Rose (no. 2079).

The type specimen was originally identified as *Polymnia edulis* Wedd. From that South American species it differs in its considerably longer and narrower outer phyllaries, longer rays, and various other characters.

***Polymnia parviceps* Blake, sp. nov.**

Herbaceous above, probably shrubby below, the lower portion not seen; stem glabrous or very sparsely hirsute below the inflorescence, striate, apparently somewhat glutinous, the internodes 3.5 to 5.5 cm. long; leaves opposite; petioles 2.5 to 8 cm.

long, broadly winged, 3 to 15 mm. wide, at base ampliate and connate-clasping; blades ovate, 10 to 17 cm. long, 4 to 11 cm. wide, acuminate, cuneately contracted into the winged petiole, unequally repand-dentate (teeth deltoid, acutish to obtuse, 1 to 5 mm. high, 5 to 7 mm. apart), papery, above deep green, sordid-puberulous along the chief veins, essentially glabrous on surface, smooth to the touch, somewhat bullate, beneath paler green, evenly but not densely pilosulous along the veins and veinlets, triplinerved above base of blade, loosely prominulous-reticulate beneath; panicle terminal, ternately divided, very many-headed, flattish, 18.5 cm. wide, rather densely sordid-puberulous with crisped eglandular hairs, the bracts linear or linear-subulate, 3 to 10 mm. long, the pedicels 5 to 15 mm. long, nodding; mature heads about 8 mm. wide; disk in fruit 3.5 to 4.5 mm. high, 4.5 to 6 mm. thick; involucre 2-seriate, the outer phyllaries 5, lance-ovate or ovate, 4 to 4.5 mm. long, 1 to 1.8 mm. wide, acutish, herbaceous, sparsely stipitate-glandular on margin and back, the inner (subtending the rays) 10, broadly ovate, submembranous, obtuse, sparsely glandular, 3 mm. long; rays 10, yellow, fertile, the lamina oval-oblong, bidentate, 3.8 mm. long, 1.8 mm. wide; disk flowers sterile, their corollas yellow, glabrous, 2.8 mm. long (tube 1.1 mm. long, abruptly widened into the campanulate throat, this 1.1 mm. long, teeth 0.6 mm. long); pales oblong-ovate, 2.8 mm. long, acute, irregularly dentate, sparsely stipitate-glandular on margin; ray achenes broadly obovoid, plump, somewhat compressed, blackish, glabrous, epappose, 2.5 mm. long, 2 mm. wide.

Type in the U. S. National Herbarium, no. 603981, collected at Torontoy, in the Urubamba Valley, Peru, altitude about 2,400 meters, May 20, 1915, by O. F. Cook and G. B. Gilbert (no. 818).

The native name of *P. parviceps* is given as "yarita." The species is nearest *P. microcephala* Hieron., of Ecuador. In that plant, fragments from the type of which (Sodiro 24/2) are now in the National Herbarium, the leaves are subscabrous above, and the tube of the disk corollas passes gradually into the nearly funnelliform throat.

***Guardiola tulocarpus pubescens* Blake, subsp. nov.**

Stem (especially at the nodes), inflorescence, and petioles loosely and rather densely pubescent with several-celled sordid hairs; leaves at first densely sordid-pubescent beneath, at maturity rather densely pilosulous on the veins on both sides, sparsely so on surface.

Type in the U. S. National Herbarium, no. 1,083,852, collected in the Arroyo del Espinal, San Ignacio, Sinaloa, Mexico, altitude 300 meters, by J. G. Ortega (no. 4593).

The typical form of *Guardiola tulocarpus* A. Gray is glabrous throughout. I have seen a single specimen, collected by E. W. Nelson (no. 4084) near San Sebastián, Jalisco, which approaches this new form in having a similar but less dense pubescence (in this case subglandular) on the stem and the branches of the inflorescence, but the leaves are glabrous as in the typical form of the species. The local name of the new subspecies is given as "vara prieta."

***Melampodium cinerascens* Blake, sp. nov.**

Herbaceous perennial, or suffrutescent below, several-stemmed, erect, about 23 cm. high; stems slender, trichotomously branched, densely and cinereously tuberculate-hispidulous with antrorse hairs with subglandular bases; internodes 1.3 to 3 cm. long; leaves opposite, linear or elliptic-linear, 1 to 2 cm. long, 1 to 3 mm. wide, obtuse, sessile, entire, revolute-margined, firm, above dull green, pubescent like the stem, beneath paler green, similarly pubescent with somewhat looser hairs and densely gland-dotted; peduncles terminating stems and branches, monocephalous, 1 to 2.8 cm. long, pubescent like the stem, very slender; heads in fruit 6 to 7 mm. wide; disk 3.5 to 5 mm. high; involucre 2-seriate, the outer phyllaries 5, broadly ovate or suborbicular-ovate, at maturity 4 mm. long, 2 to 3 mm. wide, connate for one-third to one-half their length, obtuse, subherbaceous without scarious margin, 3-nerved, densely antrorse-hirsute and ciliate with tuberculate-based hairs; rays about 7, white, the

lamina suborbicular, bidentate, 3 mm. long, 2.5 mm. wide; disk corollas white, densely hispidulous on tube, sessile-glandular on teeth outside, densely barbate-tufted at apex of teeth inside, 2.5 mm. long (tube 0.7 mm., throat 1.2 mm., teeth 0.6 mm.); pales (in natural position) with narrowly cuneate eciliate base and abruptly dilated, deltoid, obtuse, yellowish, lacerate, sessile-glandular apex, ciliate on costa, 3 mm. long; fruit (ray achenes with their enveloping phyllaries) 3.5 to 3.8 mm. long, the body curved-obovoid, 1.5 to 1.8 mm. high, 1.2 mm. wide, somewhat compressed, about 3-ribbed on the sides, not reticulate, rather densely muricate with short thick blunt subglandular papillae, the thick, whitish, somewhat nervose, sparsely hirsute and glandular hood 1 mm. high, abruptly terminated by a subulate, acuminate, sparsely hirsute, strongly recurved horn about equaling the hood.

Type in the U. S. National Herbarium, no. 1,012,316, collected at Hacienda Buena Vista, about 20 miles east of Abasolo, Tamaulipas, Mexico, June 18, 1919, by E. O. Wooton.

Related to *Melampodium longicornu* A. Gray, which is a green annual, with broader leaves and longer horns on the fruits.

***Melampodium argophyllum* (A. Gray) Blake.**

Melampodium cinereum var. *argophyllum* A. Gray; Robinson, Proc. Amer. Acad. 36: 458. 1901.

This *Melampodium*, originally named but not characterized by Doctor Gray⁷ in 1883, was again collected in mountains 24 kilometers west of Icamole, Nuevo León, February 3, 1907, by W. E. Safford (no. 1264). Mr. Safford's specimens agree perfectly with the type in the Gray Herbarium, *Palmer* 2068 (of 1880), collected in the Sierra Madre south of Saltillo, Coahuila. In its densely canescent-tomentose stems, leaves, and involucre the plant seems to differ specifically from the scabrously hispidulous but green *M. cinereum* DC.

***Melampodium microcarpum* Blake, sp. nov.**

Erect, freely branched annual, 28 cm. high or more; stem stoutish, striate, rather densely hirsute with wide-spreading, several-celled, somewhat tuberculate-based hairs and more or less glandular-puberulous especially above; leaves opposite; petioles winged, hastate-auriculate at base and there 5 to 12 mm. wide, not connate, 1 to 2.5 cm. long; blades ovate or triangular-ovate, 4.3 to 5.5 cm. long, 2 to 3.3 cm. wide, acute or acuminate but the apex obtuse, abruptly and subtruncately contracted into the winged petiole, repand-serrate or repand-serrulate with low blunt teeth, rather densely scabrous-hispidulous and hispid above, the glandular-tuberculate bases of the hairs persistent, beneath lighter green, similarly pubescent with somewhat looser hairs, triplinerved; peduncles solitary in the forks and terminal, very slender, glandular-puberulous and rather sparsely hispid-pilose, 3.5 to 7 cm. long; heads at maturity 5 to 6.5 mm. wide; outer phyllaries usually 3, sometimes with 1 or 2 additional smaller ones, broadly ovate, obtuse, hispid-pilose and ciliate and more or less glandular-puberulous, 2 to 4 mm. long, 2 to 2.5 mm. wide; rays 8, the lamina suborbicular, yellow, hispid-pilose on back along the two chief veins, bidentate, 3 to 3.2 mm. long, 2.8 mm. wide; disk corollas yellowish, 2.5 mm. long, the cylindric tube 1 mm. long, glabrous, the campanulate throat 1 mm. long, glabrous, the teeth 0.5 mm. long, papillose-margined and with a tuft of inflexed hairs within below the apiculate apex; pales scarious, obtuse, fimbriatulate or denticulate at tip, 2.5 mm. long; fruits (ray achenes with their enfolding phyllaries) quadrate-oblong or oval-oblong, plump, 1.6 to 1.8 mm. long, truncate-rounded at apex, not hooded or beaked, somewhat contracted below the middle, about 1.2 mm. wide, rounded on the back, about 3-nerved on the sides, irregularly crustaceous-tuberculate on the sides and upper portion of the back, the tubercles depressed, bearing stiffish several-celled hairs.

⁷A. Gray in S. Wats. Proc. Amer. Acad. 18: 104. 1883.

Type in the U. S. National Herbarium no. 572555, collected in the vicinity of Gómez Farias, Tamaulipas, Mexico, altitude about 350 meters, April 13 to 21, 1907, by Edward Palmer (no. 319).

Related to *M. rosei* and *M. mimulifolium* Robinson, but differing widely from either in leaf outline and in the characters of the fruit, as well as its usually 3 phyllaries. The species is remarkable in having occasionally one or two smaller phyllaries in addition to the normal 3 of the outer cycle.

***Parthenium densipilum* Blake, sp. nov.**

PLATE 58.

Stout annual, about 35 cm. high, with numerous simple or subsimple, erect branches, leafy; stem and branches striate, very densely white-hirsute with spreading subtuberculate-based hairs about 2.5 mm. long; leaves alternate, obovate or oval in outline, sessile or narrowed into a petioliform base, 3 to 10 cm. long, 1.5 to 6 cm. wide, lyrate-lobed or toothed, the terminal lobe large, obtuse, coarsely crenate-dentate, the lateral lobes 1 to 3 pairs, oblong, entire or toothed at apex, acute or obtuse, diminishing in size toward base of leaf, the blades papery, dull green above, rather densely hirsute with whitish hairs with yellowish white thickened bases, beneath densely hirsute with white hairs, the veins prominent beneath; heads 3 to 5 mm. wide, in small terminal panicles 3 cm. wide or less, the pedicels about 3 mm. long, densely yellowish-strigose; involucre 3 mm. high, 2-seriate, the outer phyllaries 5, oblong to obovate-oval, obtuse, densely accumbent-hirsute with yellow hairs, subscarious at base and with shorter subherbaceous apex, the inner (subtending the rays) scarious, cuneate-suborbicular, broadly rounded, pubescent above with several-celled clavate hairs; rays 5, white, erect, bluntly 2-lobed, 1.2 mm. long, pubescent with few-celled clavate hairs; disk corollas numerous, white, 2.2 mm. long, nearly glabrous; pales of disk cuneate, subtruncate, 2.5 mm. long, densely pubescent at apex with several-celled clavate hairs; ray achenes obovate, obcompressed, blackish, 2 mm. long, pubescent above with short clavate hairs, deciduous with the subtending phyllary and the two opposed disk flowers with their pales; pappus of 2 triangular acutish paleae, about 0.8 mm. long, connate at base on outer side, pubescent with short clavate hairs.

Type in the U. S. National Herbarium, no. 1,012,317, collected at Hacienda Buena Vista, about 20 miles east of Abasolo, Tamaulipas, Mexico, June 16, 1919, by E. O. Wooton.

A member of the *Parthenium hysterophorus* group, well characterized by its very dense, spreading pubescence.

EXPLANATION OF PLATE 58.—*Parthenium densipilum*, from the type specimen. Natural size.

***Parthenium parviceps* Blake, sp. nov.**

Suffrutescent or frutescent, 40 cm. high and more, the lower part not seen; stem slender, simple below the inflorescence, canescently arachnoid-tomentose, glabrate; leaves alternate; petioles 8 to 23 mm. long, narrowly margined, arachnoid-tomentose beneath; blades triangular-ovate, 5.5 to 9 cm. long, 3.5 to 6 cm. wide, acute, at base subtruncate, narrowly decurrent on the petiole, repand-dentate (teeth obtuse, 13 to 18 pairs), thick-papery, above deep dull green, very harshly tuberculate-hispidulous, beneath densely and canescently arachnoid-tomentose, triplinerved, the lateral veins about 6 pairs, with the secondaries reticulate beneath; panicle terminal, many-headed, 14 cm. wide, sordidly pilosulous-tomentulose, the pedicels 1 to 4 mm. long; heads 3 mm. high, 2.5 to 3.5 mm. thick; involucre 2-seriate, the outer phyllaries 5, suborbicular, 2 mm. long, rounded, pilosulous and short-ciliate, 3-nerved, the inner (subtending the rays) subscarious, orbicular, 3 mm. long, ciliolate and somewhat puberulous; rays 5, white, erect, emarginate, 1 mm. long; disk corollas white, sparsely puberulous at apex, 2.5 mm. long; pales cuneate, subtruncate, 2.8 mm. long, densely puberulous at apex with short several-celled clavate hairs; ray achenes obovate, obcompressed, blackish, 1.6 mm. long, 0.9 mm. wide, pubescent chiefly on inner face and at apex with short

several-celled subclavate hairs, deciduous with the subtending phyllary and the two opposed disk flowers with their pales; pappus none.

Type in the U. S. National Herbarium, no. 840013, collected in rocky soil at Barranca de Tenampa, Zacuapan, Veracruz, Mexico, August, 1906, by C. A. Purpus (no. 1849).

Closely allied to *Parthenium fruticosum* Less., but distinguished by its smaller awnless achenes. In *P. fruticosum*, of which I have examined fragments in the Gray Herbarium from the type (*Schiede* 334), the achene is 2 mm. long, with two awns 0.5 mm. long. Nelson's no. 2965, from the State of Chiapas, agrees well with the type of *P. fruticosum*.

Zinnia leucoglossa Blake, sp. nov.

Slender or stoutish annual, ascending, or the main stem prostrate and sending out rootlets for much of its length, 50 cm. long or less, loosely or diffusely branched, fuscous-purplish, striatulate, hispid with several-celled erectish white hairs and more or less glandular-puberulous; leaves opposite; petioles 0.5 mm. long or less; blades linear to linear-oblong or -elliptic, 9 to 17 mm. long, 1.5 to 4.5 mm. wide, obtuse or rounded at both ends, thickish, entire, rather pale green, hispid on both sides with few-celled, glandular-tuberculate-based, ascending white hairs and somewhat gland-dotted, triplinerved; peduncles axillary and terminal, 1.5 to 8 cm. long, pubescent like the stem, very slightly or not at all enlarged just below the heads; heads 8 to 14 mm. wide; disk rounded at apex, 5 to 10 mm. high, 6 to 8 mm. thick; involucre 4-seriate, strongly graduate, 3 to 4 mm. high, the phyllaries oval, broadly rounded at apex, subindurate, greenish with slightly colorate apex, hispid-pilose over most of their exposed surface and more or less gland-dotted; rays 6 to 8, the lamina oval, bidenticulate, white, slightly green-tinged beneath toward apex, rather densely hispidulous outside with spreading hairs and more or less gland-dotted, 3.5 to 4.5 mm. long, 2.3 to 3.5 mm. wide; disk-corollas orange, the tube gland-dotted, 0.1 to 0.2 mm. long, the throat very slender, somewhat dilated near the middle, glabrous except at the narrowly funnelform apical portion, where hispid and gland-dotted, 3 mm. long, the teeth narrowly oblong, obtuse, hispid and tuberculate-glandular, 0.6 mm. long; receptacle slenderly subulate; pales obtuse, scarious, yellowish above, sparsely gland-dotted and with a few hairs along the keel, about 5.8 mm. long; ray achenes obcompressed, 1-ridged on the inner face, bidentate at the truncate apex, blackish, 2 mm. long, densely covered with glandular tubercles bearing short hairs; disk achenes strongly compressed, oblong, blackish, deeply and broadly emarginate at apex, sparsely appressed-hairy on the sides, densely hispid-pilose-ciliate on both margins, 2.3 mm. long; awn solitary, slender, hispidulous, 1.5 to 1.8 mm. long.

Type in the U. S. National Herbarium, no. 637065, collected in moist ravine, vicinity of Acaponeta, Tepic, Mexico, April 9, 1910, by J. N. Rose, P. C. Standley, and P. G. Russell (no. 14205).

ADDITIONAL SPECIMEN EXAMINED:

SINALOA: Sand dunes, vicinity of Rosario, April 15, 1910, *Rose, Standley, & Russell* 14629.

This species finds its only close relative in *Z. bicolor* Hemsl., from which it differs in its regularly ciliate disk-achenes. In *Z. bicolor* the achenes are bordered by a crustaceous margin irregularly broken up into teeth.

Heliopsis longipes (A. Gray) Blake.

Philactis longipes A. Gray, Proc. Amer. Acad. 15: 35. 1879.

The genus *Philactis* Schrad. has hitherto been regarded as consisting of two species, *P. zinnioides* Schrad. and *P. longipes* A. Gray. The type species, *P. zinnioides*, has apparently not been re-collected since its description. It is characterized by its infertile disk achenes bearing a pappus of 4 unequal awns connate at base. In

P. longipes A. Gray, on the other hand, the disk achenes, as shown by submature examples of *Schaffner* 763/338, the only known collection besides the type (*Parry & Palmer* 465), are certainly fertile, and are epappose or bear (according to Gray) 2 or 4 minute teeth. In these features, as well as in habit, involucre, and floral characters, the species agrees perfectly with *Heliopsis*, and should be referred to that genus.

***Rumfordia verapazensis* Blake, sp. nov.**

Herbaceous above, oppositely branched, the lower part not seen; stem stout, striate, obscurely pubescent or glabrous below, pilosulous above with several-celled eglandular loose dull whitish hairs; leaves opposite; petioles cuneate-winged, 6 to 30 mm. long, 5 to 10 mm. wide at apex, connate-clasping at base, pilose-ciliate; blades ovate or triangular-ovate, 8 to 11 cm. long, 3 to 8 cm. wide, sometimes with a very short and obscure deltoid lobe on one side near base, acuminate, at base broadly rounded or cuneate-rounded, then cuneately decurrent the whole length of the petiole, mucronulate-denticulate (teeth about 0.3 mm. high, 3 to 5 mm. apart), membranaceous, above deep green, evenly but sparsely pilose with loose several-celled hairs with persistent tuberculate bases, glabrescent, beneath lighter green, antrorsely short-pilose along veins and chief veinlets, gland-dotted on surface, triplinerved above the base, the veins and veinlets loosely prominulous-reticulate especially beneath; heads about 3 cm. wide, in ternately arranged panicles of about 7 at tips of stem and branches, on pedicels 1 to 3 cm. long, these densely spreading-pilose with many-celled loose whitish hairs and between them somewhat pilosulous-tomentulose; outer phyllaries 5, oval-ovate, 1.7 to 2 cm. long, 7 to 8.5 mm. wide, acuminate, spreading, thin-herbaceous, 3-nerved and prominulous-reticulate, contracted at base and short-connate, ciliate and along the veins spreading-pilose with many-celled hairs; inner phyllaries oblong-ovate, acuminate, 7.5 mm. long, rather densely stipitate-glandular and hispid-pilose with several-celled hairs, ciliolate, submembranous; rays (not well seen) yellow, pistillate, the tube 4.5 mm. long, pilose and stipitate-glandular, the lamina about 12 mm. long, 2.5 mm. wide; disk flowers fertile, their corollas yellow, on tube densely spreading-pilose with many-celled hairs and stipitate-glandular, sparsely so above, at maturity 7.5 mm. long (tube ampliate at base, 3.2 mm. long, throat slender-funneliform, 3.3 mm., teeth 1 mm.); pales broadly cuneate-obovate, abruptly acuminate, 5.5 mm. long, stipitate-glandular and hispidulous, ciliolate; achenes thick-obovoid, 1.8 to 2 mm. long, bluntly quadrangular or subtrigonal, blackish, glabrous, epappose.

Type in the U.S. National Herbarium, no. 408022, collected near the Finca Sepacuité, Alta Verapaz, Guatemala, March 28, 1902, by O. F. Cook and R. F. Griggs (no. 239).

Allied to the Mexican *Rumfordia oreopola* Robinson, which has narrower, sharply acuminate leaves with one to three acuminate lateral teeth on each side toward the base.

***Sclerocarpus columbianus* Rusby & Blake, sp. nov.**

Herbaceous (?), 0.3 to 1 meter high, above simple or sparsely branched, the stem striate, hispid-pilose with spreading or ascending hairs, and more or less short-pilose with several-celled hairs; leaves opposite below, alternate above; petioles slender, 1 to 2.2 cm. long, hispid-pilose and hispidulous; blades ovate, 3.5 to 7.5 cm. long, 1.8 to 4 cm. wide, acute or acuminate, at base cuneate or rounded-cuneate and narrowly decurrent on the petiole, crenate-serrate or serrulate above the base with about 18 pairs of bluntish teeth, thin, above dull green, densely hispidulous and hispid-pilose with ascending hairs (the larger tuberculate-based), beneath paler green, densely hispid-pilose with scarcely tuberculate-based hairs, triplinerved, only the primary and chief secondary nerves prominulous beneath; peduncles solitary, terminal, pubescent like the stem, 1.8 to 3.8 cm. long, sometimes bearing a single bract below the head; heads about 12 mm. wide, 10 mm. high; involucre nearly 1-seriate or distinctly 2-seriate, the phyllaries about 10, unequal, elliptic-obovate or

the larger elliptic, 7 to 20 mm. long, 2 to 5 mm. wide, rather densely hispid-pilose with ascending hairs, acute, herbaceous, ribbed at base or nearly to apex, the outer sometimes much larger than the inner and spreading; rays yellow, neutral, the tube hispidulous, 2.2 mm. long, the lamina suborbicular, tridentate to deeply 2-lobed, 3 to 3.5 mm. long, 3 to 4 mm. wide, hispidulous on the back, 13-nerved; disk corollas yellow throughout, 4.8 to 5.8 mm. long, hispidulous especially above, the tube about 1 mm. long, passing gradually into the very slenderly funnelform throat, the lanceolate acute teeth 1 to 1.2 mm. long, hispidulous-barbate within below the apex with colorless hairs; fruits (achenes with their enclosing pales) all beaked, obovoid, 5.5 to 7 mm. long (the beak 1.5 to 2 mm. long), indurated, ribbed, and often transverse-rugulose above, appressed-pubescent above; achene obliquely obovoid, with short, whitish, stipe-like base, 4 to 5.5 mm. long, 1.5 to 1.8 mm. wide, somewhat sulcate on the sides, olivaceous or blackish brown, epappose, glabrous.

Type in the herbarium of the New York Botanical Garden, collected in thicket on irrigated land near the sea at Cienaga, vicinity of Santa Marta, Colombia, September 6 to 12, 1893-1899, by Herbert H. Smith (no. 518). Duplicate in the U. S. National Herbarium.

This species is described on the collector's label as suffruticose, but is probably herbaceous. It was apparently rare, as it was observed at only one locality. *Sclerocarpus columbianus* is most nearly related to *S. phyllocephalus* Blake, of Guatemala, but may be distinguished by the usual lack of leaflike bracts at the base of the involucre, by the smaller disk corollas with shorter teeth, and by the larger achene.

Montanoa reko Blake, sp. nov.

Large tree, the trunk up to 0.5 meter thick; branches slender, obscurely angled, appressed-pilose when very young, quickly glabrate; internodes 2 to 5 cm. long; leaves opposite; petioles slender, naked, glabrous, 1.5 to 6 cm. long; blades elliptic-lanceolate (smaller) to oval-ovate or subrhombic-ovate, 8.5 to 19 cm. long, 2.3 to 9.5 cm. wide, unlobed or the larger with a short acute lobe on one or both sides above the middle, acuminate or attenuate, acuminately cuneate at base, serrulate or crenate-serrate above the entire lower portion, papery or subpergamantaceous, equally green on both sides, above somewhat shining, sparsely and minutely strigillose with lepidote-based hairs, in age lepidote and rough, beneath densely griseous-pilosulous and dotted with shining brown glands at first, soon perfectly glabrous, triplinerved well above the base; heads discoid, 4-flowered, very numerous in a dense, rounded, terminal panicle 6.5 cm. wide, its branches and the pedicels (2 to 4 mm. long) densely pilosulous; bracts minute; disk in anthesis 5 mm. high, 2.5 mm. thick; outer phyllaries 4 or 5, ovate, erect, unequal, the larger 2 to 2.5 mm. long, 1.1 to 1.5 mm. wide, acutish, pilosulous and ciliate; corollas white, glandular and pilosulous with several-celled hairs above, 3.6 mm. long (tube 1.2 mm., throat subcampanulate, 1.5 mm., teeth 0.9 mm.); pales (submature) ovate, 5.8 mm. long, 2.5 mm. wide (when flattened out), gradually narrowed into the erect cuspidate tip, densely long-villous and villous-ciliate; achenes (submature) thick-quadrangular, glabrous, epappose, 1.3 mm. long.

Type in the U. S. National Herbarium, no. 1,012,313, collected at Apango, Oaxaca, Mexico, altitude 450 meters, October 11, 1917, by B. P. Reko (no. 3534). Duplicate, consisting of a sterile branch with larger leaves than the type, also in the National Herbarium. Also collected by Reko (no. 3160) at the same locality, April 20, 1912.

Doctor Reko describes this as a big tree, up to half a meter in diameter, with cork-like bark. It contains a rosin or camphor-like substance which burns like pitch, and has crystallized on the younger parts of one of the specimens examined. The species bears the vernacular names "yagazeche" and "ocotillo." On the sheet of sterile specimens the collector has noted the color of the flowers as yellow, but if this sheet (the larger leaves of which are described above) really belongs to this species, as it seems clearly to do, the flowers are surely white.

This remarkable species finds its only close ally in *Montanoa anomala* Robins. & Greenm., of Veracruz, in which the uppermost leaves (the only ones known) are suborbicular, broader than long, puberulent and scabrous above and rusty-tomentose beneath, while the phyllaries are linear to linear-lanceolate.

***Montanoa subglabra* Blake, sp. nov.**

Shrub with opposite spreading branches; stem stout, terete, pithy, somewhat appressed-puberulous, quickly and completely glabrate; internodes 0.6 to 4 cm. long; leaves opposite; petioles slender, naked, at first puberulous, quickly and completely glabrate except on the sulcate upper side, 1 to 3 cm. long; leaf blades rhombic or rhombic-ovate, 6.5 to 13 cm. long, 2.8 to 8 cm. wide, often with a pair of short, deltoid, erect, mucronulate lobes near middle, acuminate, crenate-serrulate above the usually entire acutely cuneate base (teeth very depressed, mucronulate, 3 to 8 mm. apart), papery, above deep dull green, harshly and sparsely hispidulous with mostly deciduous hairs with persistent lepidote-tuberculate bases, beneath in extreme youth densely cinereous-tomentulose, quickly becoming perfectly glabrous and green, or sometimes with a few persistent hairs in the axils of the veins, triplinerved above the base, loosely prominulous-reticulate beneath; panicles large, 7 to 20 cm. wide, very many-headed, ternately divided, accumbent-pilosulous, the pedicels 2 to 6 mm. long, the ultimate bracts minute; heads about 9 mm. wide, the disk in mature flower 5 to 6 mm. high, about 6 mm. thick; outer phyllaries 5, ovate, obtuse to acute, 2.2 mm. long, 1.2 mm. wide, densely ciliate, on back densely pilose or glabrescent above; rays about 4, white, the lamina oval, 4 to 4.5 mm. long, 2.2 mm. wide; disk flowers about 12, their corollas white, stipitate-glandular and pilosulous chiefly above, 3.2 to 4 mm. long; pales (immature) densely villous and villous-ciliate, the body 1.8 mm. long, rather abruptly contracted into an erect or recurved, lanceolate, acuminate cusp 1.8 mm. long.

Type in the U. S. National Herbarium, no. 252627, collected near Neutón, Guatemala, altitude 915 to 1,220 meters, December 13 to 15, 1895, by E. W. Nelson (no. 3536). Also collected by Nelson at the same locality and date under no. 3513.

Related to *Montanoa myriocephala* Robins. & Greenm. and *M. xanthiifolia* Schultz Bip.; distinguished from the former by its quickly glabrate stem and lower leaf surface, five phyllaries, fewer rays, and more numerous disk flowers, and from the latter by its merely puberulent, quickly glabrate petioles, and leaves of somewhat different shape.

***Montanoa arsenei* Blake, sp. nov.**

Stem herbaceous above, oppositely much-branched, stoutish, subterete, densely and sordidly subtomentose-pilosulous and -pilose with chiefly spreading hairs; leaves opposite; petioles densely sordid-pilosulous and more sparsely pilose, naked, 5 to 12 mm. long; leaf blades lanceolate to lance-ovate or lance-obovate, the larger 6 to 12 cm. long, 1.5 to 4 cm. wide, acuminate, at base truncate and often very unequal, occasionally with a small tooth on one or both sides at base, crenate-serrate with depressed teeth or the upper subentire, papery, above deep green, rather harshly and very densely tuberculate-hispidulous and sparsely glandular, beneath evenly and rather densely hispidulous-pilosulous with spreading griseous hairs and densely dotted with shining brownish glands, along the chief veins densely and sordidly hirsute-pilose with short several-celled hairs, triplinerved 1 to 2 cm. above the base and rather densely prominulous-reticulate beneath; heads very numerous, subternately arranged, about 2 cm. wide in flower, in fruit subglobose and (disk) about 1.6 cm. wide, on erect or in fruit somewhat decurved pedicels mostly 1 to 4 cm. long; outer phyllaries 7, spreading or recurved, lanceolate or linear-lanceolate, obtuse or acutish, often callous-apiculate, herbaceous, densely sordid-pilosulous, in flower 4 to 6 mm. long, in fruit 7 to 10 mm.; rays 7, white, the lamina obovate, 3-denticulate, about 11 mm. long, 6 mm. wide; disk corollas white, gland-dotted and sparsely

short-pilose with several-celled hairs, 3.8 mm. long (tube 0.8 mm., throat 2 mm., teeth 1 mm.); fruiting pales scarious, inflated, about 8 mm. long, rather gradually narrowed into the spreading or reflexed cuspidate apex (cusp 0.5 to 0.8 mm. long), somewhat gland-dotted, otherwise essentially glabrous except for the slightly ciliolate apex; achenes glabrous, epappose, 3 mm. long.

Type in the U. S. National Herbarium, no. 1,000,576, collected at Rincón, near Morelia, Michoacán, Mexico, altitude 1,900 meters, September 8, 1910, by G. Arsène (no. 5290).

Allied to *Montanoa frutescens* (Maire) Hemsl., which has glabrous or early glabrate branches and stiffer pales; also to *M. purpurascens* Robins. & Greenm., which has leaves with cuneate base and of different outline; and to *M. uncinata* Schultz Bip., which has different pales and leaves.

Montanoa pilosipalea Blake, sp. nov.

Stem herbaceous above, stoutish, subterete, oppositely branched, densely and sordidly tomentose-pilose with loosely spreading hairs; leaves opposite; petioles densely sordid-tomentose, sometimes glabrescent beneath, broadened below, essentially naked except toward apex, 8 to 18 mm. long; leaf blades triangular-ovate, 3.5 to 7 cm. long, 1.3 to 4 cm. wide, with 1 or 2 pairs of broad blunt triangular teeth or lobes near base or the smaller subentire, acuminate, short-decurrent on petiole from a broadly rounded or truncate base, with essentially entire or obscurely few-serrulate margin, pergamentaceous, above dull green, densely and somewhat harshly hispidulous-pilosulous (the hairs with persistent tuberculate bases), and along the chief veins densely and sordidly pilosulous-tomentulose, beneath densely and griseously pilosulous-tomentose with incurved hairs, triplinerved above the base, the secondaries mostly concealed beneath by the tomentum; panicles flattish-topped, many-headed, the terminal one 15 cm. wide; pedicels at maturity deflexed at apex, 1 to 2 cm. long; heads in fruit subglobose, the disk 1 cm. high, 1.3 cm. thick; outer phyllaries 5 or 6, in fruit lanceolate or lance-ovate, 4 to 5 mm. long, 1.2 to 1.5 mm. wide, spreading or recurved, obtuse or acutish, callous-tipped, pilosulous; rays white, the lamina elliptic, bidenticulate, 7 mm. long, 2.5 mm. wide; disk corollas white, gland-dotted and hispidulous chiefly above, 3.2 to 3.5 mm. long; body of the fruiting pales obovate-oblong, scarious, 7 to 8 mm. long, glandular, loosely long-pilose, densely pilose-ciliate above (the hairs nearly 1 mm. long), abruptly contracted into a firm spreading or slightly recurved cusp 1.5 to 1.8 mm. long; achenes obovoid, thickened, glabrous, blackish, epappose, 3.2 mm. long.

Type in the U. S. National Herbarium, no. 1,000,580, collected at Fort de la Guadalupe, vicinity of Puebla, Puebla, Mexico, altitude 2,170 meters, November 11, 1906, by G. Arsène (no. 268a).

Nearest to *Montanoa uncinata* Schultz Bip. and *M. patens* A. Gray, but distinguished from both by its loosely and rather densely pilose and ciliate, longer-cuspidate pales.

Montanoa affinis Blake, sp. nov.

"Shrub 3 meters high;" stem herbaceous above, slender, sparsely and obscurely strigillose, subterete, the opposite obscurely ancipital branches spreading at a right angle; leaves opposite; petioles very slender, naked, obscurely strigillose, 1.5 to 4.5 cm. long; leaf blades broadly ovate or suborbicular-ovate, 7 to 11 cm. long, 4.5 to 8 cm. wide, short-acuminate, at base rounded-cuneate to subtruncate and somewhat unequal, the larger with a pair of short blunt lateral lobes near middle, remotely crenate with broad depressed mucronulate teeth, membranaceous, above deep green, very harshly and evenly but sparsely tuberculate-hispidulous with mostly deciduous hairs with persistent bases, beneath equally green, sparsely strigillose or hispidulous along the chief veins, and on surface sparsely gland-dotted, triplinerved or 3-nerved, the chief veins prominulous beneath; panicles ternately divided, terminating

branches and branchlets, the individual ones 6 to 8 cm. wide, about 12-headed, loose. the pedicels finely hispidulous with chiefly appressed hairs, usually 0.5 to 2 cm. long; heads in flower 1.7 to 2 cm. wide; disk about 5 to 6 mm. high and thick; outer phyllaries 5, oblong or ovate, obtuse, 2 to 3.5 mm. long, 1.5 to 2 mm. wide, herbaceous, 3-nerved, finely strigillose; rays 5, "white," the lamina broadly cuneate-obovate or broadly oval, emarginate, about 8 mm. long, 6 mm. wide, on back stipitate-glandular; disk corollas about 22, stipitate-glandular, about 3.6 mm. long (tube 0.6 mm., throat cylindric-campanulate, 2 mm., teeth ovate, 1 mm.); pales (immature) turbinate-cymbiform, rather loosely inclosing the achenes, stipitate-glandular and along midline pubescent with short several-celled hairs, the body 2.2 mm. long, the truncate-rounded apex abruptly contracted into an erect or slightly incurved mucronate-tipped point about 0.7 mm. long; achenes (immature) obliquely compressed-turbinate, 4-angled, with broad truncate apex, epappose, glabrous, 1.5 mm. long.

Type in the U. S. National Herbarium, no. 386076, collected in granitic soil at El Ocote, Michoacán or Guerrero, Mexico, altitude 100 meters, November 12, 1898, by E. Langlassé (no. 621).

In the absence of mature pales the exact position of this species is somewhat uncertain, but it seems to be rather closely related to *M. subtruncata* A. Gray, in which the leaves are rather densely hispidulous-pilosulous beneath on all the veins and veinlets. The vernacular name of *M. affinis* is given as "flor de San Francisco."

Isocarpha cubana Blake, sp. nov.

Annual, erect or ascending, or sometimes procumbent and rooting at base, 10 to 60 cm. high; stem rather slender, puberulous with several-celled, incurved or somewhat spreading, eglandular hairs, usually freely branched, with divaricate to erectish branches; internodes usually much longer than the leaves; leaves mostly opposite, the uppermost and those of the branches usually alternate; petioles winged, 8 to 25 mm. long, 1 to 6 mm. wide, entire, dilated at base into dentate auricles 2 to 24 mm. wide; blades triangular-ovate, 1 to 5 cm. long, 0.6 to 4.3 cm. wide, acute to obtusish, subtruncate to cuneate at base and decurrent on the petiole, crenate-dentate with mostly obtuse teeth, membranaceous, sparsely pilosulous above, glabrescent except along costa and margin, beneath pilosulous along veins and veinlets, sometimes also on surface, with spreading several-celled hairs, and densely sessile-glandular with shining glands, weakly triplinerved, the veins prominulous beneath; upper leaves and branch leaves much smaller; heads discoid, usually very numerous, the pedicels mostly 0.8 to 3 cm. long, pubescent like the stem; disk ovoid becoming ellipsoid, 6 to 9 mm. long, 4 to 5 mm. thick, acutish becoming obtuse; involucre about 2-seriate, slightly graduate, 2.5 to 3 mm. high, appressed, the phyllaries ovate-lanceolate to oblong, acute or the outer subacuminate, thin-herbaceous, 1-costate at base for about one-third their length, rather densely spreading-puberulous and ciliolate with several-celled eglandular hairs and sparsely sessile-glandular; corollas white, essentially glabrous, 2 mm. long (tube 0.6 mm., throat slightly broader, 1.1 mm., teeth 0.3 mm.); pales cuneate-oblong, 2.2 mm. long, apiculate at the subtruncate apex, ciliolate and on back sessile-glandular; achenes prismatic, 5-angled, with conspicuous but short inflexed carpopod, blackish, densely spreading-puberulous on the angles, 1 mm. long; style branches with elongate, linear, hispidulous appendages.

Type in the U. S. National Herbarium, no. 521866, collected near Nueva Gerona, Isle of Pines, south of Cuba, December 19, 1903, by A. H. Curtiss (no. 246).

ADDITIONAL SPECIMENS EXAMINED:

CUBA: Without definite locality, *Wright* 2857. Province of Pinar del Rio: *Baker & Abarca* 4201; *Britton & Cowell* 9825; *Shafer* 10737, 11237. Province of Camaguey: *Shafer* 348, 958. Province of Oriente: *Pollard & Palmer* 318; *Britton* 1998; *Shafer* 1565, 12393.

This species has been confused with *Isocarpha divaricata* Benth. and *I. atriplicifolia* (L.) R. Br., and the material cited has been distributed under both names. *Isocarpha divaricata* Benth., of which *I. blepharolepis* Greenm.⁸ is a synonym, is only known from Ecuador and Peru. It is at once distinguished from the *I. atriplicifolia* group by its exauriculate petioles and glabrous achenes. The *I. atriplicifolia* group consists of three species, distinguished by the following characters:

ISOCARPHA CUBANA Blake.—Phyllaries green, merely acute or subacuminate, the simple costa conspicuous only in the lower third or not at all; pales merely apiculate or obtusish; achenes 1 mm. long. Cuba and Isle of Pines.

ISOCARPHA ATRIPLICIFOLIA (L.) R. Br.—Phyllaries acuminate, puberulous and ciliate with chiefly eglandular hairs, the prominent double whitish costa continued nearly to apex; pales acute, ciliate, the hairs at apex chiefly eglandular; achenes about 1.5 mm. long; pedicels puberulous, obscurely if at all stipitate-glandular. Guerrero (*Palmer* 534 of 1894-5; *Nelson* 2267) to Costa Rica (*Pittier*). Hitherto wrongly referred to *I. divaricata*.

ISOCARPHA BILLBERGIANA Less.—Phyllaries long-acuminate, costate as in *I. atriplicifolia*, stipitate-glandular on back and margin, the eglandular hairs few or wanting; pales abruptly short-acuminate, ciliate with chiefly gland-tipped hairs; achenes 1.5 mm. long; pedicels conspicuously stipitate-glandular. Colombia (*Smith* 678) and Trinidad (*Kuntze*, April, 1874). Hitherto confused with *I. atriplicifolia*. Lessing's type, collected by Billberg, came from Tierra Bomba, near Carthagena, Colombia.

Mr. J. Hutchinson, of the Kew Herbarium, to whom heads of the three species above described were sent, has kindly compared them with the type of *Bidens atriplicifolia* in the Linnaean Herbarium and reports that *Nelson* 2267 is an exact match. Linnaeus gave as the locality for his species "America meridionali. Miller."

Isocarpha glabrata Blake, sp. nov.

Suffrutescent, about 25 cm. long, apparently procumbent, much branched; stem slender, like the branches green and glabrous; internodes 5 to 25 mm. long; leaves opposite, or the uppermost scattered, linear-oblancheolate, 1.7 to 2.3 cm. long, 1.5 to 3 mm. wide, acute or obtusish, tapering into the short petioliform base, entire, somewhat fleshy, green on both sides and glabrous except for a few loose hairs along the slightly revolute margin, triplinerved; heads discoid, solitary or in pairs at apex of stem and branches, the peduncles glabrous, 2.5 cm. long to almost obsolete, bearing 1 or 2 lanceolate bracts just below the heads; disk turbinate, about 5 mm. high and thick, convex at maturity; involucre about 2-seriate, scarcely graduate, 4 mm. high, the phyllaries few (grading into the pales), lanceolate to oblong-lanceolate, acuminate or acute, callous-mucronate, whitish-green, about 3-ribbed, narrowly scarious margined, sparsely gland-dotted, otherwise glabrous; corollas white, sparsely stipitate-glandular at base of throat, 2.5 mm. long (tube 0.7 mm., throat 1.1 mm., teeth 0.7 mm.); pales oblong, shortly callous-apiculate from the rounded to emarginate apex, stiff, whitish, with 2 strong white ribs and 3 green vittae, somewhat gland-dotted, otherwise glabrous, the scarious margin erose; achenes obovoid-oblong, 1.5 to 1.8 mm. long, 5 or 6-ribbed, glabrous, brownish, truncate, epappose, with short but conspicuous whitish carpopod.

Type in the U. S. National Herbarium, no. 848745, collected on the Silla de Cayo, Cayo Romano, Camaguey, Cuba, October 9 to 11, 1909, by J. A. Shafer (no. 2513).

Closely related to *Isocarpha oppositifolia* (L.) R. Br., from the smoother forms of which it is distinguished by the entire absence of hairs (aside from the glands) on the surface and margins of the phyllaries and pales.

Sabazia leiachaenia Blake, sp. nov.

Slender annual, 6 to 10 cm. high, simple or with few erect or ascending branches; stem purplish-tinged, strigose with white hairs and pilose with spreading purplish

⁸Field Mus. Bot. 2: 347. 1912.

gland-tipped hairs; leaves about 4 pairs, opposite, sessile, the blades lance-ovate or lanceolate to (upper) linear-lanceolate, 8 to 18 mm. long, 2 to 7.5 mm wide, obtuse, cuneate at base, serrate with 1 to 3 pairs of lanceolate, callous-tipped, salient teeth, triplinerved, thickish, green both sides, sparsely pilose along costa above and hispid-pilose-ciliate with basally thickened hairs, beneath ascending-pilose along costa, on surface sparsely pilose with weak gland-tipped hairs; peduncles terminal and axillary, pubescent like the stem, 2.5 to 3.5 cm. long; heads 1.2 to 1.4 cm. wide, hemispheric; involucre 2-seriate, equal, 3.5 to 4 mm. high, the phyllaries few, submembranous, purplish, ovate or oval-ovate, rounded, pilose chiefly below with mostly gland-tipped hairs, above glandular-ciliate; rays 8, fertile, the lamina quadrate, 3-toothed, purplish outside, white within, or apparently sometimes white on both sides, the limb 4 mm. long, 3.2 mm. wide, the tube (1 mm. long) densely pilose; disk flowers numerous, the corollas pale yellow, 2 mm. long, the densely pilose tube 0.5 mm. long, the campanulate essentially glabrous throat 1.2 mm. long, the deltoid papillose teeth 0.3 mm. long; pales glabrous, 2.8 mm. long, divided nearly to base into 3 narrowly linear acuminate lobes, the middle one broader and longer than the lateral; ray achenes obovoid, plumpish, blackish, glabrous, epappose, striatulate, finely cross-wrinkled, 1.2 mm. long; disk achenes similar, glabrous, 1.2 mm. long, their pappus of 10 oblong, obtuse, spinulose-fimbriate, persistent, equal squamellae 1 mm. long.

Type in the U. S. National Herbarium, no. 451536, collected on the Nevada de Toluca, State of Mexico, Mexico, October 15, 1903, by J. N. Rose and J. H. Painter (no. 7918).

The only close relative of this species is *S. anomala* Greenm., in which both the ray and the disk achenes are hispidulous and bear a pappus.

***Sabazia radicans* Blake, sp. nov.**

Herbaceous, perennial (?); stems slender, striatulate, greenish, procumbent and rooting at the nodes below, ascending above, sparsely branched, about 45 cm. long, glabrous below, sparsely hispid-pilose above with appressed or ascending hairs; internodes 7 to 11 cm. long; leaves opposite; petioles slender, naked, very sparsely hispid-pilose, 10 to 15 mm. long; blades lance-ovate, 3 to 5 cm. long, 1.5 to 2.5 cm. wide, acuminate, cuneate to rounded at the unequal base, bearing 3 or 4 coarse ascending teeth on each side near the middle, membranaceous, triplinerved and loosely reticulate beneath, green on both sides, above and on margin sparsely hispid-pilose with several-celled, tuberculate-based, ascending hairs, beneath very sparsely hispid-pilose chiefly on the veins; peduncles solitary, terminal, rather densely hispid-pilose with mostly appressed hairs, 8 to 16 cm. long; heads 1.6 to 2 cm. wide; disk 5 to 6 mm. high, 7 mm. wide; involucre 2 or 3-seriate, equal, 4 to 4.5 mm. high, the phyllaries few, oval-ovate, obtuse, green, submembranous, striatulate, densely ciliate with subglandular hairs and sparsely puberulous toward apex with similar hairs; rays 8, pinkish-white (when dried), the lamina cuneate-obovate, tridentate, nearly glabrous, 8 mm. long, 4 mm. wide; disk corollas pale yellow, sparsely papillose-hispidulous, 2.5 to 2.8 mm. long (tube 0.7 mm., teeth 0.5 to 0.7 mm.); pales lance-elliptic, rather abruptly acuminate, spinulose-denticulate, 4 mm. long; ray achenes obovoid-oblong, hispidulous especially on margin and at apex, epappose, 2 mm. long; disk achenes (immature) similar.

Type in the U. S. National Herbarium, no. 461423, collected near Trinidad Iron Works, Hidalgo, Mexico, altitude 1,570 meters, on wet banks, July 11, 1904, by C. G. Pringle (no. 8943).

Sabazia radicans is distinguished from *S. sarmentosa* Less., under which name the type was distributed, by its much less pubescent leaves and stems. The latter species, moreover, has glabrous achenes, according to DeCandolle.

***Sabazia triangularis* Blake, sp. nov.**

Trailing herbaceous perennial; stems subsimple or sparsely branched, rooting at the lower nodes, with ascending tips, about 80 cm. long, striate, rather sparsely pilose especially above with loosely ascending or spreading few-celled hairs; inter-

nodes 3 to (uppermost) 10 cm. long; leaves opposite; petioles densely spreading-pilose on upper side, 1 to 2 cm. long; blades triangular-ovate or the uppermost lance-ovate, 3.5 to 5 cm. long, 2 to 2.5 cm. wide, acuminate nearly from the base, truncate-rounded at base, serrate with 8 to 10 pairs of depressed mucronulate teeth, membranous, triplinerved, above rather densely pilose with several-celled, subtuberculate-based, lucid, ascending hairs, beneath slightly paler green, rather densely pilose with loosely ascending hairs; peduncles terminal and axillary toward tip of stem, monocephalous, densely ascending-pilose especially above, with a few gland-tipped hairs intermixed, 5 to 9 cm. long; heads 1.8 cm. wide; disk 7 to 8 mm. high and thick; involucre 3-seriate, graduate, 6 to 7 mm. high, the phyllaries oval or ovate-oval, obtuse, or the outermost lance-ovate, green, submembranous, lineate, ciliolate nearly or quite throughout; rays 8, the lamina cuneate or cuneate-suborbicular, 3-lobed, purplish outside, white within, 5 to 7 mm. long, 4.5 mm. wide, the tube densely pilose; disk corollas pale yellowish, 3 mm. long (tube 0.8 mm., teeth 0.6 mm.), rather densely hispidulous chiefly on tube and teeth; pales lance-elliptic, acuminate, with a tooth on one side, spinulose-denticulate, 4.5 mm. long; ray achenes (immature) clavate, glabrous, epappose, 2 mm. long; disk achenes (immature) clavate, rather densely hispidulous, epappose, 2 mm. long.

Type in the U. S. National Herbarium, no. 677499, collected in humid ravine around El Potrero Camp, Chiriquí Volcano, Panama, altitude 2,800 to 3,000 meters, March 10 to 13, 1911, by H. Pittier (no. 3109).

Sabazia triangularis is allied to *S. sarmentosa* Less. and *S. radicans* Blake, but is distinguished by the outline and pubescence of its leaves and by the fact that the ray achenes are glabrous while those of the disk are hispidulous.

Wedelia oxylepis Blake, sp. nov.

Herbaceous above, 45 cm. high and more, the lower portion not seen; stem slender, hispid, particularly near the nodes, with spreading or deflexed mostly deciduous hairs with persistent swollen bases, and spreading-hispidulous; internodes 7 to 9.5 cm. long; leaves opposite throughout; petioles pubescent like the stem, 4 to 8 mm. long; blades ovate, 5 to 7.5 cm. long, 1.5 to 3 cm. wide, acuminate, cuneate at base, serrate or serrulate (teeth 8 to 15 pairs, acute, coarse or small and depressed), papery, above deep green, harshly hirsute-hispid, and hirsutulous with antrorse hairs, the larger with lepidote-tuberculate bases, beneath somewhat lighter green, on surface evenly but not densely hirsutulous, along the veins hirsute-hispid, triplinerved, the lateral veins about 4 pairs, prominulous beneath, the secondaries scarcely prominulous; heads about 2.3 cm. wide, solitary in the upper axils and ternate at apex of stem, the peduncles 3.5 to 11 cm. long, very densely spreading-hirsutulous and less densely hirsute-hispid; disk 10 to 11 mm. high, 10 to 12 mm. thick; involucre 2-seriate, subequal, 9 to (fruit) 13 mm. high, the phyllaries oblong-lanceolate (1.5 to 4 mm. wide), acute or acuminate, erect, with pale, indurate, essentially ribless base and longer herbaceous tip, antrorsely tuberculate-hispid and hispidulous, hispid-ciliate with spreading hairs; rays 12, yellow, fertile, the lamina oval, bidentate, 9 mm. long, 4 mm. wide; disk corollas yellow, sparsely hispidulous at apex of tube and on teeth, slenderly obconic, 5 to 6.2 mm. long (tube 1.8 to 2.6 mm., throat 2.5 to 2.8 mm., teeth 0.8 mm.); pales obtuse or acute, 1-dentate on each side below apex, carinate from base to below the apex (the keel glabrous except at the erose-ciliolate tip), erose-ciliolate above, purplish along keel, about 6.5 mm. long; ray achenes trigonous, quadrate-oblong in outline, 3-winged, 3 mm. long, 2.2 mm. wide, glabrous, their pappus a crown of lacerate, connate squamellæ 0.2 mm. long; disk achenes oblong, elliptic in cross-section, crustaceous-margined but not winged, crustaceous-tuberculate, hispidulous, 3.5 mm. long, 1.5 mm. wide, bluntly and shortly 2-toothed at apex, their pappus a crown of lacerate, connate squamellæ about 0.15 mm. high, borne on a short thick neck 0.3 mm. long, 0.7 mm. wide.

Type in the U. S. National Herbarium, no. 1,023,399, collected in the vicinity of Durán, near Guayaquil, Ecuador, November 5 to 8, 1918, by J. N. Rose and G. Rose (no. 23599).

Allied to *Wedelia helianthoides* H. B. K., also Ecuadorian, which has much shorter phyllaries, exceeded by the pales, and smooth disk achenes. Related also to *Wedelia latifolia* DC., collected by Bertero at an unknown locality in South America, to which I refer the recently described *Wedelia heterophylla* Rusby⁹ and *W. symmetrica* Rusby,¹⁰ from Colombia. In *W. latifolia* the disk achene is considerably larger with a much more conspicuous pappiferous neck.

***Aspilia macrolepis* Blake, sp. nov.**

"Climbing;" branches herbaceous, brownish, subterete, tuberculate-strigose, or tuberculate-hispid with ascending hairs; leaves opposite; petioles naked, sulcate, 1 to 1.3 cm. long, tuberculate-hispid-pilose; blades ovate, 8.5 to 10.3 cm. long, 3 to 4 cm. wide, falcate-acuminate, at base broadly rounded, subpapyraceous, repand-denticulate with about 7 pairs of minute teeth, above deep green, sublucid in age, evenly but not densely strigose with subtuberculate-based hairs, beneath paler and duller green, similarly pubescent, triplinerved about 8 mm. above the base, the secondaries about 15 pairs, spreading nearly at right angles, somewhat prominulous; peduncles axillary, 13 to 15.5 cm. long, pubescent like the stem, bearing at apex 3 heads, sessile or on densely spreading-hispid-pilose pedicels 1.7 cm. long or less; bracts lance-linear, 2 cm. long; heads 17 mm. wide, the disk 12 mm. high, 1 cm. wide; involucre obgraduate, the two outermost series of phyllaries (about 6) lanceolate, 12 to 18 mm. long, 2 to 3 mm. wide near base, herbaceous essentially throughout or indurated at extreme base, strigose, reflexed from near the base; the inner two series oblong, obtuse, dryish with submembranous tips, finely puberulous above and ciliolate, 8 to 9 mm. long; rays about 8, yellow, neutral, the lamina oval, 5 mm. long, essentially glabrous; disk corollas numerous, yellow, narrowly funnel-form, papillose at apex of teeth, otherwise glabrous, 5.5 mm. long (the indistinct tube 1.2 mm.); pales narrow, subscarios, 9 mm. long, acuminate, carinate, sparsely ciliate on keel below, spinulose-ciliolate above and on keel; achenes (immature) linear, very narrowly winged, ciliate and ascending-pilose, 5 mm. long; awns 2, lanceolate, upwardly pubescent, 1.2 mm. long, united at base to the corona; corona of basally united deeply lacerate-fimbriate squamellae 0.8 mm. long.

Type in the U. S. National Herbarium, no. 531083, collected on hills of Miraflores, above Palmira, in the central Cordillera, State of Cauca, Colombia, January, 1906, by H. Pittier (no. 893).

This species may be recognized by its elongate and reflexed herbaceous outer phyllaries, strigose stem, and peculiar inflorescence.

***Aspilia patentipilis* Blake, sp. nov.**

"Herb," sparsely branched, the stem slender, terete, striatulate, fuscous-brown, densely short-pubescent with spreading, several-celled, subglandular hairs and hispid-pilose with spreading whitish hairs about 5 mm. long; leaves opposite; petioles naked, very densely pubescent like the stem, 6 to 9 mm. long; blades ovate, 7 to 8.5 cm. long, 2.5 to 3.8 cm. wide, falcate-attenuate, at base rounded, entire, above brownish-green, slightly shining in age, tuberculate-hispidulous and more sparsely spreading-hispid-pilose, beneath paler green, rather densely subtuberculate-hispidulous, along the veins short-hispid and sparsely hispid-pilose with long spreading hairs, rough on both sides, submembranous, triplinerved about 5 mm. above the base and somewhat prominulous-reticulate beneath, the veins impressed above; peduncles solitary, axillary, monocephalous, 8.5 to 11 cm. long, pubescent like the stem; heads about 2.5 cm. wide; disk 12 mm. high, about 14 mm. wide; involucre

⁹ Descr. New S. Amer. Pl. 152. 1920.

¹⁰ Loc. cit. 153.

3-seriate, obgraduate, the outermost phyllaries ovate-lanceolate, about 2 cm. long, 5 to 6 mm. wide, with short narrow indurate base and spreading or reflexed attenuate herbaceous apex, pubescent like the leaves and ciliate; second series similar but shorter and broader, 11 to 13 mm. long, with indurate base and longer ovate herbaceous tip; third series oval, rounded or obtuse, 9 mm. long, 4 to 5 mm. wide, subchartaceous with submembranaceous tip, finely puberulous above and ciliate; rays yellow, probably about 8, neutral, the lamina oblong-oval, emarginate, 12 mm. long, 6 mm. wide, sparsely hispidulous on the nerves of the back; disk corollas yellow, glabrous except for the hispidulous teeth, 6 mm. long (the slender tube 1.5 mm. long); pales narrow, acutish, carinate, nearly glabrous, 7.5 mm. long; achenes oblong-obovoid, plump, lenticular in cross-section, narrowly margined on one side or marginless, 5 mm. long, 2.8 mm. wide, brownish-black, rather sparsely appressed-pilose, contracted above into a neck about 0.7 mm. long; pappus a crown of united unequal squamellae, about 0.5 mm. long.

Type in the herbarium of the New York Botanical Garden, collected in a loamy clearing at La Trinidad, Líbano, Department of Tolima, Colombia, altitude 1,100 to 1,400 meters, December 21 to 25, 1917, by F. W. Pennell (no. 3229). Duplicate in the U. S. National Herbarium.

This species may be distinguished by the character of its pubescence and of its involucre.

Aspilia retroflexa Blake, sp. nov.

Herbaceous (?); stems (or branches?) 40 to 50 cm. long, slender, simple, densely and harshly tuberculate-strigose (the hairs above sometimes divergent or ascending); internodes 4.5 to 7.5 cm. long; leaves opposite; petioles slender, naked, 7 to 10 mm. long, densely tuberculate-strigose and tuberculate-hispid and hispidulous; leaf blades ovate or the lower lance-ovate, 6.5 to 10 cm. long, 2.5 to 3.5 cm. wide, falcate-acuminate, at base cuneate, obscurely serrulate (teeth about 10 or 12 pairs, depressed, 2 to 3 mm. apart), submembranaceous, above deep green, evenly but not densely ascending-hirsute with lepidote-tuberculate-based hairs, asperous, beneath scarcely paler green, evenly but not densely hispid-hirsute with ascending or subappressed hairs with scarcely tuberculate bases, triplinerved above the base, the chief veins mostly impressed above, prominulous beneath; peduncles terminal, solitary, monocephalous, pubescent like the upper part of stem, 7.5 cm. long; heads 3 cm. wide; disk 11 mm. high, 8 mm. thick; involucre 4-seriate, obgraduate, the phyllaries few, the two outermost series lanceolate or ovate-lanceolate, 8 to 14 mm. long, with appressed, indurate, densely strigose and strigillose base and much longer, reflexed or spreading herbaceous tip, this tuberculate-hispid, 1-nerved, obtuse, callous-apiculate, 3 to 4 mm. wide; the two inner series broadly oval, 8 to 9 mm. long, 5 mm. wide, broadly rounded, subappressed, with pale indurate base and subequal or shorter, herbaceous or submembranous (in the innermost narrowly scarious-margined) apex, densely strigillose and minutely tuberculate or the inmost subglabrous; rays apparently 6, neutral, golden-yellow with orange base (when dry), the lamina oblong-oval, bidentate, 16 mm. long, 6.5 mm. wide; disk corollas yellow, glabrous except for the teeth (these papillose-hispidulous on margin with several-celled hairs), 5.8 mm. long (tube 1.3 mm., throat slender-funneliform, 3.5 mm., teeth 1 mm.); pales spinulose-ciliolate toward the yellow apex, otherwise glabrous, acute, 6.5 mm. long; disk achenes (immature) ascending-pilose, 2.8 mm. long; pappus cyathiform, contracted at base, the ciliate squamellae somewhat unequal, 1 mm. long or less, without distinct awns.

Type in the U. S. National Herbarium, no. 1,059,673, collected in rich alluvial soil at Hacienda Alamos, 15 miles south of Gulf of Guayaquil, about 40 miles from Guayaquil, Ecuador, altitude 10 meters above tidewater, July 11, 1921, by W. W. Rowlee and George Mixter (no. 1239).

Apparently nearest *Aspilia eggertii* Hieron., also Ecuadorian, but distinguished by its reflexed outer phyllaries and considerably larger inner phyllaries.

Aspilia angusta Blake, nom. nov.

Aspilia angustifolia A. Gray in S. Wats. Proc. Amer. Acad. 22: 425. 1887. Not *A. angustifolia* Oliver & Hiern in Oliver, Fl. Trop. Afr. 3: 380. 1877.

The Mexican species named *Aspilia angustifolia* by Gray may be renamed *A. angusta*, Gray's name being preoccupied by a valid African species described by Oliver and Hiern.

Aspilia linearis Blake, nom. nov.

Aspilia linearifolia Baker in Mart. Fl. Bras. 6³: 192. 1884. Not *A. linearifolia* Oliver & Hiern in Oliver, Fl. Trop. Afr. 3: 380. 1877.

The name *Aspilia linearifolia*, applied by Baker to a Brazilian species, is preoccupied by a valid African species of the genus, described by Oliver and Hiern.

GYMNOLOMIA H. B. K.

Several years ago it was shown¹¹ that the name *Gymnolomia* H. B. K., which for many years had been used for a considerable group of species characterized by their epappose achenes, must be restricted to a group of about six species very closely related to *Aspilia*, and only remotely allied to most of the thirty-odd species which had been associated with them. At the same time the suggestion was made that further investigation might prove the genus to be identical with *Aspilia*. Subsequent study has shown that there are no characters of any consequence in habit, involucre, achenes, pappus, or floral features to distinguish *Gymnolomia* from the older genus *Aspilia* Thouars, and its species are accordingly here transferred to the latter genus.

Gymnolomia H. B. K.¹², as originally described, contained four species, *G. tenella* (pl. 373), *G. hondensis*, *G. triplinervia*, and *G. rudbeckioides* (pl. 374). The first species, *G. tenella*, which is to be taken as the type of the genus, is well figured in the plate cited, and is now represented by several collections made by Lehmann and Pittier in Colombia. The second species, represented in the Gray Herbarium by a photograph of the type, does not appear to be distinct from *G. tenella*. The third, *G. triplinervia*, is not known to have been re-collected since its discovery. The fourth, *G. rudbeckioides*, from Peru, has been recently collected by C. H. T. Townsend (no. A90) at Sabiango, Ecuador. His specimens in the National Herbarium, originally determined as this species by Dr. J. M. Greenman, agree very well with the original description and plate. They have a pappus of several short, free, subequal squamellae, without awns, and belong in fact to the genus *Hymenostephium*, to which the species is transferred on page 630 of this paper.

With the transfers here made, the only species of *Gymnolomia* unaccounted for are *G. kunthiana* (Gardn.) Baker and the scarcely known *G. connata* Spreng. It is not possible to place these species definitely until the types can be examined. The four species here transferred from *Gymnolomia* to *Aspilia* are the following.

Aspilia jelskii (Hieron.) Blake.

Gymnolomia jelskii Hieron. Bot. Jahrb. Engler 36: 487. 1905.

Fragments from the type, *Jelski* 649, from Tambillo, Peru, are now in the National Herbarium.

Aspilia lanceolata Blake, nom. nov.

Gymnolomia hirsuta Klatt, Bot. Jahrb. Engler 8: 42. 1887. Not *A. hirsuta* (Gardn.) Benth. & Hook.; Hook. & Jacks. Ind. Kew. 1¹: 216. 1893.

The type, *Lehmann* 360a from Tunguragua, Ecuador, is in the Gray Herbarium, and a photograph is in the National Herbarium.

¹¹ Blake, Contr. Gray Herb. n. ser. 54: 13. 1918.

¹² Nov. Gen. & Sp. 4: 217. pl. 373-4. 1820.

***Aspilia tenella* (H. B. K.) Blake.**

Gymnolomia tenella H. B. K. Nov. Gen. & Sp. 4: 218. pl. 878. 1820.

Gymnolomia hondensis H. B. K. Nov. Gen. & Sp. 4: 218. 1820.

This species is represented by *Lehmann* 1956, 2865, and 2994 (all in the Gray Herb.), and *Pittier* 650 (U. S. Nat. Herb.), all from the State of Cauca, Colombia. A photograph of the type of *G. hondensis* is in the Gray Herbarium. The two supposed species were originally described as somewhat doubtfully distinct, and the only differential characters listed were those of the leaves. In *G. tenella* these were described as ovate, acute, slightly cordate at base, and hispid-scabrous on both sides; in *G. hondensis* as ovate, subacuminate, rounded at base, and hispid-pilose. No further distinctions of any importance are brought out in the detailed descriptions of both plants or in the plate and photograph of the two species, and the specimens above listed, all certainly belonging to a single species, show that the leaves vary from broadly rounded to slightly cordate at base.

***Aspilia triplinervia* (H. B. K.) Blake.**

Gymnolomia triplinervia H. B. K. Nov. Gen. & Sp. 4: 219. 1820.

Type from the vicinity of Bogotá, Colombia. The species has not been recognized among recent collections. It appears to differ from *A. tenella* in its larger, appressed-hispidulous leaves, which are acute at base.

***Viguiera apiculata* Blake, sp. nov.**

Erect, herbaceous, 1 meter high, branched toward the apex, the base not seen; stem slender, fuscous, subterete, hirsute-pilose with erectish to appressed few-celled whitish hairs with small tuberculate bases, glabrescent below; leaves alternate; blades narrowly linear-lanceolate or linear, 4 to 8.5 cm. long, 1.5 to 5 mm. wide, attenuate, acute at the sessile base, weakly triplinerved above the base and sparsely feather-veined, hispid-pilose on both sides with antrorse whitish hairs with tuberculate bases and sparsely gland-dotted, dark green above, somewhat lighter green beneath; heads oblong-cylindric, 1 cm. wide, in small dense clusters of 6 to 12 at apex of stem and branches, on densely strigillose pedicels 2.5 mm. long or less; disk 5.5 to 7 mm. high, 3 mm. thick; involucre 4-seriate, strongly graduate, 4 to 5 mm. high, the outermost phyllaries broadly ovate, somewhat pointed, the inner oblong or oval, all indurate, whitish, nerved, with very small, abrupt, obtuse, appressed or somewhat spreading, herbaceous tips, rather sparsely hirsute-pilose and ciliate especially along margin and toward apex, a few subglandular hairs intermixed; rays 4 or 5, yellow, neutral, the lamina oval, 2 or 3-denticulate, 4-nerved, 3.3 mm. long, 2.5 mm. wide, hispid-pilose along the nerves on the back like the apex of the slender tube, this 2 mm. long, sessile-glandular; disk-flowers 8, the corollas yellowish, 4.2 to 4.5 mm. long, the slender tube 1.2 mm. long, glandular, the funnellform throat 1.8 mm. long, glabrous, the 5 teeth lance-ovate, papillose-ciliate, sparsely hispid dorsally at apex, 1.2 to 1.5 mm. long; pales lanceolate, hyaline, fimbriate, 3.5 mm. long; ray achenes inane, linear, glabrous, 3 mm. long. the pappus of a pair of lanceolate lacerate awns 0.5 mm. long and 1 or 2 similar squamellae half as long on each side between them; disk achenes (immature) oblong, 2 mm. long, glabrous, the pappus of 2 slender fimbriate-ciliate awns 1.3 to 1.5 mm. long and on each side between them about 3 deeply lacerate-fimbriate squamellae, united at base; anthers sagittate at base; style branches acute, shortly papillose-hispid on back.

Type in the U. S. National Herbarium, no. 385866, collected in clayey soil at La Tuveria, Michoacán or Guerrero, Mexico, altitude 850 meters, September 6, 1898; by E. Langlassé (no. 329).

Although the achenes are very immature, and the generic reference is therefore somewhat uncertain, I have little doubt that this species is a *Viguiera*. It goes readily in the section *Leighia*, where it is distinguished by the tiny crowded heads, and the phyllaries with minute abrupt herbaceous tips.

***Helianthus grandiceps* Blake, sp. nov.**

"Shrub, 2.6 meters high;" stem stout, herbaceous and pithy above, terete, with few short sterile branches below the inflorescence, loosely spreading-pilose with mostly deciduous, several-celled, whitish hairs with small tuberculate bases, glabrescent; leaves (at least the upper) alternate; petioles densely hirsute-pilose with several-celled spreading hairs, 1 to 1.5 cm. long; upper leaf blades ovate, 5.5 to 10 cm. long, 2.5 to 5 cm. wide, acuminate, cuneate at base, crenate-serrate, thick-papery, above in youth densely and rather softly pilose with tuberculate-based hairs, at maturity densely and harshly tuberculate and somewhat hispidulous, beneath densely and softly pilose-tomentose with griseous (or in youth ochroleucous) flexuous hairs, triplinerved above the base, the smaller veins mostly concealed beneath by the tomentum; heads about 6, cymose-panicled, on monocephalous peduncles 2.5 to 14 cm. long, in flower 4.5 cm. wide, the disk at maturity 1.2 to 1.5 cm. high, 2 to 2.5 cm. thick; involucre 4-seriate, graduate, 1.6 to (fruit) 2 cm. high, the phyllaries oblong-lanceolate (outer) to ovate-oblong, acuminate, the outer herbaceous essentially throughout, 1-nerved, the inner with short indurate base and long herbaceous tip, 3-nerved, all rather densely pilose with suberect hairs and hirsute-pilose-ciliate, the tips loose, in age often reflexed or spreading; rays yellow, neutral, about 14, the lamina linear-elliptic, bidentate, about 10-nerved, 2.2 cm. long, 4 mm. wide, hispidulous on the veins beneath; disk corollas yellow with blackish teeth, sparsely hispidulous below and on teeth, 6 mm. long (tube 1 mm., throat 4.2 mm., teeth 0.8 mm.); pales obtuse or acutish, often minutely callous-apiculate, essentially glabrous, blackish-green at apex, 7 to 9 mm. long; ray achenes (sterile) with a pappus of about 10 ovate or oblong unequal squamellae 0.7 mm. long or less; disk achenes oblong, compressed, glabrous, 3.8 mm. long, their pappus of 1 narrowly lanceolate, paleaceous, caducous awn 2.5 mm. long, on the outer angle, and sometimes a squamella about half as long at its base; style tips hispidulous, obtuse.

Type in the U. S. National Herbarium, no. 1,021,898, collected in the vicinity of Huigra, mostly on the Hacienda de Licay, Ecuador, August 19, 1918, by J. N. Rose and G. Rose (no. 22231).

Helianthus grandiceps is nearest to *H. jelskii* and *H. lehmannii* Hieron., both of which are now represented by fragments in the National Herbarium. The former differs in its triangular-ovate, cordate-based leaves, which are ochroleucous-lanate-tomentose beneath, and the latter in its smaller heads and fewer narrower phyllaries, which are densely long-pilose with subsericeous hairs on their exposed surface.

***Helianthus subniveus* Blake, nom. nov.**

Helianthus niveus Hieron. Bot. Jahrb. Engler 21: 350. 1895. Not *H. niveus* T. S. Brandeg. Proc. Calif. Acad. II. 2: 173. 1889.

The Peruvian plant named *Helianthus niveus* by Hieronymus in 1895, fragments of whose type are now in the National Herbarium, is a very distinct species, but its name must be changed because of the fact that a species of the Sonoran region of western North America, *Helianthus niveus* (Benth.) T. S. Brandeg., already bears the same name.

***Perymenium simulans* Blake, sp. nov.**

Root woody, tuberous-thickened, 1.5 to 2 cm. in diameter; stems numerous, curved-ascending from a decumbent base, 15 to 30 cm. long, herbaceous, slender, branched, greenish, striate, sparsely strigose; leaves remote, 3 to 6 pairs, opposite, the middle and upper ones much the larger; petioles hispid, 1 to 3 mm. long; blades ovate, 2.5 to 5 cm. long, 1.8 to 2.3 cm. wide, acute, rounded to cuneate-rounded at base, serrate with about 8 pairs of usually emucronulate teeth, firm, triplinerved, reticulate beneath, green both sides, above evenly but not densely scabrous-strigose and strigillose with lepidote-based hairs, beneath hispid and hispidulous with ascending hairs, these longer along the veins; lower leaves and those of the sterile branches

much smaller, ovate or oval, 1 to 1.8 cm. long; heads 3 to 4.5 cm. wide, solitary, terminal, on strigose peduncles 6 to 12.5 cm. long; disk 10 mm. high, 9 to 12 mm. thick; involucre 2-seriate, equal or with the outer phyllaries slightly longer, 9 to 10 mm. high, the phyllaries elliptic-oblong, acutish, rather sparsely strigose and hispid-ciliate, with short pale scarcely ribbed base and much longer, herbaceous, loosely spreading tip; rays 8, fertile, golden-yellow, the lamina oval-oblong, 1.8 to 2 cm. long, 6 to 8 mm. wide; disk corollas yellow, papillose on teeth, 6 mm. long (tube 1.5 mm.); pales acuminate, hispidulous except on sides, 8.5 mm. long; disk achenes (immature) hispid especially on angles and apex; pappus awns about 20, fragile, unequal, the 2 on the angles 2.2 to 4 mm. long, the others 0.5 to 1.5 mm. long.

Type in the U. S. National Herbarium, no. 571433, collected at Otinapa, Durango, Mexico, July 25 to August 5, 1906, by Edward Palmer (no. 408).

ADDITIONAL SPECIMEN EXAMINED:

DURANGO: Without definite locality, altitude 1,000 meters, *García* 340.

Perymenium simulans differs from *P. tenellum* A. Gray, under which name the type was distributed, in its much larger heads and leaves and longer involucre, as well as in its strigose stems. It is more closely related to *P. flexuosum* Greenm., but may be distinguished by its larger rays and involucre, and especially by its well-developed pappus.

***Perymenium subcordatum* Blake, sp. nov.**

Shrub with flexuous branches; stem and branches strigose and strigillose, in age glabrate, grayish; leaves opposite; petioles slender, strigose, 2 to 3 mm. long; blades ovate, 1.5 to 3 cm. long, 9 to 17 mm. wide, acute, at base slightly cordate to broadly rounded, serrulate with 4 to 7 pairs of depressed mucronulate teeth, triplinerved and prominulous-reticulate beneath, pergamentaceous, above scabrously strigose and strigillose with slightly tuberculate-based hairs, beneath scarcely paler green, strigose along the chief veins, rather sparsely strigillose along the veinlets and on surface, the hairs slightly divergent; heads 3 or 4 toward tips of branches, axillary and terminal; peduncles monocephalous, strigose, 1.5 to 6.5 cm. long; disk hemispheric, 5 to 6 mm. high, 5 to 7 mm. thick; involucre of few appressed phyllaries, 3 to 4-seriate, strongly graduate, the outermost series of phyllaries ovate, obtuse, strigillose, indurate, with short subherbaceous tip, the next series similar but oval, rounded, strigillose and short-ciliate, the inner similar, oblong-elliptic, obtuse, with obscurely subherbaceous tip; corollas not seen; pales slender, strigillose on keel and toward the yellowish apex, 6 mm. long; ray achenes trigonous, wingless, blackish-brown, cross-wrinkled, puberulous toward the truncate apex, 2.2 mm. long; disk achenes similar, biconvex, 2.8 mm. long; pappus of about 12 very unequal slender deciduous awns, those toward the angles much the longest, about 1 mm. long.

Type in the U. S. National Herbarium, no. 566198, collected on mountains, Tlapancingo, Oaxaca, Mexico, altitude 1,830 to 2,440 meters, December 7, 1894, by E. W. Nelson (no. 2067). Duplicate in the Gray Herbarium.

Perymenium subcordatum is related to *P. cervantesii* DC. and *P. jaliscense* Robins. & Greenm. From the latter it differs in the form of its leaves and its much shorter pappus; from the former in the shape of its leaves and in its narrower, obscurely herbaceous-tipped inner phyllaries.

***Perymenium oxycarphum* Blake, sp. nov.**

Stems tufted, herbaceous, 50 cm. high, slender, quadrangular, strigillose, greenish, simple below the inflorescence; leaves opposite, few, about 6 pairs; petioles strigose, 6 to 7 mm. long; blades of the middle leaves ovate to oblong-ovate, 4 to 4.5 cm. long, 2 to 2.3 cm. wide, acute, rounded or cuneate-rounded at base, papyraceous, crenate-serrate with 7 to 8 pairs of depressed mucronulate teeth, triplinerved and loosely prominulous-reticulate beneath, above dull green, evenly scabrous-strigose and strigillose with tuberculate-based hairs, beneath green, rather sparsely strigose and strig-

illose chiefly along the veins and veinlets, the hairs longer along the chief veins; upper and lower leaves smaller; peduncle 11 cm. long, 4-headed; pedicels 2.5 to 11 cm. long, striate, strigillose, that of the terminal head only 6 mm. long; heads 4 cm. wide; disk subglobose, 7 to 9 mm. high, and thick; involucre 3-seriate, graduate, 6 to 6.5 mm. high, the phyllaries ovate, acute, strigillose and ciliate, with pale indurate base and short, loose, herbaceous, callous-unguiculate apex; rays 8, fertile, yellow, apparently darker at base, the lamina elliptic, bidenticulate, 17 mm. long, 6 mm. wide; disk corollas yellow, papillose-hispidulous on teeth, 5 mm. long (tube 1.2 mm.); pales narrow, stiffly acuminate, narrowly keeled, hispidulous above, yellowish, 6 mm. long; disk achenes thickened, blackish, hispidulous above, 2.5 mm. long; pappus awns about 10, unequal, deciduous, 3 mm. long or less.

Type in the U. S. National Herbarium, no. 385887, collected in clayey soil, Real de Guadalupe, Michoacán or Guerrero, Mexico, altitude 1,300 meters, September 15, 1898, by E. Langlassé (no. 354).

Perymenium oxycarpum is most closely related to *P. cornutum* T. S. Brandeg., but may be easily distinguished by its strongly indurate-based, merely strigillose phyllaries, and by the sparser appressed pubescence of its nonrugose leaves.

***Perymenium lancifolium* Blake, sp. nov.**

Shrubby; stem slender, 4-sulcate, strigillose, branched; leaves opposite; petioles slender, narrowly margined above, strigillose, 6 to 10 mm. long; blades lanceolate, those of the main stem 6 to 10 cm. long, 1 to 2 cm. wide, long-acuminate, somewhat falcate, at base acutely cuneate and narrowly decurrent on the upper part of the petiole, firm-papery, remotely serrulate (teeth low, 6 to 15 pairs), above deep dull green, harshly and sparsely short-strigose, beneath much lighter green, antrorse-hispidulous along the veins and veinlets, gland-dotted between them, triplinerved above the base and prominulous-reticulate beneath, impressed-veined above; heads about 1.8 cm. wide, in ternately divided cymes or cymose panicles of 3 to 12 at tips of stem and branches, the pedicels naked, 5 to 28 mm. (usually about 18 mm.) long; disk subglobose, 4 to 5 mm. high, 5 to 6 mm. thick; involucre 4 to 5-seriate, graduate, 5 to 6 mm. high, the outermost phyllaries small, broadly ovate, acute, appressed, indurate, minutely strigillose and obscurely ciliolate, the middle ones oval, broadly rounded, appressed, ciliolate, the innermost longer, oval, their tips loose, subscarious, broadly rounded, minutely ciliolate, dorsally subglabrous, yellowish (?); rays about 7, fertile, the lamina oblong-elliptic, yellow, darker toward base (at least when dry), 9 mm. long, 2.8 mm. wide; disk corollas yellow, minutely hispidulous toward apex of tube, 3.5 mm. long (tube slender, 1.3 mm., throat funnelliform-campanulate, 1.5 mm., teeth deltoid-ovate, 0.7 mm.); pales acute, carinate, spinulose-ciliolate on keel, dentate on margin above, yellowish toward tip, 3.3 mm. long; achenes of ray trigonous, oblong, 2.2 mm. long, blackish brown, finely cross-wrinkled, hispidulous, wingless but with a minute tooth at apex of each angle, their pappus of about 25 slender, hispidulous, unequal, fragile awns 1.5 mm. long or less, that on the inner angle the longest; disk achenes oblong, lenticular in cross section, hispidulous, wingless, 2.5 mm. long, their pappus of about 15 unequal awns, the two longest 1.5 mm. long or less, the others 0.4 to 0.8 mm. long.

Type in the U. S. National Herbarium, no. 1,012,467, collected at Batel, Concordia, Sinaloa, Mexico, altitude 1,600 meters, September, 1919, by M. P. Dehesa (no. 1621).

Perhaps nearest *Perymenium gracile* Hemsl., known to the writer only from description, and said to have ovate-lanceolate leaves and smaller heads.

***Perymenium rotundisquamum* Blake, sp. nov.**

Stems tufted, woody only at base if at all, 40 cm. high or more, slender, quadrangular with rounded angles, strigillose, greenish, simple below the inflorescence; leaves opposite, shorter than the internodes; petioles strigose, naked, 5 to 7 mm. long; blades oblong to oblong-lanceolate, 3 to 4.8 cm. long, 1 to 1.5 cm. wide, acute,

at base cuneate, serrulate with about 20 pairs of depressed mucronulate teeth, triplinerved above the base, prominulous-reticulate beneath, above deep green, evenly but not densely scabrous-strigillose and densely glandular-tuberculate, beneath pale but not canescent, strigillose along veins and veinlets and more finely so between them; peduncles terminal and from the upper axils, slender, strigillose, 3 to 4-headed, 2 to 6.5 cm. long; pedicels 5 to 23 mm. long; heads 1.5 to 1.8 cm. wide; disk subglobose, 5 mm. high, 6 mm. wide; involucre 4-seriate, graduate, 4 to 4.5 mm. high, the phyllaries orbicular-ovate (outer) to suborbicular, obtuse (outer) to broadly rounded, appressed, subindurate without herbaceous apex, strigillose and ciliolate, vittate; rays 9, fertile, the lamina oval, yellow, apparently darker at base, 7 mm. long, 3.5 mm. wide; disk corollas (immature) yellow, glabrous, papillose on teeth, 3 mm. long (tube 0.7 mm.); pales obtuse, carinate, strigillose above and on keel, 4 mm. long; disk achenes (very immature) strigillose above; pappus awns about 10, those on the angles 2 mm. long, the others about 0.6 mm. long.

Type in the U. S. National Herbarium, no. 385895, collected in clayey soil at Vallecito, Michoacán or Guerrero, Mexico, altitude 950 meters, September 18, 1898, by E. Langlassé (no. 363).

Related to *P. goldmanii* Greenm., from which it differs in its very round-tipped phyllaries and more oblong leaves with entirely appressed pubescence, and to *P. purpusii* T. S. Brandeg., from which it differs in its involucre and in its smaller, serrulate, shorter-petioled leaves.

***Perymenium nicaraguense* Blake, sp. nov.**

Shrub, branched above; stem rather slender, rounded-quadrangular, 4-sulcate, strigillose; leaves opposite; petioles slender, 1 to 2 cm. long, strigillose; blades elliptic-lanceolate, those of the main stem 6 to 10.5 cm. long, 1.3 to 3 cm. wide, acuminate, slightly falcate, cuneate at base, remotely serrulate, pergamentaceous, above dull green, sparsely and somewhat harshly strigillose, beneath pale, antrorse-hispidulous along the veins and minutely so along the finer veinlets, featherveined or indistinctly triplinerved well above the base, the lateral veins 6 or 7 pairs, prominulous beneath and with the secondaries loosely reticulate; heads about 1.5 cm. wide, in ternately divided cymose panicles of 5 to about 23 at tips of stem and branches, the pedicels strigillose, mostly 5 to 9 mm. long; disk 3 to 5 mm. thick, in flower 8 mm. high, in fruit about 6 mm.; involucre about 4-seriate, graduate, 4 to 5 mm. high, the phyllaries acute (outer) to (innermost) acutish or obtuse, ovate (outermost) to-oblong-oval, with indurate base and obscurely subherbaceous apex, appressed, minutely strigillose and rather obscurely ciliolate; rays 6, yellow, fertile, the lamina oval, about 6 mm. long, 2.5 mm. wide; disk corollas yellow, about 4.5 mm. long (tube 1.2 to 1.6 mm., throat 2.5 mm., teeth 0.7 mm.); pales acute or obtuse, slightly toothed laterally, with ciliolate keel, about 5 mm. long; ray achenes trigonous, cuneate-oblong in outline, blackish, cross-wrinkled, hispidulous at apex and on the angles, narrowly winged above, the wings produced into teeth 0.7 mm. long or less, the pappus of about 14 slender, hispidulous, unequal, fragile awns, the longest 1.5 mm. long; disk achenes cuneate-oblong, compressed, hispidulous at apex and on margin, 3.2 mm. long, produced at apex into 2 teeth about 0.7 mm. long, the pappus of about 15 unequal fragile awns, the longest 2 mm. long.

Type in the U. S. National Herbarium, no. 988985, collected in pine woods at San Rafael del Norte, Nicaragua, altitude 1,200 to 1,350 meters, March 25 or 26, 1917, by W. de W. Miller and Ludlow Griscom (no. 44). Additional specimens, with the same data, collected under nos. 45 and 76.

Related to *P. purpusii* T. S. Brandeg., of Guatemala and Chiapas, but with much shorter pedicels and proportionately narrower leaves, which are distinctly pale beneath. Of interest as the first species of the genus to be found in the region between El Salvador and Colombia.

***Perymenium chihuahuense* Blake, sp. nov.**

Shrub with simple branches; stem and branches slender, strigose and strigillose, sulcate, purplish becoming brownish; leaves opposite, reflexed; petioles strigose; 1 mm. long; blades lance-ovate, 2 to 3 cm. long, 7 to 10 mm. wide, acuminate, at base rounded, serrate, usually more or less folded and with plicate-crisped margins, triplinerved and somewhat prominulous-reticulate beneath, above light green, evenly scabrous-strigose, beneath not paler, evenly but not densely short-strigose; heads about 8 mm. wide, in terminal clusters of 3 to 5; pedicels strigose, usually 6 to 12 mm. long, sometimes up to 3.5 cm., subtended by reduced bract-like leaves; disk sub-hemispheric, 7 to 8 mm. high, 4 to 6 mm. thick; involucre 4 to 5-seriate, graduate, 4 to 5 mm. high, appressed, densely cinereous-strigillose and ciliate, the outermost phyllaries ovate, acutish, the inner oval-ovate, obtuse, 3-nerved, all pale and indurate, with very obscure subherbaceous tips; rays about 8, pistillate, yellow, the lamina elliptic, 2.5 mm. long; disk corollas yellow, essentially glabrous, 4 mm. long (tube 1 mm.); pales acute, strigillose above, yellow-tinged, 6 mm. long; ray achenes not seen; disk achenes biconvex, strigillose, wingless, 3 mm. long; pappus of about 12 very unequal slender caducous awns 1.8 mm. long or less.

Type in the U. S. National Herbarium, no. 41957, collected on rocky hills near Chihuahua City, Chihuahua, Mexico, May 25, 1885, by C. G. Pringle (no. 152).

The type collection of this species was doubtfully included in *Perymenium rude* by Robinson & Greenman¹³ in their revision of the genus. In restricting the name *P. rude*, I select as type the first listed specimen, Pringle 4803 in the Gray Herbarium, from Las Sedas, Oaxaca. The specimen of this number in the U. S. National Herbarium may represent a distinct species, having the leaves densely cinereous-hispidulous beneath, while they are distinctly green beneath and much less densely pubescent in the type sheet in the Gray Herbarium. Nelson 954, cited in the original description of *P. rude*, agrees in these features with the specimen in the Gray Herbarium, while C. L. Smith 616 (not cited) agrees perfectly with the sheet of Pringle 4803 in the National Herbarium.

From *P. rude*, as thus restricted, *P. chihuahuense* is distinguished by its narrower, lance-ovate, reflexed and crisped leaves, and its densely cinereous-strigillose phyllaries with nearly obsolete herbaceous tips. It is more closely allied to *P. parvifolium* A. Gray, but differs in the obsolete herbaceous tips of the phyllaries and the less evident peduncle. *P. chihuahuense* is of interest as the most northern representative of the genus.

***Perymenium lasiolepis* Blake, sp. nov.**

Frutescent, branching; stem slender, brown, striatulate, lenticellate, glabrescent; branches erectish, striate, fuscous, densely hispidulous or short-hispid-pilose with spreading or slightly reflexed hairs; leaves opposite, rarely alternate on the branches; petioles hispidulous and hispid-pilose, 2 to 5 mm. long; blades rhombic-ovate, 2 to 3.3 cm. long, 1 to 1.8 cm. wide, broadest near the base, acutish, cuneate or rounded-cuneate at base, serrate with 8 to 11 pairs of teeth, firm, triplinerved, impressed-veined above, finely reticulate beneath, above dull green, densely and somewhat harshly hispid-pilose with spreading tuberculate-based hairs, beneath very densely and rather softly canescent-pilose with spreading hairs, along the veins hispid-pilose; heads about 1.3 cm. wide, in panicles of 4 to 9 terminating stem and branches; pedicels densely ascending-hispid-pilose, 6 to 23 mm. long; disk hemispheric, 6 to 8 mm. high and thick; involucre 3-seriate, graduate, 6 to 7 mm. high, the phyllaries lance-ovate, acuminate to an acute or acutish apex, densely and subcanescently hispid-pilose and ciliate, subindurate and pale at base, with equal or longer, loosely spreading, herbaceous tip; rays about 8, pistillate, yellow, the lamina oval, 5 mm. long; disk corollas yellow, puberulous on teeth, 4.5 mm. long (tube 1.5 mm.); pales acuminate, thin, narrowly carinate, hispidulous above, 4.5 mm. long; disk achenes biconvex,

¹³ Proc. Amer. Acad. 34: 527. 1899.

papillose, blackish, hispidulous on angles and above, 2 mm. long; pappus-awns about 12, fragile, one 2.5 mm. long, the others 1 to 1.5 mm. long.

Type in the U. S. National Herbarium, no. 841412, collected at San Simón, Puebla, Mexico, September, 1909, by C. A. Purpus (no. 4138).

The type collection of this species was distributed as *P. asperifolium* Schultz Bip. Its nearest relative, however, is *P. blepharolepis* Blake, from which it is distinguished by its densely hispid-pilose phyllaries and its densely canescent-pilose lower leaf-surface.

***Perymenium consobrinum* Blake, sp. nov.**

Frutescent, branching; stem slender, subterete, purplish-brown, glabrate; branches fuscous, striatulate, densely and cinereously hispidulous and hispid-pilose with short reflexed hairs; leaves opposite, rarely alternate on the branches; petioles hispidulous and hispid-pilose, margined above, 3 to 6 mm. long; blades ovate to lance-ovate, 2.5 to 4 cm. long, 1.2 to 2 cm. wide, acutish, cuneate at base, firm, crenate-serrate with about 5 pairs of obtuse teeth, triplinerved with the veins impressed on the upper surface, above deep green, rugose, densely hispid-pilose with short spreading tuberculate-based hairs, beneath glaucous-cinereous, very densely hispid-pilose with spreading slightly harsh hairs; heads 1.8 cm. wide, in terminal umbellate clusters of 5, and on 1 to 3-headed peduncles 3.8 to 5 cm. long from the upper axils; pedicels 1 to 2.8 cm. long, densely hispid-pilose with short spreading-ascending hairs; disk hemispheric, 6 to 8 mm. high, 7 to 8 mm. thick; involucre 3 to 4-seriate, graduate, 6 mm. high, the phyllaries ovate, narrowed to apex but distinctly obtuse, ribbed, strigose and short-ciliate, with pale subindurate base and equal or longer, loosely spreading, herbaceous tips; rays about 8, pistillate, yellow, the lamina oval, 9 mm. long; disk corollas yellow, hispidulous on teeth, 5 mm. long (tube 1.6 mm.); pales acute, thin, ciliolate on back and above, 6 mm. long; disk achenes (immature) somewhat hispidulous; pappus awns about 12, very unequal, one 2.5 to 3 mm. long, the others 0.5 to 1.5 mm. long.

Type in the U. S. National Herbarium, no 840782, collected at Los Naranjos, Oaxaca, Mexico, July, 1908, by C. A. Purpus (no. 3097).

This species, the type collection of which was distributed as "*Zaluzania*," is distinguished from its near ally, *P. hypoleucum* Blake, by its longer involucre and pedicels, and by the denser pubescence of the lower leaf-surface.

***Perymenium latisquamum* Blake, sp. nov.**

Branching, probably frutescent; stem and branches stoutish, pale greenish, striate, strigillose with strongly tuberculate-based hairs; leaves opposite; petioles tuberculate-strigose, gland-dotted, naked, 8 to 15 mm. long; blades ovate to (upper) lance-ovate, 6 to 12 cm. long, 2.2 to 7.5 cm. wide, acuminate, cuneate to rounded-cuneate at base, crenate-serrate with 16 to 30 pairs of mucronulate teeth, firm, triplinerved and prominulous-reticulate beneath, above dull green, harshly tuberculate-hispidulous with curved ascending hairs, beneath paler green, evenly but not densely spreading-hispid-pilose and gland-dotted, the hairs along the veins stouter and incurved; heads numerous, 2.5 cm. wide; pedicels 1.5 to 5 cm. long, striate, strigose; disk hemispheric, 8 to 11 mm. high and thick; involucre 4-seriate, graduate, 8 to 9 mm. high, the phyllaries suborbicular (outer) to rotund-oval, obtuse (outer) to broadly rounded, vittate, the outer strigillose and sparsely ciliate, appressed, with short obscure dark tips, the inner finely strigillose, indurate and pale below, the tip shorter, erose, sparsely ciliate, otherwise nearly glabrous, loosely spreading, submembranous; rays 12, pistillate, yellow, the lamina oval, 1 cm. long; disk corollas yellow, papillose on teeth, 4.8 to 6 mm. long (tube 1.3 to 2 mm.); pales acute to acuminate, spinulose on keel, 6 mm. long; disk achenes biconvex, blackish, papillose, hispidulous on margin and apex, 3.5 mm. long; pappus awns about 15, fragile, unequal, the 2 on the angles 2.5 to 3.8 mm. long, the others 1.5 mm. long.

Type in the Gray Herbarium, collected on the Sierra de Tonalá, Chiapas, Mexico, September, 1913, by C. A. Purpus (no. 6647). Photograph and fragments in the U. S. National Herbarium.

Related to *P. strigillosum* (Robins. & Greenm.,) Greenm., as which it was distributed, but readily distinguishable by its very different involucre.

***Perymenium acuminatum* (Llave) Blake.**

Oteiza acuminata Llave, Reg. Trim. 1 : 41. 1832.

Calea elegans DC. Prodr. 5 : 674. 1836.

This species has the pappus of *Perymenium*, of numerous, hispidulous, caducous, setiform aristae, and must be referred to that genus. It is known from San Luis Potosi (*Parry & Palmer* 491, *Schaffner* 237/679), and State of Mexico (*Pringle* 4297). Pringle's plant has closely aggregated heads and may be distinguishable from the San Luis Potosi form, but more material is needed. The closest relative of *P. acuminatum* is probably *Perymenium ruacophilum* Donn. Smith.,¹⁴ of which *Calea insignis* Blake¹⁵ is a synonym.

The description of *Oteiza acuminata* Llave, for a copy of which I am indebted to Dr. J. H. Barnhart, agrees well with material of *Calea elegans*, and there seems to be no reason why the earlier specific name should not be adopted. The name *Oteiza* Llave is referred to *Calea elegans* DC. without hesitation by Bentham and Hooker,¹⁶ "fide specimenum Mexicanorum ex herb. Mairetiano."

***Steiractinia rusbyana* Blake, sp. nov.**

Frutescent, 1 to 1.3 meters high; stem and branches stout, 4 to 6 mm. thick, terete, dull grayish brown, densely lanate-pilose with dull loosely spreading hairs, in age glabrate; leaves opposite; petioles stout, naked, densely lanate-pilose, 1.5 to 2.2 cm. long; blades ovate-lanceolate, 6 to 10 cm. long, 2 to 4 cm. wide, tapering from near the base to the somewhat falcate tip, at base cuneate-rounded, serrulate (teeth about 30 pairs, subappressed), triplinerved and reticulate beneath, thick-pergamentaceous, above dull green, densely and rather softly incurved-pilose and in youth rufescent-subsericeous, beneath densely lanate-pilose with somewhat rufescent hairs, in youth subsericeous; heads about 4.5 cm. wide, about 4 at ends of branches, axillary and terminal; pedicels densely lanate-pilose, 1 to 3.5 cm. long; disk hemispheric, 1 to 1.3 cm. high, 1.8 to 2.3 cm. thick; involucre 3 to 4-seriate, somewhat graduate, 12 mm. high, the outermost phyllaries about 4, broadly ovate, acute or acutish, with short indurate base and herbaceous spreading tip, densely tuberculate-pilose and puberulous, 3 to 6 mm. wide; the next series similar; the one or two innermost series broadly obovate-oblong, subglabrous, with rounded and ampliate, erose-ciliate, membranaceous tip; involucre sometimes subtended by 2 or 3 small lance-elliptic bracts; rays about 10, neutral, the lamina elliptic-oblong, bifid, yellowish, 1.8 cm. long; disk corollas pale yellow, glabrous, with papillose-margined teeth, 6 mm. long (tube 1.8 mm.); pales acute, spinulose-ciliate above, 8 mm. long, strongly wing-keeled, the keel spinulose, abruptly terminating and forming a tooth below apex of pale; ray achenes iaane, trigonous, sparsely spinulose-ciliolate, 2.5 mm. long; pappus of about 22 very unequal slender spinulose awns, 1.5 mm. long or less; disk achenes biconvex, blackish, narrowly 2-winged, glabrous except for the spinulose-ciliate wings 4 mm. long; pappus of about 30 slender spinulose caducous awns 1.8 to 3 mm. long.

Type in the herbarium of the New York Botanical Garden, collected on the open top of the San Lorenzo Ridge, near Santa Marta, Colombia, altitude about 2,200 meters, January 25 and February 26, 1898-99, by Herbert H. Smith (no. 1342). Photograph and fragments in the U. S. National Herbarium.

¹⁴ Bot. Gaz. 55 : 437. 1913.

¹⁵ Contr. Gray Herb. n. ser. 52 : 56. 1917.

¹⁶ Benth. & Hook. Gen. Pl. 2 : 391. 1873.

Steiractinia rusbyana is related to *S. mollis* Blake and *S. ocanensis* Blake. From the former it is easily distinguished by its longer petioles and strongly alate-carinate pales, from the latter by its glabrate branches, soft pubescence, and shorter involucre. Smith's label states that the species is rare.

***Steiractinia longipes* Blake, sp. nov.**

"Tall herb;" stem terete, fuscous-brown, densely strigose-pilose with dull white hairs with slightly tuberculate bases, glabrescent below, oppositely branched; leaves opposite; petioles densely strigose-pilose and hispid-pilose-ciliate, sulcate, 12 to 16 mm. long; blades ovate, 6.5 to 10.5 cm. long, 3 to 5.2 cm. wide, acuminate, at base cuneate, papyraceous, triplinerved about 1 cm. above the base and somewhat venose below, serrulate with about 8 pairs of minute teeth near the middle, above dull green, evenly tuberculate-hispid-pilose with incurved hairs, beneath densely and rather softly incurved-pilose with sordid-white somewhat shining hairs, these longer and somewhat coarser along the veins; peduncles 3 to 6 at tips of branches, pubescent like the stem, 6 to 10 cm. long, bearing 1 or 2 heads, naked or 1-bracteate; heads about 5.3 cm. wide; disk hemispheric, 1.3 cm. high, 1.5 cm. wide in flower, 2.2 cm. in fruit; involucre about 3-seriate, the outermost phyllaries 4 or 5, 10 to 14 mm. long, 2.5 to 7 mm. wide, with short, contracted, indurate, glabrescent base and ovate or oval-ovate, obtuse, spreading or reflexed herbaceous tip, this tuberculate-strigose, strigillose, and ciliate; two inner series thinner, oval, with somewhat indurate glabrescent base, the tip longer, submembranous, rounded, crose, sparsely strigillose, at length loose; rays about 10, neutral, yellow, the lamina oval, emarginate, 2.2 cm. long, 8 mm. wide, sparsely hispidulous on the dorsal nerves; disk corollas yellow, glabrous except for the papillose-margined teeth, 7.5 mm. long (tube 2 mm.); pales narrow, essentially glabrous, 9 mm. long, with contracted spinulose-denticulate tip; achenes obovate-oblong, 4.3 mm. long, 2.5 mm. wide, somewhat thickened, narrowly 2-winged nearly to apex, mottled, sparsely pubescent above, with truncate saucer-shaped apex; pappus caducous, of about 30 upwardly hispidulous very slender awns 5 mm. long or less.

Type in the herbarium of the New York Botanical Garden, collected in open loam between Fusagasuga and Pandi, Department of Cundinamarca, Colombia, altitude 1,000 to 1,300 meters, November 30, 1917, by F. W. Pennell (no. 2748). Duplicate in the U. S. National Herbarium.

Related to *Steiractinia oyedaeoides* Blake, which has peduncles only 2.2 to 4.2 cm. long, smaller heads, 1-winged achene, and much shorter pappus.

The inflorescence in this species consists at first of three heads, one terminating the branch or stem, the others solitary in the axils of the two reduced leaves which are borne at the last node. Later a second or sometimes even a third peduncle develops in the axil between each leaf and its primary peduncle, in the same vertical plane, either free or adnate for 2 or 3 mm. at base to the older peduncle.

***Melanthera oxycarpa* Blake, sp. nov.**

Herbaceous, 0.5 meter high and more, the base not seen; stem slender, purple-maculate, sparsely strigose, oppositely branched; internodes 5 to 17 cm. long; leaves opposite; petioles slender, nearly naked, sparsely strigose and short-hirsute, 6 to 13 mm. long; leaf blades linear-lanceolate, 3.5 to 7.5 cm. long, usually with a single short erect lobe at base on each side and there 8 to 12 mm. wide, above the lobes 6 to 10 mm. wide, acuminate, dentate-serrate or serrulate throughout above the entire cuneate base (teeth 20 to 25 pairs), papery, above deep green, densely tuberculate, evenly but sparsely hirsute with somewhat incurved hairs, beneath scarcely paler green, evenly but not densely hirsute especially along the veins, triplinerved above the base, the veins obscure or impressed above, prominulous beneath, the secondaries few; heads solitary in the forks and in 2's or 3's at tips of branches, discoid, subglobose, in fruit (corollas fallen) 6 to 8 mm. high, 9 to 11 mm. thick, on strigose monocephalous peduncles 2 to 9.5 cm. long; involucre 2 or 3-seriate, scarcely

graduate, 4 to 5 mm. high, the phyllaries lance-ovate, acuminate, densely strigose, with pale subindurate base and subequal, appressed or erect, herbaceous tips; disk corollas white, finely hispidulous toward apex, 4.2 to 4.5 mm. long (tube 0.8 mm., throat about 2.8 mm., teeth 0.8 mm.); pales obovate-oblong, 5 to 5.5 mm. long, abruptly cuspidate-acuminate (the point erect or slightly recurved, 1.2 mm. long), spinulose-hispidulous on keel and on margin toward apex; achenes thick-quadrangular, 2.2 mm. long, glabrous except for an hispidulous ring around the truncate apex; awns about 4, deciduous, unequal, slender, 2 mm. long or less; squamellae few, short, inconspicuous.

Type in the U. S. National Herbarium, no. 841743, collected in fields at Zacuapan, Veracruz, Mexico, May, 1907, by C. A. Purpus (no. 2437).

The type collection was distributed as *Melanthera lanceolata* Benth., but in that species the pales are merely acute. The species finds its nearest relative in *M. microphylla* Steetz of Panama, in which, according to the description, the stems are numerous, filiform, and procumbent, the leaves are linear, strigose, and much smaller, and the heads are smaller.

***Melanthera purpurascens* Blake, sp. nov.**

Stem about 0.5 meter long (or more?), oppositely branched, perhaps suffrutescent and procumbent, slender, rounded-quadrangular, grooved, evenly but not densely strigillose; internodes mostly 4 to 8 cm. long; leaves opposite; petioles strigillose or hispidulous, 4 to 15 mm. long; leaf blades linear-oblanccolate to oblong-elliptic, 2.7 to 4.5 cm. long, 3 to 17 mm. wide, acute, at base cuneate, serrulate or serrate with 5 to 17 pairs of teeth (a pair near base sometimes noticeably larger than the others), thick-papery, above deep green, densely tuberculate-hispidulous and more sparsely tuberculate-hispid with ascending hairs, beneath scarcely paler green, along the venation rather densely short-hispid with antrorse or divergent hairs, on the surface evenly but not densely tuberculate-hispidulous, triplinerved above the base, the veins impressed above, loosely prominulous-reticulate beneath; peduncles 1 or 2 at tips of branches, monocephalous, 3 to 10 cm. long; heads depressed-subglobose, in fruit 5 mm. high, 9 to 10 mm. thick; involucre 2-seriate, scarcely graduate, 3.5 to 4 mm. high, the phyllaries ovate, acute or short-acuminate, callous-tipped, appressed, with pale indurate base and subequal greenish apex, densely strigillose, on margin distinctly short-hispid-ciliate; corollas not seen; pales 4 to 5 mm. long, purplish above, hispidulous dorsally, tuberculate toward apex, the outer with abrupt stiff callous-pointed tips 0.5 to 0.8 mm. long, the inner rather gradually acuminate, with callous tips; achenes thick-quadrangular, 2 mm. long, glabrous except at the truncate minutely hispidulous apex; awns deciduous, about 1.8 mm. long, slender; squamellae none.

Type in the U. S. National Herbarium, no. 234001, collected on tableland about Ocuilapa, Chiapas, Mexico, altitude 1,035 to 1,155 meters, August 21, 1895, by E. W. Nelson (no. 2995).

Related to *Melanthera lanceolata* Benth., but distinguished by its strongly hispidulous-ciliate phyllaries and smaller heads with distinctly acuminate inner pales.

***Flourensia hirtissima* Blake, sp. nov.**

PLATE 59.

Undershrub, about 20 cm. high, much branched, very leafy, the branches ascending; younger branchlets brown, pilose-hirsute, the older gray-barked, glabrate; leaves alternate, narrowly linear-lanceolate or linear-oblanccolate, 1.8 to 4.8 cm. long (including the petioliform base), 1.8 to 4 mm. wide, acuminate at apex, long-acuminate to the petioliform narrowly margined base, entire, coriaceous, nearly equally green on both sides, densely hirtous-ciliate with spreading white hairs with conical bases, and hirtous, usually more sparsely so, on both surfaces, prominulously featherveined and somewhat reticulate, narrowly revolute-margined; heads solitary, about 2.2 cm. wide, at length nodding, terminating the branches, the peduncles 4 to 7 cm. long, naked, densely or sparsely pilose-hirsute with loose white hairs, most densely so just

below the head; disk in fruit 1.2 cm. high, 1.2 to 1.5 cm. thick; involucre 2-seriate, subequal, 6 to 8 mm. high, the phyllaries about 12, the outer linear to lanceolate narrowed to an acutish apex, thick-herbaceous, densely or sometimes sparsely hirsute, ciliate with spreading white hairs, on back more sparsely pilose-hirsute, the inner broader, lance-ovate, similarly pubescent on their exposed surface, all appressed or the outer slightly loose; rays 5 (or more?), yellow, neutral, the tube pilose, the lamina oblong-oval, 1 cm. long, 4.5 mm. wide; disk corollas yellow, glabrous except for a small tuft of hairs on teeth below apex, 6 mm. long (tube 1.7 mm., throat subcylindrical, 3.6 mm., teeth deltoid-ovate, 0.7 mm.); pales obtuse, sometimes bluntly 3-toothed, 7 to 10 mm. long, hirsute at tip, resinous-glandular on costa and margin and toward apex; achenes thickened, obovoid-oblong, 5.2 to 6 mm. long, 1.8 mm. wide, very densely appressed-silky-pilose, without crustaceous margin; awns 2, slender, subequal or very unequal, 4.5 mm. long or less; squamellae none.

Type in the U. S. National Herbarium, no. 704387, collected in uplands on conglomerate, General Roca and vicinity, Río Negro Valley, Territory Río Negro, Argentina, altitude 250 to 360 meters, December 31, 1914, by Walter Fischer (no. 194).

Related to *Flourensia hirta* Blake, of the Province of Rioja, Argentina, which has 1 to 4 heads at the apex of the branches, broader leaves, smaller heads, and much less pubescent involucre.

EXPLANATION OF PLATE 59.—*Flourensia hirtissima*, from the type specimen. Natural size.

***Simsia sanguinea albida* Blake, subsp. nov.**

Rays white; otherwise as in small forms of the species.

Type in the Gray Herbarium, collected among stones on lightly wooded limestone hills, Uaxac Canal, Quen Santo, Huehuetenango, Guatemala, altitude 1,300 meters, July 21, 1896, by C. and E. Seler (no. 3098). Duplicates examined in the Berlin Herbarium.

Of interest as the first known form of the genus with white rays, those of all the others being yellow or (in the other forms of *S. sanguinea*) purple. The label of the type collection states that the rays are white and the disk reddish lilac. No form of *Simsia sanguinea* A. Gray has hitherto been reported from Guatemala, but non-typical specimens of *S. sanguinea palmeri* (S. Wats.) Blake were examined by the writer several years ago in the Berlin Herbarium, collected on lightly wooded limestone hills, Uaxac Canal, Quen Santo, Huehuetenango, Guatemala, August 23, 1896, by C. and E. Seler (no. 3027). This plant was previously known only from Jalisco.

***Hymenostephium rudbeckioides* (H. B. K.) Blake.**

Gymnolomia rudbeckioides H. B. K. Nov. Gen. & Sp. 4: 219. pl. 374. 1820.

The type of this species came from Ayavaca, Peru, and a photograph is in the Gray Herbarium. Specimens agreeing well with the original description and plate are in the National Herbarium, collected by C. H. T. Townsend (no. A90) at Sabiango, Ecuador, altitude 915 meters, November 26, 1910, and determined by Dr. J. M. Greenman as *Gymnolomia rudbeckioides*. The species has the pappus and all other features of *Hymenostephium*, and is the only representative of that genus known south of Colombia.

***Zexmenia media* Blake, sp. nov.**

Herbaceous, the base not seen; stem simple, more or less striate-angulate, straight or flexuous, fuscous, densely strigose with tuberculate-based hairs, and more or less hispid-pilose with spreading or ascending hairs; leaves opposite, 3 to 7 pairs, the lower longer than the internodes; petioles flattened, hispid-pilose, 1 to 3 mm. long; blades elliptic-ovate, 3.5 to 7.5 cm. long, 1.3 to 3 cm. wide, obtuse to acutish, at base cuneate to rounded, serrulate, firm, erect, equally green on both sides, feather-veined or obscurely triplinerved, evenly but not densely hispid with curved, tuberculate-based, spreading hairs, these somewhat deciduous above in age; heads

2.8 cm. wide, in terminal cymes of 3; peduncles strigose and hispid-pilose, 3.5 to 6.5 cm. long; disk campanulate-hemispheric, 1 to 1.3 cm. high, 9 to 12 mm. wide involucre 3 to 4-seriate, subequal, 1 to 1.2 cm. high, the two outer series of phyllaries; elliptic or lance-elliptic, acute, appressed, herbaceous throughout or indurate at extreme base, densely hispid-pilose with tuberculate-based hairs, the inner series oblong-oval, acutish, strigillose and ciliate, with thin purplish-tinged apex; rays about 12, fertile, yellow, the lamina elliptic, emarginate, 9 mm. long, 1.5 mm. wide; disk corollas yellow, glabrous except for the hispid-pilose teeth, 7 to 8.5 mm. long (tube 2.5 to 3 mm., teeth 0.8 to 1.2 mm.); pales slender, acuminate, ciliolate and sparsely strigillose above, 1 cm. long; ray achenes trigonous, blackish, sparsely puberulous above, narrowly margined, 4 mm. long; awns 3, triangular to lanceolate, 1.5 mm. long or less; squamellae united into a denticulate corona 0.3 mm. high; disk achenes obovate, strongly compressed, striate, blackish, sparsely puberulous above, 4 mm. long, narrowly wing-margined, the margins continuous with the awns; awns slender, unequal, 2 to 3 mm. long; squamellae united into a corona about 0.3 mm. high, denticulate toward the margin.

Type in the U. S. National Herbarium, no. 301468, collected near Huejuquilla, Jalisco, Mexico, August 25, 1897, by J. N. Rose (no. 2549).

Zexmenia media is related to *Z. aurea* (D. Don) Benth. & Hook., and the collection on which the species is based was included under that species in W. W. Jones's revision of the genus. It is distinguished by its larger and more numerous leaves, its longer involucre of acute or acutish phyllaries, and the more developed squamellaceous corona.

***Zexmenia michoacana* Blake, sp. nov.**

Trichotomously branched shrub; young branches striate-angulate, very densely hirsute-pilose with spreading, several-celled, tuberculate-based, dull whitish hairs; older branches and stem glabrate, gray-barked; internodes mostly 2.5 to 8 cm. long; leaves opposite; petioles pubescent like the stem, 2 to 10 mm. long; blades ovate, 5 to 10 cm. long, 2 to 5.5 cm. wide, acuminate, sometimes falcate, at base broadly rounded to cuneate, serrate or serrulate with 10 to 14 pairs of low acute or acutish teeth, papery or pergamentaceous, above deep green, harshly short-hispid (the hairs with persistent tuberculate bases), beneath lighter green, short-hispid-pilose along the veins and veinlets with spreading or divergent hairs, triplinerved from near the base and rather loosely prominulous-reticulate beneath; heads in anthesis about 1.5 cm. wide, in umbellate clusters of 1 to 6, terminal and in the axils of the upper leaves, on stout, densely spreading-hirsute-pilose pedicels 1 to 3.5 cm. long; disk 9 to 11 mm. high, 7 to 9 mm. thick, in fruit subglobose; involucre about 4-seriate, slightly graduate, 7 to (fruit) 10 mm. high, the two outer series of phyllaries oblong to oblong-ovate or triangular-ovate, or the inner deltoid-ovate, 2 to 6 mm. wide, obtuse to acute or subacuminate, appressed or at apex somewhat loose, rather densely hirsute-pilose and ciliate, with short, pale, indurate base and usually longer, 3 or 5-ribbed herbaceous tip; the two inner series oblong or oval-oblong, with subscarios, obtuse or rounded, ciliolate, otherwise essentially glabrous tip; rays about 8, fertile, yellow, the lamina oval, 7 to 10 mm. long, 4 mm. wide; disk corollas yellow, sparsely hispidulous on the back of the papillose-margined teeth, 6 mm. long (tube 1.7 mm., throat 3.5 mm., teeth 0.8 mm.); pales abruptly acuminate, with narrow spinulose keel, about 5.5 mm. long; ray achenes trigonous, 3.5 to 4 mm. long, narrowly subalate-marginate, the margins produced into 3 teeth or short awns 0.7 to 1.3 mm. long; disk achenes oblong or obovate-oblong, strongly compressed, blackish brown, glabrous, 3 to 4.5 mm. long, about 1.8 mm. wide, narrowly wing-margined on one side, narrowly margined on the other, the margins spinulose, continuous with the awns; awns 2, unequal, slender, spinulose, 2 to 3 mm. long, connected by a crown of lacerate, irregularly connate squamellae about 0.5 mm. high, the central squamella on each side sometimes 0.8 mm. long and acuminate.

Type in the U. S. National Herbarium, no. 1,000,061, collected at Loma Santa María, near Morelia, Michoacán, Mexico, altitude 1,950 meters, August 28, 1910, by G. Arsène (no. 5829).

ADDITIONAL SPECIMENS EXAMINED:

MICHOACÁN: Patzcuaro, November 2, 1895, C. & E. Seler 1200 (Gray Herb.).

Loma Santa María, altitude 1,900 meters, August 15, 1909, *Arsène* 3060.

Cerro de las Nalgas, near Morelia, altitude 2,100 meters, September 9, 1909, *Arsène* 2651.

Nearest *Zexmenia fruticosa* Rose, but with more numerous heads, on pedicels much shorter than the leaves, and with much more densely pubescent young branchlets.

***Zexmenia rotundata* Blake, sp. nov.**

Trichotomously branched shrub; branchlets greenish, sparsely strigillose; stem slender, fuscous, glabrous, lenticellate; internodes mostly 3.5 to 7 cm. long; leaves opposite; petioles slender, strigose and hirsute-ciliate, 6 to 8 mm. long; blades lance-ovate, the larger 5.5 to 8 cm. long, 2 to 2.8 cm. wide, falcate-acuminate, at base cuneate, serrulate with 8 to 11 pairs of low acutely mucronulate teeth, papery, above light green, evenly but sparsely hirsute with white hairs with persistent lepidote-tuberculate bases, beneath scarcely lighter green, similarly pubescent with more appressed hairs with scarcely tuberculate bases and longer along the veins, triplinerved above the base and loosely prominulous-reticulate; heads about 11 mm. wide in flower, in cymose clusters of 3 to 6 at apex of stem and in the uppermost axils, the pedicels densely strigillose, mostly 6 to 12 mm. long, rarely obsolete or up to 18 mm. long, disk 8 to 11 mm. high, about 5 mm. thick; involucre about 5-seriate, strongly graduate, 8 to 9 mm. high, appressed, the outermost phyllaries 2, very small, oblong, about 2.8 mm. long, obtuse, the others suborbicular to (innermost) broadly oval, all broadly rounded, with pale, indurate, essentially glabrous base, several-vittate above, and subequal or shorter, densely strigillose and ciliate, thin-herbaceous tips, the innermost with submembranous tips; rays about 4, fertile, yellow, the lamina suborbicular-tridentate, 5.5 mm. long, 4.5 mm. wide; disk flowers about 19, their corollas yellow, slender, very sparsely hispidulous at base of the sinuses between the papillose-margined teeth, otherwise glabrous, 6.6 mm. long (tube 2 mm., throat 4 mm., teeth 0.6 mm.); pales obtuse, sometimes abruptly narrowed below apex, spinulose-ciliolate above and toward tip of the narrow keel, about 6.5 mm. long; ray achenes (immature) trigonous, narrowly margined, 3.2 mm. long, the margins produced into 3 subequal awns 2 mm. long, adnate to the few unequal squamellae (the longer 1.3 mm. long); disk achenes (immature) compressed, 3 mm. long, alate-margined on the inner angle, the margin continuous with the awn, marginless and 2-awned on the outer angle, the 3 awns subequal, 4.2 to 4.8 mm. long, linear-lanceolate, connected by a crown of lacerate, connate squamellae 0.5 to 0.8 long, these sometimes produced on one side into a slender awn, this 3 mm. long or sometimes equaling the three chief awns.

Type in the U. S. National Herbarium, no. 302455, collected at Huasemote, Durango, Mexico, August 14, 1897, by J. N. Rose (no. 3478).

Zexmenia rotundata is related to *Z. ceanothifolia* (Willd.) Schultz Bip., *Z. fasciculata* (DC.) Schultz Bip., and *Z. gradata* Blake, but differs from all these in its very broadly rounded phyllaries.

***Zexmenia gradata* Blake, sp. nov.**

Shrub, up to 3 meters high; stem 2 cm. thick below, lenticellate, gray-barked, glabrous; branches whitish, striatulate, strigose or strigillose with scarcely tuberculate-based hairs; internodes mostly 4.5 to 14 cm. long; leaves opposite; petioles strigillose or strigose and sometimes hirsute-ciliate, 4 to 12 mm. long; blades oblong-elliptic to ovate, 7 to 12.5 cm. long, 2.3 to 5.3 cm. wide, acuminate, usually falcate, at base acutely cuneate to rounded-cuneate, serrate or crenate-serrulate with 11 to 25 pairs of low mucronulate teeth, membranous or papery, above deep green, harshly

and rather sparsely tuberculate-hispidulous or short-hispid, beneath densely hirsute-pilose on all the veins and veinlets, sometimes also between them, with spreading or divergent, rarely antrorse hairs with scarcely tuberculate bases, triplinerved above the base and rather loosely prominulous-reticulate beneath; heads 1 to 1.3 cm. wide, in small umbelliform fascicles or panicles of 7 to 20 at apex of stem and branches and in the uppermost axils, the pedicels densely strigillose, slender, usually 7 to 15 mm. long, sometimes up to 3.2 cm.; disk 8 to 11 mm. high, about 4 mm. thick; involucre about 5-seriate, strongly graduate, appressed, 6 to 7.5 mm. high, the outermost phyllaries ovate or oblong-ovate, acute or acutish, the others suborbicular or deltoid-ovate to broadly oval, 2.5 to 3.5 mm. wide, obtuse to acute, never acuminate, with pale, indurate, somewhat strigillose or subglabrous base, and shorter, barely subherbaceous, densely strigillose and short-ciliate or ciliolate tip, the innermost with subscarious, rounded or obtuse, ciliolate, otherwise subglabrous tips; rays 8, fertile, yellow, the lamina oval, tridentate, 5 to 6.5 mm. long, 2.3 to 3 mm. wide; disk flowers about 13, their corollas yellow, slender, very sparsely hispidulous-pilosulous, 7 mm. long (tube 1.8 mm., throat 4.5 mm., teeth 0.7 mm.); pales obtuse, usually abruptly contracted below the apex, spinulose-ciliolate on the narrow keel and at apex, about 6 mm. long; ray achenes trigonous, narrowly alate-margined, 2.8 to 3.5 mm. long, the margins spinulose, continuous with the 3 unequal or subequal awns, these 1.5 to 3.2 mm. long, connected at base by an entire or sparsely spinulose crown of completely connate squamellae, 0.2 to 0.7 mm. high; disk achenes oblong-cuneate, compressed, 3.5 mm. long, 1 mm. wide, alate-margined on one side (the margin spinulose, decurrent on its awn), 2 or sometimes 3-awned, the awns slender, acuminate, very unequal or subequal, the longer 2.5 to 2.8 mm. long, connected by a crown of connate, ciliate or lacerate squamellae 0.3 to 0.8 mm. long.

Type in the U. S. National Herbarium, no. 305446, collected at Lodiago, Sinaloa, Mexico, October 9 to 15, 1891, by Edward Palmer (no. 1578).

ADDITIONAL SPECIMEN EXAMINED:

SINALOA: Cofradia, October 26 and November 5, 1904, *Brandegee*.

All the material listed above has been referred to *Zexmenia fasciculata* (DC.) Schultz Bip., and the type collection was, with some hesitation, recorded under that name in W. W. Jones's revision¹⁷ of the genus. Examination of the type collection (*Berlandier* 2134) of that species in the Gray Herbarium shows, however, that it differs in having ovate, acuminate or subacuminate, much less strongly graduate phyllaries. *Pringle* 3753 and 11560, and *Palmer* 155 (of 1885) and 1100 (of 1878-79) agree with it, and represent a plant specifically distinct from the one here described as new. *Zexmenia gradata* is more closely related to *Z. ceanothifolia* (Willd.) Schultz Bip., but in that species the awns are mostly longer than the body of the disk achenes, and are conspicuously exerted in the fruiting heads.

***Zexmenia cordifolia* Blake, sp. nov.**

Shrub; stem and branches subterete, densely pilose with sordid, several-celled, loosely spreading hairs, in age gray, glabrate; leaves opposite; petioles pilose, 1 to 2 mm. long; blades ovate, 5 to 6 cm. long, 2.8 to 3.5 cm. wide, acute, at base shallowly cordate, serrate throughout with low triangular teeth, triplinerved and loosely prominulous-venose, nearly equally green on both sides, above sparsely strigose, beneath sparsely strigose on the veins and strigillose between them; heads about 1.5 cm. wide, in several-headed terminal and axillary umbelliform cymes; pedicels strigillose, 6 to 27 mm. long; disk cylindrical-turbinate, 7 to 9 mm. high, 4 to 5 mm. thick; involucre 5-seriate, strongly graduate, 8 mm. high, with one or two small herbaceous bracts at base, the phyllaries all appressed, the outermost ovate, acute, herbaceous above the short indurate base, strigose, the next series similar but oval, obtusish, the inner series cuneate-oval, thinner, strigillose on their exposed surface,

¹⁷Proc. Amer. Acad. 41: 156. 1905.

erose-ciliate at the rounded, faintly greenish, reticulate-venose, submembranous tip; rays yellow, pistillate, the lamina linear-elliptic, 6 mm. long; disk corollas yellow, glabrous except for the hispidulous teeth, 6 mm. long (tube 2.2 mm.); pales slender, tridentate with acuminate central tooth, 6 mm. long; disk achenes (very immature) sparsely strigillose above, narrowly 2-winged, 2 mm. long; awns 2, slender, unequal, 2.5 to 3.2 mm. long; squamellae united into an erose-denticulate crown 0.2 to 0.3 mm. long.

Type in the U. S. National Herbarium, no. 302273, collected near Acaponeta, Tepic, Mexico, July 30, 1897, by J. N. Rose (no. 3297).

Zexmenia cordifolia is nearest *Z. fasciculata* (DC.) Schultz Bip., but is distinguished by its broader, subsessile, cordate-based leaves. The type specimen consists of a leafy portion of the stem, a branch bearing only old heads, and a single detached flowering head.

***Zexmenia aggregata* Blake, sp. nov.**

Shrub; stem and older branches slender, brownish gray, lenticellate, glabrous; younger branches rather densely hirsute with spreading hairs; internodes 2 to 5.5 cm. long; leaves opposite; petioles narrowly margined above, densely hirsute, 4 to 6 mm. long; blades ovate, 4 to 5.5 cm. long, 1.8 to 2.6 cm. wide, acuminate, at base rounded or cuncate-rounded and usually unequal, then narrowly cuneate into the petiole, serrulate with about 10 pairs of low acute teeth, papery, above deep green, harshly antrorse-hirsute with lepidote-tuberculate-based hairs, beneath lighter green, rather softly hirsute-pilose with spreading hairs along all the veins and veinlets, triplinerved above the base, prominulous-reticulate beneath; heads about 1.7 cm. wide, in terminal and axillary fascicles of 1 to 4 toward tips of branches, the fascicles subtended by foliage leaves, the pedicels very densely spreading-hirsute, 1.4 cm. long or less; disk narrowly obovoid, about 13 mm. high, 6 mm. thick; involucre about 3-seriate, 9 to 10.5 mm. high, the two outer series of phyllaries few (about 4), subequal, lance-ovate, subcaudate-acuminate, hispid-pilose, hispidulous, and ciliate or ciliolate, with pale somewhat indurate base and much longer, rather loose, herbaceous tip, the innermost series equal or shorter, with submembranous or obscurely herbaceous, ciliolate and somewhat puberulous tips; rays about 4, fertile, yellow, the lamina oval, bidentate, 8 mm. long, 5 mm. wide; disk corollas yellow, on teeth slightly hispidulous outside, papillose-margined within, otherwise glabrous, 6 mm. long (tube 1.2 mm., throat slender-funnelform, 4 mm., teeth 0.8 mm.); pales obtuse, 1-nerved, 1-toothed on each side, spinulose-ciliolate at apex, otherwise glabrous, about 6.5 mm. long; ray achenes (immature) trigonous, very narrowly wing-margined, spinulose-ciliolate, 3-awned, the awns unequal, 1.5 mm. long or less, connected by a corona of lacerate, connate squamellae about 0.5 mm. long; disk achenes (submature) narrowly cuncate, compressed, hispidulous, 4.8 mm. long, 1.2 mm. wide, narrowly wing-margined on one side, the margin decurrent on the awn; awns 2, subequal, narrowly lanceolate, flattened, about 4.5 mm. long; squamellae connate, spinulose-ciliolate, about 0.5 mm. high, adnate to the awns.

Type in the U. S. National Herbarium, no. 574587, collected at Santa Catarina, Oaxaca, Mexico, July 14, 1910, by H. H. Rusby (no. 86).

Related to *Zexmenia elegans* Schultz Bip., of which the type, in the Gray Herbarium, has been examined. In that species the leaves are very sparsely pubescent beneath, and the phyllaries are much broader, while the disk achenes are smaller and have shorter awns.

***Zexmenia macropoda* Blake, sp. nov.**

Shrub; stem stoutish, dull gray, subterete, strigose, glabrescent; leaves opposite; petioles flattened, hispid-pilose, 7 to 12 mm. long; blades lance-ovate, 7 to 12 cm. long, 2.8 to 4 cm. wide, long-acuminate, at base cuneate to rounded-cuneate, serrate with appressed teeth, membranaceous, triplinerved and somewhat prominulous-reticulate beneath, above tuberculate-hispid especially along costa, in age harshly

tuberculate, beneath slightly paler green, hispid-pilose with spreading hairs on the veins, evenly but not densely hispidulous-pilosulous and gland-dotted between them; heads about 2.5 cm. wide, umbellate in clusters of 4 to 10 at ends of branches; peduncles 2 to 8 cm. long, hispid-pilose with spreading or ascending hairs; disk campanulate, 1 to 1.5 cm. high, 8 to 12 mm. wide; involucre 4-seriate, slightly graduate, 1 to 1.3 cm. high, the two outer series of phyllaries narrowly lanceolate to triangular-lanceolate, acuminate, with short indurate base and herbaceous spreading or reflexed tip, hispid-pilose with spreading hairs, the third series oval, obtuse, with indurate base and shorter subchartaceous tip, sparsely pubescent on middle of back, the inmost similar but essentially glabrous except for the submembranous ciliolate tip; rays about 15, yellow, fertile, the lamina elliptic, 8 to 12 mm. long, 2.5 mm. wide; disk corollas yellow, glabrous except for the hispidulous teeth, 8.5 mm. long (tube 2.8 mm., teeth 0.8 mm.); pales 9 mm. long, abruptly acuminate, keeled, puberulous on back; ray achenes trigonous, very narrowly or obsoletely wing-margined, hispidulous, 5 mm. long, the awns 3 to 4, lanceolate, 1 to 3 mm. long, continuous with the wings, the squamellae about 0.5 mm. high, united into a denticulate crown; disk achenes obovate, strongly compressed, blackish, sparsely hispidulous, the very narrow white wing-margins continuous with the awns; awns 2, unequal, slender, 3.5 to 4.5 mm. long, united at base by a narrow crown; free squamellae none.

Type in the Gray Herbarium, collected at Sololá, Guatemala, altitude 2,130 meters, January 25, 1915, by E. W. D. Holway (no. 109). Photograph in the U. S. National Herbarium.

This species is related to *Z. frutescens* (Mill.) Blake, formerly known as *Z. costaricensis* Benth. It differs from that species in its longer peduncles and much larger heads, and in involucre characters.

***Zexmenia subsericea* Blake, sp. nov.**

Shrub; branches slender, somewhat costate-angulate, densely hispid with whitish, glandular-tuberculate-based, curved, ascending or spreading hairs, in age grayish-barked; leaves opposite; petioles 1 to 1.5 mm. long, pubescent like the stem; blades lanceolate, 2 to 3 cm. long, 4 to 7 mm. wide, acuminate, at base short-acuminate, entire, revolute-margined, triplinerved, firm, above dark green, densely and harshly hispid with glandular-tuberculate-based hairs and gland-dotted between them, beneath subsericeously canescent-pilose with long, ascending, rather soft hairs with scarcely enlarged bases, densely gland-dotted between them; peduncles solitary at apex of stem and branches, hispid and glandular, 3 to 6.5 cm. long; heads subhemispheric, 2 cm. wide or more; disk 9 to 11 mm. high, 13 to 18 mm. thick; involucre about 5-seriate, graduate, 7 to 8 mm. high (excluding the leaflike outer phyllaries), the 2 or 3 outer series with ovate indurate base and reflexed herbaceous tip 1 to 1.8 cm. long, this similar to the leaves in shape and pubescence; inner series oval, acutish, indurate, with short, narrow, abrupt or obscure, herbaceous apex, hispid-pilose and glandular chiefly down middle and on margin; rays 8 or more, fertile, the lamina oval, emarginate, hispid-pilose on nerves of back, 8 mm. long, 3.5 mm. wide; disk corollas 4 mm. long, the slender tube and narrowly funnelform throat subequal, subglabrous, the ovate recurved teeth 0.7 mm. long, papillose on margin and papillose-crested at apex outside; pales very slender, carinate, spinulose-dentate on margin and on keel except at base, 7 mm. long; ray achenes trigonous, blackish, 3 mm. long, rather narrowly 3-margined, the margins spinulose, the pappus of 3 spinulose-serrate awns, that on the inner angle 2 mm. long, those on the outer angles 0.7 to 1 mm. long; disk achenes oblong-obovate, 3 mm. long, 1.8 mm. wide, the body blackish, more or less tuberculate-hispidulous, the two rather narrow, subequal, crustaceous, whitish wing-margins spinulose-ciliate, the pappus of two spinulose awns 1.5 to 2.5 mm. long, and on each side between them about 3 lanceolate, acute, spinulose-ciliate, basally united squamellae 0.3 to 0.5 mm. long.

Type in the U. S. National Herbarium, no. 862061, collected at Agua Blanca, Guatemala, November, 1913, by R. Tejada (no. 57).

Zexmenia subsericea is at once distinguishable from *Z. brevifolia* and *Z. gnaphalioides* A. Gray, its nearest relatives, by its narrowly lanceolate acute-based leaves, as well as by the character of its pubescence.

***Zexmenia oyedaeoides* Blake, sp. nov.**

Shrub; stem and branches densely hispid-pilose with appressed whitish hairs glabrescent, very densely tuberculate with the persistent hair bases; internodes 9 to 18 mm. long; leaves opposite; petioles densely hispid-pilose, 5 to 12 mm. long; blades lanceolate to lance-ovate, 6 to 9 cm. long, 1.7 to 2.7 cm. wide, long-acuminate, acute at base, serrate with about 16 pairs of depressed teeth, thick, above densely, cinerascenscently, and rather softly short-hispid with incurved tuberculate-based hairs, beneath cinereously hispid-pilose with very dense ascending hairs (those along the veins deciduous and tuberculate-based), triplinerved about 1.5 cm. above the base; only the primary veins evident beneath; heads about 2.5 cm. wide, about 7 in ternately divided corymbs about 5 cm. wide terminating stem and branches, overtopped by the leaves, the bracts lanceolate, 2 cm. long or less; disk 1.2 cm. high, 8 to 14 mm. thick; involucre 3-seriate, 7 mm. high, slightly graduate, the phyllaries lance-ovate or narrowly oblong-ovate, densely hispid-pilose with appressed tuberculate-based hairs, indurate and whitish below, the longer subherbaceous apex acute, appressed, the innermost with thinner apex; rays 12, fertile, yellow, the lamina oblong-oval, tridenticulate, 12 mm. long, 4 mm. wide, hispidulous on the nerves of the back; disk corollas yellow, glabrous except for the papillose teeth, very slender, 6 mm. long (tube 2 mm. long); pales acuminate, hispidulous above, carinate, 7 mm. long; immature ray achenes 3-awned and with several squamellae; immature disk achenes linear, somewhat contracted at apex, densely appressed-pubescent, 5 mm. long, narrowly winged; pappus awns 2, unequal, 5 mm. long or less; squamellae about 10, those on each side of achene united nearly to apex into a lacerate scale 2 mm. long, the whole united at base to the awns.

Type in the Gray Herbarium, collected at Valle Dupena (?), Santa Marta, Colombia, by William Purdie.

A plant very similar in appearance to the smaller-headed species of *Oyedaea*, such as *O. reticulata*, but with the fertile rays of *Zexmenia*. It does not appear to be very closely allied to any described species of *Zexmenia*.

***Otopappus scaber* Blake, sp. nov.**

Frutescent, evidently scandent; stem slender, strigillose, striatulate; branches opposite, spreading at a right angle; leaves opposite; petioles slender, strigillose, 3 to 7 mm. long; leaf blades elliptic-ovate or oblong-ovate, 4.5 to 9 cm. long, 1.8 to 3.5 cm. wide, acute or acuminate, rounded at base, serrulate (teeth 12 to 15 pairs, acute, short), firmly pergamentaceous, deep green and somewhat shining on both sides, or above in age fuscous green, above harshly and evenly hispidulous with antrorse mostly deciduous hairs with persistent tuberculate bases, beneath evenly but not densely antrorse-hispidulous on veins and surface with persistent scarcely tuberculate-based hairs, triplinerved about 2 mm. above the base, loosely prominulous-reticulate beneath, the veins on the upper surface usually impressed; heads 2.7 to 3 cm. wide, in terminal cymes of 3 or 5, the peduncles 1- or rarely 2-headed, 1.2 to 3.5 cm. long, densely strigillose, subtended by leaves 3.5 to 5 cm. long; disk campanulate-subglobose, 1 to 1.2 cm. high and thick; involucre about 5-seriate, graduate, 5 to 6 mm. high, the 1 or 2 outermost series of phyllaries spatulate, about 6 mm. long, herbaceous essentially throughout, spreading or reflexed from near the base, rounded or apiculate, tuberculate-hispidulous, the middle series oblong or oblong-ovate, pale and indurate, ribbed and vittate, strigillose, with very short, obtuse, spreading, herbaceous apex, the 2 inner series similar but subacute and without herbaceous apex; rays about 9, pistillate, pale yellow (?), the lamina elliptic, tridenticulate, 11 mm. long, 3.5 mm. wide; disk corollas pale yellow (?), 6.5 mm. long (tube 1.5 mm., throat 4 mm., teeth 1 mm.), the teeth with a dorsal papillose-hispidulous crest; pales

narrow, acuminate, keeled, hispidulous on keel and margin, 8 to 10 mm. long; ray achenes (immature) trigonous, narrowly 3-winged, 3.5 mm. long, the wings hispidulous, the pappus a cup of more or less completely united fimbriate squamellae 1 mm. long, the wing of inner angle of achene sometimes adnate to the pappus and broadly produced above it; disk achenes (immature) 2-winged at least above, the wings adnate to the pappus awns, the broader 1 mm. wide, the narrower about 0.4 mm. wide; pappus of 2 unequal awns about 1 to 2.5 mm. long and several fimbriate squamellae, connate at least below, obtuse, 1 to 1.2 mm. long.

Type in the U. S. National Herbarium, no. 396844, collected at Apazote, near Yahaltun, Campeche, Mexico, December 26, 1900, by E. A. Goldman (no. 482).

Related to *Otopappus verbesinoides* Benth., as which this specimen has been recorded by Greenman,¹⁸ but differing in its harshly hispidulous leaves.

***Verbesina oxylepis* Blake, sp. nov.**

Erect perennial herb, 35 to 50 cm. high; stems solitary or few from a short root-stock with slender fibrous roots, slender, striatulate, rather densely strigillose; lowest leaves opposite, reduced, the others alternate, their blades linear to lance-linear, 3 to 5.5 cm. long, 5 to 6 mm. wide, acuminate, obtuse at the sessile base, sparsely serrulate, usually conduplicate, firm, uniformly but not densely strigillose above, pale green and strigose beneath (the hairs with glandular-tuberculate bases), feather-veined and prominulous-reticulate beneath; heads 1 to 6 in a terminal cyme, 2.5 to 3.5 cm. wide; peduncles strigillose, 1.5 to 6.5 cm. long; disk hemispheric, 9 to 11 mm. high, 9 to 12 mm. thick; involucre 3-seriate, scarcely graduate, 7 to 9 mm. high, the phyllaries with lance-ovate somewhat indurate body and shorter or nearly as long, loosely spreading, attenuate, herbaceous apex, rather densely incurved-pubescent with more or less tuberculate-based hairs; rays about 10, yellow, the lamina elliptic-oblong, 1.5 cm. long; disk corollas yellow, densely pilose on tube, sparsely so on throat, 3.5 mm. long (tube 0.6 mm.); pales acutish, rather broad, yellow-tipped, ciliolate above, sparsely pubescent on costa, 6.5 mm. long; achenes obovate-oval, blackish, 1-ribbed and papillose-hispidulous on the sides, 2-winged, 3.5 mm. long, 3 mm. wide; awns 2, slender, equal, smoothish, 1.6 mm. long.

Type in the U. S. National Herbarium, no. 42953, collected at Río Blanco, Jalisco, Mexico, 1886, by Edward Palmer (no. 167).

Verbesina oxylepis is related to *V. stricta* (Hemsl.) A. Gray, but is readily distinguished by its narrow leaves and longer, attenuate phyllaries.

***Verbesina synotis* Blake, sp. nov.**

Stem stout, pithy, herbaceous, glabrous, striate, greenish plum-color, somewhat glaucous; leaves opposite; petioles broadly margined, 2 to 4.5 cm. long, 1 to 1.3 cm. wide, the margins united at base into subentire auricles about 1.5 cm. wide; blades triangular or ovate-triangular, 7 to 9.5 cm. long, 3.5 to 6 cm. wide, broadest at base, acuminate, at base cuneate or rounded-cuneate and abruptly contracted into the margined petiole, doubly serrulate with close callous-tipped teeth, papyraceous, triplicated and prominulous-reticulate beneath, above somewhat harshly strigillose and strigose, glabrescent, beneath densely and griseously soft-pilose, with rather short loosely spreading hairs; uppermost leaves alternate, considerably reduced; heads in fruit turbinate-hemispheric, 1 cm. high, 1 to 1.3 cm. wide, very numerous in convex terminal panicles 9 to 13 cm. wide; pedicels loosely hispidulous-pilosulous with several-celled hairs, mostly 3 to 10 mm. long; involucre 2-seriate, about 5 mm. high, the phyllaries very unequal, linear-lanceolate, acuminate, callous-tipped, stramineous, glabrescent; rays fertile, yellow, the lamina elliptic, tridenticulate, 8 mm. long, 2.5 mm. wide; disk corollas about 16, yellow, glabrous, 7 mm. long (tube 1.3 mm.); pales narrowly lanceolate, with acuminate callous tip, pubescent above, 8 to 10 mm. long; achenes cuneate-obovate, pale, rather narrowly 2-winged, 5.5 mm. long, 3 mm. wide, the wings ciliolate; awns 2, unequal, slender, strigillose, about 2 mm. long.

¹⁸ Field Mus. Bot. 2: 270. 1907.

Type in the U. S. National Herbarium, no. 571206, collected at San Ramón, Durango, Mexico, April 21 to May 18, 1906, by Edward Palmer (no. 185).

This species evidently belongs in the section *Saubinetia*, but it is so distinct in foliage characters that it scarcely requires comparison with any of the described species.

***Verbesina otophylla* Blake, sp. nov.**

Shrub; stem somewhat branched, grayish barked, glabrous; branches striate, glaucescent, somewhat strigillose, densely leafy; leaves alternate, lanceolate or elliptic-lanceolate, 7.5 to 10.5 cm long, 1 to 1.3 cm. wide, acuminate, narrowed to a sessile auriculate-clasping base (about 4.5 mm. wide), serrate above the entire lower third with 11 to 15 pairs of low, acutely mucronulate teeth, narrowly revolute-margined, firm-papery, above deep green, densely strigillose except near midrib with deciduous hairs with lepidote-tuberculate bases, smoothish to the touch, beneath slightly lighter green, glabrous except for a few obscure hairs on costa and sometimes on the veins, featherveined, the veins about 11 pairs, prominulous beneath, the secondaries closely reticulate but scarcely prominulous; peduncle terminal, few-bracteate, 2.8 cm. long; heads 5, cymose, 1.2 to 1.4 cm. wide, on slightly strigillose, angulate pedicels 6 to 20 mm. long, these subtended by linear bracts 7 mm. long or less; disk hemispheric, 7 to 8 mm. high, 1 to 1.4 cm. thick; involucre about 3-seriate, slightly graduate, 6 to 7 mm. high, the phyllaries oblong, appressed, obtuse to (inner) acutish, subherbaceous, dull olive-green, ciliolate, dorsally glabrous, obscurely 2-ribbed; rays about 8, fertile, yellow, the lamina elliptic-oblong, tridenticulate, 4.5 mm long, 1.5 mm. wide; disk corollas yellow, pilose on tube and sparsely so on throat with slender many-celled hairs, 3.6 mm. long (tube 0.7 mm., throat subcylindric, 2.4 mm., teeth 0.5 mm.); pales oblong, obtuse, 4.8 mm. long, ciliate on the narrow keel and on margin above, pilose above; disk achenes obovate, flatly compressed, the body black, glabrous, 3 to 3.5 mm. long, 1.3 mm. wide, the 2 wings white, erose-ciliolate, at apex widest (0.7 to 1 mm. wide), adnate to the awns for 0.7 to 1 mm.; awns 2, unequal, slender, hispidulous, 1.5 to 2.5 mm. long.

Type in the U. S. National Herbarium, no. 1,012,315, collected at Hacienda Buena Vista, about 20 miles east of Abasolo, Tamaulipas, Mexico, June 18, 1919, by E. O. Wooton.

This species belongs in the section *Saubinetia*, and is somewhat related to *Verbesina nelsonii* Robins. & Greenm., which has very much larger leaves and spreading-tipped pales. In leaf outline it is similar to *V. persicaefolia* DC., but in that species the leaves have an unmarginated petiole. The vernacular name is given as "jara."

***Verbesina cymbipalea* Blake, sp. nov.**

Base not seen; stem herbaceous, terete, either naked or narrowly winged by the decurrent petiole bases, densely tuberculate-hispidulous with spreading hairs; leaves alternate; petioles naked, 3 to 6 mm. long, in well-developed stems decurrent on the stem, forming wings about 1.5 mm. wide and 1.5 to 5 cm. long; blades lance-elliptic, 7 to 16 cm. long, 1.5 to 4 cm. wide, acuminate at each end, serrulate mostly above the middle with 6 to 8 pairs of mucronulate teeth, papyraceous, featherveined and loosely prominulous-reticulate beneath, above dull green, harshly hispidulous with deciduous hairs with persistent glandular-tuberculate bases, beneath much paler green, evenly but sparsely hispidulous with spreading tuberculate-based hairs; heads about 1.3 cm. wide, numerous in terminal divergently branched panicles 6 to 15 cm. wide; pedicels densely hispidulous, mostly 1.5 to 3 cm. long; disk subglobose, in fruit 6 to 8 mm. high, 7 to 10 mm. thick; involucre 2-seriate, 2 mm. high, slightly graduate, radiating in fruit, the phyllaries oblong or oval, obtuse, subcoriaceous, obscurely ciliolate, sparsely strigillose; rays elliptic, the lamina 3 mm. long; disk corollas densely pubescent on tube, sparsely so above, 2.8 mm. long

(tube 0.5 mm.); pales boat-shaped, firm, 3.5 mm. long, with short, reflexed, submucronate tip and ciliolate keel; achenes broadly obovate, blackish, sparsely pubescent above, 3 to 3.5 mm. long, 2.5 mm. wide (including the wings); wings about half as wide as body of achene, the inner one ciliolate throughout, the outer only at apex; awns 2, unequal, about 1.5 mm. long.

Type in the U. S. National Herbarium, no. 305418, collected at Tepic, Territory of Tepic, Mexico, January 5 to February 6, 1892, by Edward Palmer (no. 1954).

This species belongs in the section *Saubinetia*, and is related to *V. seemannii* Schultz Bip. and *V. angustifolia* (Benth.) Blake. From the first it differs in its densely hispidulous stems and distinctly winged achenes, from the second in its larger leaves and longer petioles, and from both in the wings of the stem (when present). The type sheet bears two specimens, apparently differing only in the fact that in one the stem is winged, in the other wingless. If further material should show that these belong to two different species, it is to the one with winged stems that the name should be restricted.

***Verbesina synethes* Blake, sp. nov.**

Shrub; branch (or upper part of stem) stout, subterete, striate, wingless, densely spreading- or reflexed-puberulous with dull white hairs, glabrate; leaves alternate; petioles narrowly winged essentially to base, 2 to 3.5 cm. long, about 2 mm. wide near base, sordidly spreading-puberulous, not auriculate or decurrent; blades ovate, 11.5 to 15 cm. long, 4.5 to 6 cm. wide, acuminate, at base cuneate or rounded-cuneate, then narrowly decurrent on the petiole, serrulate or crenate-serrulate above the entire lower portion (teeth about 20 pairs, depressed, obtuse, mucronulate), papery, above dull green, densely and rather softly puberulous with mostly spreading subglandular-based hairs, beneath densely griseous-pilosulous with crisped, more or less spreading hairs; panicle terminal, many-headed, flattish, about 9.5 cm. wide, densely griseous-pilosulous with spreading hairs, the pedicels 7 to 14 mm. long; heads 9 mm. wide; disk subglobose, 6 to 7 mm. high and thick; involucre 3-seriate, graduate, 3 to 4 mm. high, the phyllaries elliptic or ovate (outermost) to oblong or obovate-oblong, the outer obtuse, the inner with short erectish or somewhat spreading apiculations, all pale greenish or whitish, the outermost subherbaceous, the others subchartaceous with scarious margin and obscurely subherbaceous tip, densely short-ciliate and toward margin and near apex pilosulous, the apiculation subglabrous; rays 8, fertile, white, the tube hispidulous, the lamina oval, 2 or 3-denticulate, 5-nerved, 3.5 mm. long, 2.2 mm. wide; disk flowers about 29, the corollas white, pilosulous chiefly on tube and teeth, 2.5 mm. long; pales apiculate, puberulous on costa and at apex, 4 mm. long; achenes (both ray and disk) obovate, compressed, hispidulous, 3.5 mm. long, 1.6 mm. wide, very narrowly 2-winged, the wings adnate to the base of the awns; awns 2, subequal or unequal, 2 mm. long or less.

Type in the U. S. National Herbarium, no. 1,042,424, collected in open loam between Fusagasuga and Pandi, Department of Cundinamarca, Colombia, altitude 1,000 to 1,300 meters, November 30, 1917, by F. W. Pennell (no. 2724).

A member of the section *Ochractinia*, nearest *V. acuminata* DC., in which the leaves are narrower, soon very smooth above, and much less densely pubescent beneath. Similar in the form and pubescence of the leaves to *V. szyszyłowiczii* Hieron., but in that species the leaves are "sessile" (i.e., the petiole is broadly margined to the base) and decurrent on the stem.

***Verbesina laevis* Blake, sp. nov.**

Shrub; stem (or branch) striate, glabrous, more or less glaucous; leaves all opposite, the blades 3 to 6 cm. long, 1.2 to 3 cm. wide, oval to oblong-elliptic, acutish to obtuse, mucronulate, at base rounded or cordate-rounded, sessile, and somewhat clasping, obscurely serrulate with very depressed callous-mucronulate teeth, glabrous and somewhat glaucous on both sides, greenish or pale beneath, coriaceous, feather-veined with 7 to 9 pairs of lateral veins, prominulous-reticulate above, more

finely reticulate but scarcely prominulous beneath; heads discoid, numerous in terminal, flat-topped, ternately divided, hispidulous-strigillose, cymose panicles 4 to 10 cm. wide; pedicels 4 mm. long or usually less, often obsolete; disk cylindrical becoming turbinate, 10-flowered, 6 to 7 mm. high, 2 to 6 mm. wide; involucre 2-seriate, graduate, 3 to 4 mm. high, the phyllaries few, oblong, obtuse, indurate-subherbaceous, striate, usually ciliolate, with several reduced phyllaries or bracts at base; corollas glabrous, 4.5 mm. long (tube 0.8 mm., teeth deltoid, 0.6 mm. long); pales obtuse, glabrous, blackish green above, 5.5 mm. long; achenes obovate, blackish, essentially glabrous, 4 to 5 mm. long, narrowly winged, the wings adnate to the base of the awns; awns 2, unequal, slender, 2.5 to 3.5 mm. long.

Type in the Gray Herbarium, collected in the Province of Chachapoyas, Peru, by A. Mathews; photograph in the U. S. National Herbarium. Duplicate in the Torrey Herbarium of the New York Botanical Garden.

Verbesina laevis belongs in the section *Lipactinia*, and is readily distinguished by its glabrous and glaucous stem and its thick, opposite, sessile leaves with callous marginal mucronulations.

***Verbesina crassiramea* Blake, sp. nov.**

"Tree;" branches stout, 8 to 10 mm. thick, angulate, pithy, densely pilose-tomentose with sordid matted hairs; leaves alternate; petioles stout, unmarginated, densely and sordidly pilose-tomentose, not auriculate or decurrent, 3 to 7.5 cm. long; blades oval to ovate, 10 to 22 cm. long, 4.5 to 10 cm. wide, obtusish, at base cuneate-rounded to broadly truncate-rounded, subentire or obscurely dentate-serrulate, papyraceous, feather-veined (lateral veins about 8 pairs) and more or less prominulous-reticulate beneath, above dull green, rather densely pilose with somewhat tuberculate-based mostly deciduous hairs, beneath densely pilose-tomentose with matted sordid-griseous hairs; heads discoid, 5 to 9-flowered, very numerous in terminal and subterminal sordidly pilose-tomentose panicles 12 to 25 cm. wide, about equaling the leaves; pedicels mostly obsolete, rarely up to 5 mm. long; disk cylindrical becoming hemispheric, 9 to 11 mm. high, 3 to 7 mm. thick; involucre 2-seriate, graduate, 3.5 mm. high, the phyllaries few, oblong, obtuse, subherbaceous, somewhat indurate below, sparsely pubescent and ciliate, the outer more decidedly herbaceous; corollas "yellow" (?), pilose below and on nerves above, 5 mm. long (tube 1 mm.); pales obtuse, apiculate, ciliate toward apex, more or less pilose, with greenish back or midrib, about 6 mm. long; achenes cuneate-obovate, 5 mm. long, 2 mm. wide, blackish, essentially glabrous, strongly 1-nerved on each face, very narrowly winged, the wings adnate to base of awns; awns 2, slender, equal, smooth and glabrous, 3.5 mm. long.

Type in the U. S. National Herbarium, no. 603096, collected at La Peña, Colombia, altitude 2,800 meters, July, 1911, by Brothers Apollinaire and Arthur (no. 13).

OTHER SPECIMENS EXAMINED:

COLOMBIA: Mountain slope, altitude 2,700 to 2,800 meters, September 30, 1917, *Pennell* 2280 (N. Y. Bot. Gard.). Laguna de Verjón, altitude 2,800 meters, October 10, 1917, *Ariste Joseph* A32.

This species belongs in the *V. arborea* group of the section *Lipactinia*, and is particularly distinguished by its dense sordid pubescence, and its sparsely pubescent involucre.

***Verbesina pennellii* Blake, sp. nov.**

"Tall shrub;" stem herbaceous above, subterete, densely sordid-pubescent with subglandular matted hairs, glabrescent below; leaves alternate (only the upper seen); petioles pubescent like the stem, naked except toward apex, 2 to 2.8 cm. long; blades ovate or oblong-ovate, 5.5 to 9 cm. long, 2.8 to 3.5 cm. wide, obtuse or acute, at base cuneate-rounded, then cuneate into the petiole, papyraceous, sparsely and finely denticulate, above dull green, rather densely and harshly hispid-pilose with incurved, glandular-tuberculate-based, at length deciduous hairs, beneath densely sordid-pilose with matted hairs, the lateral veins about 6 pairs; panicles

terminating stem and branches, many-headed, the terminal one convex, 13.5 cm. wide, pubescent like the stem, the pedicels mostly 1 to 3 mm. long; heads oblong, discoid, 6 to 7 mm. high, 3.5 to (fruit) 4.5 mm. thick, 10 or 11-flowered; involucre 2-seriate, unequal, about 4 mm. high, the phyllaries oblong-ovate or the outer ovate, obtuse or the outer acutish, whitish, subindurate, ciliate and sparsely pilosulous; corollas whitish, 3.5 to 4 mm. long (the obscure tube 0.4 to 0.8 mm. long), sparsely appressed-pilose, densely so on the teeth; pales greenish toward the obtuse or slightly apiculate tip, 5 to 6 mm. long, above sparsely pilose on back and ciliate; achenes compressed, obovoid, 3.5 mm. long, the body 1 mm. wide, blackish, glabrous, 2-winged, the wings narrow below, broader above (0.6 mm. wide) and adnate to the bases of the awns; awns 2, unequal, finely hispidulous, 3.2 mm. long or less.

Type in the herbarium of the New York Botanical Garden, collected in open thicket in the Cordillera Oriental, east of Neiva, Department of Huila, Colombia, altitude 1,300 to 1,800 meters, August 1 to 8, 1917, by H. H. Rusby and F. W. Pennell (no. 992). Duplicate in the U. S. National Herbarium.

A member of the section *Lipactinia*, related to *V. arborea* H. B. K., but distinguished by its smaller leaves with different pubescence, and its merely pilosulous, not lanate, phyllaries.

Verbesina baccharidea Blake, sp. nov.

PLATE 60.

Tall shrub with simple branches; stem and branches angulate, sulcate, 2 to 6 mm. thick, grayish fuscous, densely appressed-puberulous, in age glabrate; leaves alternate; petioles densely appressed-puberulous, not margined or auriculate, 1 to 6 mm. long; blades elliptic, 2.8 to 6.5 mm. long, 8 to 23 mm. wide, acute, callous-tipped, at base cuneate, callous-denticulate above the lower third with 6 to 9 pairs of very depressed teeth, subcoriaceous, penninerved (lateral veins 7 to 12 pairs, impressed above, scarcely prominulous beneath), deep green and strigillose on both sides, slightly roughened beneath; heads discoid, about 60-flowered, in dense, terminal, flattish or convex panicles of 5 to 21, equaling or slightly surpassing the leaves; peduncles and pedicels densely and sordidly lanate-pilose, the pedicels 3 to 20 mm. long; disk subglobose, many-flowered, 1 to 1.5 cm. high, 1.2 to 1.6 cm. thick; involucre about 3-seriate, subequal, 6 to 7 mm. high, densely and sordidly lanate-pilose, the phyllaries oblong, callous-tipped, subherbaceous; corollas "greenish white," sparsely pilose on the obconic-cylindric limb and teeth, 5.8 mm. long (tube 1.5 to 2 mm. long, swollen at base in age); pales acute to acuminate, more or less callous-tipped, pubescent, blackish green above, 7 to 9 mm. long; achenes obovate, strongly compressed, blackish, very narrowly winged, spinulose-ciliolate, 4.5 mm. long, 1.8 mm. wide; awns 2, slender, spinulose-ciliolate, subequal, 3 mm. long.

Type in the U. S. National Herbarium, no. 888454, collected at Guadalupe, near Bogotá, Colombia, 1911, by Brother Ariste Joseph (no. A245).

ADDITIONAL SPECIMEN EXAMINED:

COLOMBIA: Bushy slope, above Bogotá, altitude 2,700 to 2,800 meters, August 16, 1917, *Rusby & Pennell* 1270.

Verbesina baccharidea is a member of the section *Lipactinia*, related to *V. guianensis* Baker and *V. schomburgkii* Sch. Bip., but differing in its much smaller leaves, pubescent pales, and other characters.

EXPLANATION OF PLATE 60.—*Verbesina baccharidea*, from the type specimen. Natural size.

Coreopsis buchii (Urban) Blake.

Selleophytum buchii Urban, Rep. Spec. Nov. Fedde 13: 484. 1915.

A specimen of this plant, collected on a cliff near Fond Parisien, Etang Saumatre, Haiti, May 5 to 13, 1920, by Emery C. Leonard (no. 4103), is in the National Herbarium. It agrees well with Urban's detailed description based on *Buch* 1137 from Morne la Selle, Haiti, and shows that his genus *Selleophytum*,¹⁹ based on this

¹⁹Op. cit. 483.

species, is a synonym of *Coreopsis*. The species goes readily in the subgenus *Leptosyne*, section *Electra* (DC.) Blake,²⁰ where it is characterized by its entire, sessile, cordate-based, lanceolate or lance-elliptic leaves and solitary or ternate heads. *Selleophytum* was placed near *Zinnia* by Urban, presumably because its rays are somewhat persistent, but has no relationship whatever with that genus. The species is of interest as the sole indigenous West Indian representative of its genus.

***Coreopsis oblanceolata* Blake, sp. nov.**

Frutescent; stem slender, striate, fuscous, glabrous; leaves opposite, rather crowded below, remote above, 2.5 to 3.8 cm. long, 5 to 7.5 mm. wide, oblanceolate, acutish or obtuse, obtusely callous-mucronulate, tapering from above the middle into a petiolelike base, entire, coriaceous, slightly revolute, 1-nerved with obscure lateral veins, glabrous, equally green on both sides; peduncles monocephalous, naked or bracteate, terminal and from the upper axils, sparsely incurved-pubescent at apex, 11 cm. long or less; heads 4 cm. wide; disk hemispheric, about 1.2 cm. high, 1 cm. wide; outer phyllaries about 8, herbaceous, narrowly oblong, slightly narrowed at base, rounded or obtuse, ciliolate, very sparsely pubescent at base, 3-vittate, 5.5 mm. long, 1.8 mm. wide; inner phyllaries oblong-obovate, acute or acuminate, membranaceous, densely lineate with purplish-brown, and with narrow yellow margin, erose-ciliolate at tip, 7.5 mm. long, 2 mm. wide; rays 8 or more, yellow, neutral, the lamina elliptic-oblong, bidentate, 2 cm. long, 6 mm. wide; disk flowers yellow, pilose at apex of tube, with narrowly funnelliform throat, 4.2 mm. long (tube 1.3 mm.); pales elliptic-ovate, acuminate, ciliate below, erose-ciliate toward tip, 5 mm. long; achenes (immature) oblong-elliptic, pubescent on one face, densely long-ciliate on margins, ciliate at apex, 4 mm. long; awns 2, lance-linear, subequal, densely upward-ciliate, 2.2 mm. long; style with short, triangular, acute, papillose appendages.

Type in the herbarium of the Field Columbian Museum, no. 298515, collected on the top of the western Cordillera opposite Huancabamba, Peru, altitude 2,440 to 2,900 meters, September 26, 1911, by C. H. T. Townsend (no. A211). Photograph and fragments in the U. S. National Herbarium.

This species is at once distinguishable, among the South American forms, by its oblanceolate, entire, coriaceous leaves.

***Coreopsis longula* Blake, sp. nov.**

Shrub, with slender, striate-angled, essentially glabrous stem and branches, the internodes 4 to 22 mm. (usually about 10 mm.) long; leaves opposite, the upper sometimes with small fascicles in their axils, linear-filiform, entire, 2.5 to 7 cm. long, 0.6 to 1 mm. wide, obtuse, ascending, thick, flattish, glabrous, light-punctulate, the costa obscure, slightly sulcate above and beneath, the bases connate; heads terminating stem and branches, solitary or usually in twos or threes, about 2 cm. wide; peduncles slightly thickened upwardly, 1 to 2 cm. long, sordid-pilose with inflexed hairs, glabrate, naked or 1-bracteolate; disk campanulate-hemispheric, 9 mm. high, 7 to 10 mm. thick; involucre at base slightly sordid-tomentose and glabrate, otherwise glabrous; outer phyllaries 8, herbaceous, lance-subulate, obtuse, appressed, 1-nerved, 2 to 4 mm. long, 1 mm. wide at base; inner phyllaries 8, elliptic-oblong, truncate or obtuse, blackish-green with narrow yellow margin, 7 to 8 mm. long, 1.8 to 2 mm. wide; rays probably 8, neutral, golden-yellow, pilose on tube, the lamina oval-oblong, sparsely pubescent on back, 8 mm. long, 3.8 mm. wide; disk corollas golden-yellow, essentially glabrous, 4.4 mm. long (tube 1.4 mm., the funnelliform throat and teeth 3 mm. long); pales linear-oblong, 6 mm. long, obtuse, sparsely pilose on midline of back, golden-yellow with about 7 orange-brown vittae; achenes linear-oblong, 5.5 mm. long, 1.3 mm. wide, densely pilose-ciliate, rather densely pilose on inner face and at apex between the awns, sparsely so on outer face, unmarginated; awns 2, linear-lanceolate, upwardly pilose-ciliate, subequal, about 1.8 mm. long.

²⁰ Proc. Amer. Acad. 49: 337. 1913.

Type in the Gray Herbarium, collected in the Province of Chachapoyas, Peru, by A. Mathews. Photograph in U. S. National Herbarium.

This species is related to *Coreopsis venusta* H. B. K., the only other South American species with always entire, linear-filiform leaves. In that Ecuadorian species the leaves are shorter and broader (about 3.7 cm. long and 1.5 mm. wide), the heads are solitary and long-peduncled, and the outer phyllaries are oblong.

***Coreopsis triloba* Blake, sp. nov.**

Shrub; stem and branches slender, striate, densely leafy, in youth pilose-tomentose at the tips, soon glabrate; internodes mostly 2 to 8 mm. long, sometimes as much as 2 cm.; leaves opposite, glabrous; petioles 1 to 1.5 cm. long, as broad as the blades, connate at base into a cup 0.5 to 1 mm. high; blades 8 to 20 mm. long, rarely entire and linear-filiform, usually partly into 3 linear-filiform, subulate-tipped, coriaceous lobes, entire or the middle one sometimes 3-parted, 0.3 to 0.8 mm. wide; heads usually in 3's at tips of stem and branches, rarely solitary, about 1.5 cm. wide; peduncles pilose-tomentose, soon glabrate, 1 to 6 cm. long; disk 6 to 8 mm. wide; hemispheric; involucre 6 to 8 m. high; outer phyllaries 8, lanceolate to lance-ovate, obtusish, thick-herbaceous, appressed or slightly loose, green with 3 dark stripes; glabrous, 2.5 to 3 mm. long, 0.8 to 1.2 mm. wide; inner phyllaries about 8, oblong-elliptic, obtuse, membranaceous, brown with narrow yellow border, glabrous; rays yellow, the lamina oval, about 6 mm. long; pales (immature) acutish, spinulose-ciliolate at apex, glabrous dorsally; achenes (very immature) ciliolate, with 2 upwardly hispid-ciliate, paleoliform awns 0.8 mm. long.

Type in the U. S. National Herbarium, no. 534665, collected in Ecuador, without definite locality, by W. Jameson. A duplicate is no. 534651, U. S. National Herbarium.

From its only close ally, *C. capillacea* H. B. K., this species may be distinguished by its lanceolate to lance-ovate outer phyllaries, only one-half as long as the inner (in *C. capillacea* lance-linear, two-thirds as long as the inner)

***Coreopsis townsendii* Blake, sp. nov.**

Shrub, trichotomously branched, with erect densely leafy branches; stem slender, quadrangular, striate, greenish, glabrous; leaves opposite, the blades parted into 3 linear entire lobes, these acute, coriaceous, 1-nerved, glabrous or sparsely and obscurely pubescent along costa beneath, 7 to 23 mm. long, 1 to 1.5 mm. wide; petioles of equal breadth, 1 to 2.5 cm. long, connate at base; heads 2.5 to 3 cm. wide, in 3's at apex of stem and of subterminal branchlets; peduncles slender, striate, with 1 or 2 linear bracts, loosely pilose, densely so just below the head, 1 to 5.5 cm. long; disk hemispheric, 7 mm. high, 7 to 10 mm. thick; outer phyllaries 6, herbaceous, linear-oblong, obtuse to rounded, 3-vittate, ciliate below the middle, otherwise glabrous, 4 to 4.5 mm. long, 1 to 1.2 mm. wide; inner phyllaries membranaceous, elliptic-oblong, obtuse, erose-ciliolate at apex, yellow, densely striped with purple-brown, 8 mm. long, 2.5 mm. wide; rays 8, yellow, neutral, the lamina oval, 13 mm. long, 7 mm. wide; disk corollas yellow, glandular-puberulous at apex of tube, on the campanulate funnellform throat sparsely pilose above with many-celled hairs, 3 to 3.2 mm. long (tube 1 mm.); pales oblong, about 5-vittate, erose-ciliolate at the obtuse apex, 3.3 to 4 mm. long; achenes oblong, blackish, glabrous on the faces, densely long-ciliate, 3.5 mm. long; awns 2, paleiform, lanceolate, trigonous, equal, densely upward-ciliate, 1.3 mm. long; style with deltoid, obtusish, papillose appendages.

Type in the herbarium of the Field Columbian Museum, no. 298496, collected at Huascaray, Peru, altitude 1,980 to 2,285 meters, September 10, 1911, by C. H. T. Townsend (no. A 192). Photograph and fragments in the U. S. National Herbarium.

Coreopsis townsendii is related to *C. capillacea* H. B. K., described from "Andibus Peruviae?", but is distinguished by its ternately arranged heads, broader and entire leaf segments, linear-oblong outer phyllaries, and campanulate-funnelform disk corol-

las. It differs from *C. triloba* Blake in its broader leaf segments and ciliate or ciliate-phyllaries.

Coreopsis boliviana Blake, sp. nov.

Shrub; stem slender, glabrate, grayish-barked; branches striate, hirtellous or hispidulous with spreading hairs; internodes mostly 1 to 3.5 cm. long, the upper as much as 6 to 7.5 cm.; leaves opposite, sometimes with fascicles in the axils; petioles 8 to 10 mm. long, about as broad as the rachis, united at base into a hirtellous cup 1.5 to 2 mm. high; blades 1.5 to 1.8 cm. long and about as wide across the lobes, ternately parted, the lobes 3 to 5-parted or the terminal one again ternately divided with 3-parted lobes, the ultimate divisions linear, subulate-tipped, glabrous, coriaceous, 2 to 6 mm. long, 0.8 to 1 mm. wide, slightly broader than the rachis; heads solitary or in pairs at tips of stem and branches, 3.5 to 5 cm. wide; peduncles sordidly pilose-tomentose below the head, glabrate, naked or with a single bract, 6 to 12 cm. long; disk hemispheric, rounded, 1 cm. high and wide; involucre 10 to 12 mm. high, reflexed in age; outer phyllaries 8, narrowly ovate-oblong, obtusish, appressed, thick-herbaceous, green with about 5 dark stripes, sordid-tomentose at base, glabrescent, 4 to 4.5 mm. long, 1.2 to 1.5 mm. wide; inner phyllaries about 9, oblong-elliptic, obtuse, membranous, brown with narrow yellow margin, more or less sordid-pilose on back below the apex; rays about 8, golden-yellow, the lamina elliptic, glabrous, 2 cm. long; disk corollas yellow, glabrous, 5.5 mm. long (tube 1.6 mm.); receptacle flattish; pales membranous, obtuse, pilose on back, ciliate at apex, 6 mm. long; achenes (immature) linear-oblong, 5 mm. long, densely villous-ciliate, sparsely villous down midline on both faces; awns 2, paleiform, pilose-ciliate, 2.2 mm. long.

Type in the U. S. National Herbarium, no. 42950, collected near La Paz, Bolivia, altitude 3,050 meters, October, 1885, by H. H. Rusby (no. 1685). Duplicate in the Gray Herbarium.

This species is nearest the Peruvian *C. spectabilis* A. Gray, which has the stem and involucre glabrous and the leaves larger and with more numerous lobes.

Calea pennellii Blake, sp. nov.

Low, branching shrub; branches stout, densely pilose with dull matted hairs; leaves opposite; petioles 2.5 mm. long, stout, pubescent like the stem; blades oval-ovate, 3.5 to 4.7 cm. long, 1.5 to 2.5 cm. wide, acute, callous-apiculate, at base rounded, coriaceous, serrulate with about 14 pairs of callous teeth, grayish green above, rather densely pilose with tuberculate-based hairs, beneath densely and griseously pilose-tomentose with matted hairs, triplinerved and prominent-reticulate; peduncles axillary and terminal, monocephalous, stout, pubescent like the stem, 7 to 14 cm. long; disk 2 to 2.5 cm. wide, 1 to 1.5 cm. high; involucre about 4-seriate, scarcely graduate, the outer phyllaries about 5, obovate or spatulate, 10 to 17 mm. long, 2.5 to 6 mm. wide, coriaceous-herbaceous, similar to the leaves but much smaller, appressed or slightly spreading; inner phyllaries broadly oval, brownish and scarious, slightly indurate below, lacerate-erose, somewhat ciliate or essentially glabrous; rays yellow, the tube glabrous, 5 mm. long, the lamina narrowly cuneate, 11 mm. long, 4 mm. wider, deeply and irregularly 3-lobed; disk corollas golden yellow, glabrous, 6.5 mm. long (tube 2.5 mm., throat funnellform, 2.8 mm., teeth ovate, 1.2 mm.); disk achenes blackish brown, glabrous, 3 mm. long; pappus of 20 linear-lanceolate aristate-tipped awns 5 mm. long.

Type in the U. S. National Herbarium, no. 1042047, collected on bushy slope at base of mountain, Chapinero, near Bogotá, Department of Cundinamarca, Colombia, altitude 2,700 to 2,800 meters, September 18 to 23, 1918, by F. W. Pennell (no. 1999).

Related to *Calea peruviana* (H. B. K.) Benth., which has the leaves hirtous-pubescent above and canescent-villous beneath, and the outer phyllaries nearly 3 cm. long, much longer than the inner.

***Calea ovalis* Blake, sp. nov.**

PLATE 61.

Shrub; stem stout, striatulate, hispidulous; leaves opposite; petioles stout, 2 to 3 mm. long, hispidulous; blades oval, 6.5 to 8 cm. long, 3.7 to 4.8 cm. wide, broadly rounded at apex, obscurely cordate at base, coriaceous, crenate-dentate (teeth about 12 pairs, depressed), slightly revolute-margined, scabrid-hispid and somewhat shining above, beneath paler green, sparsely hispidulous chiefly along the veins, densely and strongly prominent-reticulate especially beneath, the lateral veins about 8 pairs; heads in terminal clusters of about 5, subtended by small leaves, 10 to 11 mm. high, 8 to 10 mm. thick, on pedicels 1 to 1.8 cm. long; involucre 3-seriate, graduate, 9 mm. high, the outer phyllaries 4, ovate or oblong-ovate, 5 mm. long, more or less hispidulous, with indurate base and coriaceous-herbaceous, obtuse, slightly loose apex; the inner broadly oval or oblong-oval, with indurated base and shorter, scarious, yellowish-brown, rounded apex, slightly ciliolate or essentially glabrous; ray flowers about 8, their corollas yellow, usually irregularly bilabiate and with traces of stamens, the lamina erect, elliptic, 6 mm. long; disk corollas yellow, glabrous, 6.5 mm. long (the stout tube 2 mm. long, the throat funnelform-campanulate, 3.5 mm. long, the teeth ovate, 1 mm. long); achenes of ray and disk similar, sparsely hispidulous, 1.8 mm. long; pappus of about 20 linear-lanceolate acuminate awns 4.5 mm. long.

Type in the U. S. National Herbarium, no. 1,041,957, collected on open slope at Monte Redondo, south of Quetame, Department of Cundinamarca, Colombia, altitude 1,600 to 2,000 meters, September 6, 1917, by F. W. Pennell (no. 1821).

Related to *Calea tolimana* Hieron., which has ovate or subelliptic leaves, glabrous phyllaries, and achenes 2.5 mm. long.

EXPLANATION OF PLATE 61.—*Calea ovalis*, from the type specimen. Natural size

***Calea sororia* Blake, sp. nov.**

Probably frutescent; stem stoutish, terete, striatulate, brownish, densely and sordidly tomentose-pilosulous with loosely spreading, tuberculate-based, mostly deciduous hairs; leaves opposite; petioles densely griseous-tomentose, naked, 4 to 6 mm. long; blades broadly ovate, 3 to 5.5 cm. long, 2.5 to 4.5 cm. wide (those just below the inflorescences smaller), acute, mucronulate, cuneate to broadly rounded-cuneate at base, coarsely crenate-dentate with 5 to 7 pairs of large, broadly triangular or ovate-triangular, obtuse or acute, mucronulate teeth, triplinerved, impressed-veined above, reticulate-veined beneath, papyraceous, above dull green, densely and rather harshly hispid with yellowish, several-celled, subtuberculate-based, spreading hairs, beneath densely and softly griseous-pilose-tomentose with several-celled loosely spreading hairs; peduncles numerous, axillary and terminal, umbellately clustered, griseously pilose-tomentose, 1 to 3.5 cm. long, bearing at apex a close cluster of 6 to 8 heads, sessile or on pedicels 2 mm. long or less; heads cylindrical-turbinate, discoid, 7.5 to 9 mm. high, 3.5 to 5 mm. thick; involucre about 5-seriate, graduate, 5.5 to 6 mm. high, the outermost phyllaries about half as long as the innermost, narrowly oblong to oblong-ovate, acute, sordidly griseous-pilosulous, with indurate base and subequal, acute, herbaceous, appressed or spreading apex; the next series similar, broader, with longer, indurate, pale, subglabrous base and short, appressed, sordid-pilosulous, acute, herbaceous tip; the inner similar but with the herbaceous tip obsolete, often mucronulate; the innermost obtuse, subglabrous; disk flowers 13; corollas yellowish (?), sparsely glanduliferous on tube and at base of throat, 4.5 mm. long (tube 2 mm., enlarged below, the campanulate throat 0.5 mm. long, the oblong-lanceolate, obtuse, terminally thickened teeth 2 mm. long); pales scarious, acutish, denticulate above, 5 mm. long; achenes blackish-brown, cylindrical-obovoid, slightly thickened, ciliate on the obscure angles, 3 mm. long; pappus awns about 10, lanceolate or oblong-lanceolate, acuminate or mostly obtuse, spinulose on margin, persistent, 1 to 1.5 mm. long.

Type in the U.S. National Herbarium, no. 252633, collected near Neutón, Huehuetenango, Guatemala, altitude 915 to 1,220 meters, December 13 to 15, 1895, by E. W. Nelson (no. 3544).

This new species is related to *C. albida* A. Gray and *C. hypoleuca* Robins. & Greenm., differing from the former in its larger, more densely pubescent leaves and smaller, less herbaceous outer phyllaries, and from the latter in its narrow heads, less prominently herbaceous outer phyllaries, and narrower, not papyraceous, inner phyllaries.

***Calea leptocephala* Blake, sp. nov.**

Shrub; stem slender, puberulous in lines, glabrate; leaves opposite; petioles sordidly incurved-puberulous, 4 to 6 mm. long; blades ovate, those of the stem 5.5 to 8.5 cm. long, 3.5 to 5 cm. wide, acuminate with very acute, sometimes falcate tip, at base cuneate, coarsely serrate above the entire base with 6 to 8 pairs of acutely mucronulate teeth, submembranous, above deep green, sparsely strigillose with mostly deciduous hairs, in age bullate and roughish, beneath scarcely lighter green, very sparsely pilosulous on the veins, especially the larger ones, and densely dotted with shining yellowish glands on surface, triplinerved above the base, the nerves impressed above, beneath with the secondaries loosely prominulous-reticulate; heads cylindric or narrowly turbinate-cylindric, 5 mm. wide, in ternately or quinate divided panicles at tip of stem and branches, the central cluster sessile or subsessile, of (1) 5 to 8 heads, the lateral clusters on peduncles 2 to 3.2 cm. long, subtended by small or minute bracts (2.5 cm. long or usually much less), the pedicels incurved-puberulous and gland-dotted, 3 mm. long to almost none; disk 6.5 high, 2 mm. thick; involucre about 5-seriate, strongly graduate, 5 to 5.5 mm. high, the phyllaries few (about 11), the outer ovate, about 1.8 mm. long, acutish, appressed, whitish and indurate with obscurely herbaceous tip, ciliate chiefly below apex, on back glabrous or sparsely pubescent on costa, 1 or 3-nerved, the others oblong-ovate to oblong, whitish, subchartaceous with subscarios margin and apex, glabrous except for the ciliolate and sometimes glandular margin, the apex obtuse, involute-margined, at length brownish, spreading; ray 1, pale yellow, glabrous, the tube becoming 2 mm. long, the lamina ovate, tridenticulate, 2 mm. long, 1.5 mm. wide; disk flowers 3 or 4, pale yellow, glabrous, 3.8 to (in age) 4.2 mm. long (tube 1.2 to (in age) 1.8 mm., throat campanulate, 0.8 mm., teeth lanceolate, 1.5 to 1.8 mm.); pales broad, scarios, bluntly 3 or 4-dentate, ciliolate at apex, 5 mm. long; achenes of ray and disk similar, obconic-cylindric, subterete, 2.5 to 3 mm. long, hispid-pilose in lines, blackish, with conspicuous, thick, whitish carpopod; pappus 1 mm. long, of 10 subequal, oblong, obtuse, minutely denticulate, palaceous squamellae.

Type in the U. S. National Herbarium, no. 1,014,202, collected at Tonameca, Oaxaca, Mexico, November 9, 1917, by B. P. Reko (no. 3544).

Related to *Calea zacatechichi* Schlecht., but distinguished by its smaller, fewer-flowered heads and subcylindric involucre with spreading-tipped phyllaries.

***Calea tejadae* Blake, sp. nov.**

Frutescent(?); stems or branches slender, subterete, striate, densely and cinerously pilose-tomentose with several-celled, subglandular-based, matted hairs; leaves opposite; petioles naked, griseous-pilose-tomentose, 5 to 6 mm. long; blades ovate, 3.5 to 4.5 cm. long, 1.8 to 2 cm. wide, acute, cuneate at base, triplinerved, somewhat reticulate beneath, thickish, crenate-serrate with about 6 pairs of depressed mucronulate teeth, above dull green, densely and rather softly hispid-pilose with several-celled ascending hairs with subglandular bases, beneath very densely griseous-pilose-tomentose with matted hairs, subrufescent along the veins; peduncles numerous, axillary and terminal, 1.3 to 2 cm. long, densely griseous-pilose-tomentose, bearing 7 to 15 umbellately clustered heads, on pedicels 2 to 6 mm. long; heads discoid, 7 mm. high, 13-flowered; involucre 6-seriate, strongly graduate, ellipsoid, 4.5 to 5 mm. high, 2.5 to 3 mm. thick, the outermost phyllaries suborbicular, very short, the others oblong to oval-oblong, all siccate-indurate, without herbaceous tips, obtuse or rounded, ciliolate, otherwise essentially glabrous; corollas yellowish (?), gla-

brous, 3.5 mm. long (tube 1.3 mm.) the campanulate throat 0.7 mm. long, the oblong-lanceolate, recurved, apically thickened teeth 1.5 mm. long; pales subtruncate, sparsely glandular-ciliolate at apex, 4.2 mm. long; achenes blackish, obconic, pubescent, 2.5 mm. long; pappus awns 9, oblong, obtuse, subequal, denticulate, 1 mm. long.

Type in the U. S. National Herbarium, no. 862066, collected at Agua Blanca, Guatemala, November, 1913, by R. Tejada (no. 80).

Calea tejadae is distinguished from *C. zacatechichi* Schlecht., its nearest ally, by its dense pubescence.

***Calea brevipes* Blake, sp. nov.**

Shrub; stem densely pilose with matted grayish hairs, densely leafy; leaves opposite; petioles 1 to 2 mm. long, pilose-tomentose; blades narrowly ovate, 2.5 to 3 cm. long, 1 to 1.2 cm. wide, acute, at base broadly rounded to subcordate, coriaceous, crenate-serrulate, slightly revolute-margined, above dull green, densely and harshly hispid-pilose with tuberculate-based hairs, beneath densely and griseously pilose-tomentose, triplinerved and prominulous-reticulate beneath, the veins impressed above; peduncles terminating stem and branches, ternately arranged, 7 to 10 mm. long, bearing usually 3 sessile heads; heads discoid, ellipsoid, 10 or 11-flowered, 7 mm. high, 3 mm. thick in flower; involucre about 3-seriate, graduate, 5 mm. high, usually subtended by 1 or 2 elliptic or lanceolate, herbaceous-tipped bractlets about 3 mm. long, the phyllaries few, the outermost ovate or lance-ovate, acute, with indurate base and subherbaceous tip, densely sordid-pubescent chiefly above the middle, the inner phyllaries elliptic-oblong or elliptic, obtuse, with yellowish white indurate base and yellow or brownish yellow scarious apex, few-nerved, lacerate-ciliate, otherwise glabrous; corollas yellow, glabrous, at maturity 4.5 mm. long (tube slender, somewhat dilated at base, 2.2 mm. long, throat campanulate, only 0.5 mm. long, teeth lanceolate, 1.8 mm. long); pales scarious, deeply lacerate above, obtuse or acute, glabrous, 1-nerved, 4.5 mm. long; achenes blackish, sparsely hispidulous above, 2 mm. long; pappus of 22 linear-lanceolate serrulate awns 4 mm. long.

Type in the U. S. National Herbarium, no. 1,042,835, collected on edge of forest at El Convenio, west of San Lorenzo, Department of Tolima, Colombia, altitude 1,000 to 1,200 meters, December 29 to 30, 1917, by F. W. Pennell (no. 3463).

This species is related to *Calea glomerata* Klatt, also of Colombia, which has peduncles 10 to 18 mm. long and broader ovate leaves 1.5 to 2 cm. wide.

***Calea pachyphylla* (Klatt) Blake.**

Aspilia pachyphylla Klatt, *Leopoldina* 23: 143. 1887.

Actinomeris pachyphylla Schultz Bip.; Klatt, *Leopoldina* 23: 143. 1887, as synonym.

Altamirania pachyphylla Greenm. *Proc. Amer. Acad.* 39: 106. Sept. 25, 1903. Not

Altamiranoa Rose, Sept. 12, 1903.

Aspiliopsis pachyphylla Greenm. *Bot. Gaz.* 37: 222. 1904.

This plant is obviously closely allied to the *Caleas* of the section *Tetrachyron*, having the same habit, involucre, and achenes. The type species of that group, *C. manicata* (Schlecht.) Benth. & Hook., has a pappus of only 4 unequal awns. In *C. brandegei* Greenm. the 4 awns or squamellae are unequal, linear, and almost bristle-form. In *C. rupestris* T. S. Brandeg. the pappus consists of about 7 to 10 unequal awns or squamellae. *C. platyphylla* represents a further step in the direction of *Viguiera*, having the parts of its pappus readily separable into awns and squamellae. Its relationship to the species of the section *Tetrachyron*, which as above indicated are rather variable in pappus characters, is so close that it is inadvisable to attempt to separate it generically.

Klatt's name was doubtfully referred to *Altamirania pachyphylla* by Greenman when he described the plant as a new genus (*Altamirania*). The new name *Aspiliopsis*, proposed because of the slightly earlier publication of a genus *Altamiranoa* by Rose'

was first published in a supplementary leaflet (unpaged) distributed with Contribution 25 (new series) of the Gray Herbarium. Klatt's plant is represented in the Gray Herbarium by a leaf and fruiting head from the type (*Liebmann* 452, from "St. Gertrudes," Mexico), in addition to a good sketch of the specimen and drawings of floral details. Although the achenes examined show scarcely any squamellae, these are clearly indicated in Klatt's drawings, and the correspondence in other respects with Greenman's type (*Nelson* 829, from near Totontepec, Oaxaca) is so close as to leave no doubt that *Aspilia pachyphylla* and *Altamirania pachyphylla* are identical.

Tridax oligodonta Blake, sp. nov.

Suffrutescent?, with few opposite or alternate branches, nearly naked above; stem slender, densely hispid-pilose with spreading griseous hairs, some of which are tipped with dark glands; leaves opposite, those subtending the elongate branches of the inflorescence often alternate; petioles narrowly margined, densely pubescent like the stem, 5 to 8 mm. long; blades ovate or sometimes oval, 2 to 2.5 cm. long, 8 to 14 mm. wide, acute or obtuse, mucronulate, at base cuneate to broadly rounded, remotely serrulate (teeth low, acute, 2 or 3 pairs), densely pilose with ascending hairs on both sides, tripli- or subquintuplinerved, the veinlets obscure; heads few, about 2 cm. wide, the peduncles monocephalous, 3.5 to 9 cm. long, densely hispidulous-pilosulous and less densely pilose with longer hairs tipped with dark glands, the hairs all spreading and several-celled; disk broadly campanulate, 1.4 cm. high, 1 to 1.5 cm. thick; involucre about 4-seriate, strongly graduate, 10 mm. high, the outermost phyllaries small, oval, rounded, with whitish-green base and subequal, appressed, subherbaceous tip, rounded or rarely acute, ciliolate, pilosulous and glandular-pilose, several-nerved, the middle ones similar but larger, the inner oval-oblong, rounded, somewhat puberulous, not ciliolate, with somewhat loose, purplish, subscarious tips; rays about 5, fertile, the lamina cuncate-suborbicular, rosy or whitish in the dried state, 9 to 11 mm. long, 8 to 10 mm. wide, crenately 3-toothed with very short broadly rounded teeth, the 2 inner basal lobes minute, roundish, about 0.1 mm. long; disk corollas (in the dried state) deep green or blackish green above, densely pilose on tube and base of throat with simple hairs (a few gland-tipped hairs intermixed), papillose-ciliolate on teeth, 7.8 mm. long (tube 2.8 mm., throat subcylindric, 3.8 mm., teeth ovate, acutish, 1.2 mm.); pales oblong, dentate, abruptly acuminate, glandular-vittate, glabrous, 7 to 8 mm. long; ray achenes densely silky-pilose, their pappus of 10 linear-lanceolate plumose awns 1.5 mm. long; disk achenes (submature) obovoid, compressed, densely silky-pilose, 3 mm. long, with prominent, thick, crustaceous carpopod; their pappus of 20 linear or linear-lanceolate, acuminate, unequal, plumose awns 2.5 to 4 mm. long.

Type in the U. S. National Herbarium, no. 1,023,201, collected in the vicinity of Las Juntas, near Loja, Ecuador, September 28, 1918, by J. N. Rose, A. Pachano, and G. Rose (no. 23892). Additional specimen, with the same data, collected as no. 23168.

Related to *Tridax stuebelii* Hieron., also Ecuadorian, which according to description has lanceolate, entire or denticulate leaves 4 cm. long and 7 mm. wide, and ray achenes with the pappus scanty or none. The rays in *T. oligodonta* bear at the apex of the tube 1 to 3 linear appendages 0.6 mm. long or less, suggesting abortive stamens.

HELENIEAE.

Trichocoryne Blake, gen. nov.

Simple or subsimple herbaceous perennial, with a slender rootstock; leaves opposite, linear, entire, sessile, glandular-punctate, connate at base; heads solitary at apex of stem and branches, pedunculate, white, heterogamous; involucre 2-seriate, subequal, of 10 broad, rounded, flat, membranous-herbaceous phyllaries; receptacle convex, obtusish, muricate, epaleaceous; rays 5 to 7, white, sterile, the lamina

spreading, cuneate, emarginate; disk flowers numerous, hermaphrodite, fertile, their corollas broadly campanulate, with very short tube and 5 short teeth, densely pubescent especially on tube with many-celled clavate hairs; stamens 5, the anthers cordate-sagittate at base, the terminal appendages broadly ovate, obtuse; style branches short, acutish, unappendaged, merely papillose, the stigmatic lines extending nearly to apex; disk achenes obovoid-oblong, somewhat compressed, obtusely 4-angulate-ribbed, sometimes with a pair of additional weaker ribs on each face, subtruncate at apex, sparsely sessile-glandular, epappose.

The relationship of this genus appears to be with *Galeana* Llave, from which it differs in its more numerous, flat phyllaries, its sterile rays, more numerous flowers, and obtusely quadrangular achenes, as well as in its narrow, entire, sessile, connate-based leaves. The generic name (from $\theta\rho\iota\zeta$, hair, and $\kappa\omicron\rho\upsilon\upsilon\eta$, club) refers to the club-shaped hairs which thickly clothe the tube and teeth of the disk corollas.

Trichocoryne connata Blake, sp. nov.

Erect single-stemmed perennial, 17 to 21.5 cm. high, from a slender whitish rootstock bearing many fibrous rootlets; stem simple or with few opposite branches, 1.5 to 2.5 mm. thick, greenish, appressed-hispidulous with blackish-based hairs, glabrescent below, denudate below except for the more or less persistent, scarious, sheathing bases of the leaves; leaves opposite, 11 to 13 pairs, spreading, linear or linear-lanceolate, 1.3 to 2.5 cm. long, 2 to 4.5 mm. wide, slightly narrowed at the subtruncate apex, connate at base into a subscarious sheath 2 mm. long, thickish, 3-nerved (the nerves impressed), equally green on both sides and densely impressed-punctate with shining olivaceous glands, sparsely hispidulous on costa beneath with appressed blackish-based hairs, otherwise glabrous; peduncles terminal, sometimes becoming pseudo-axillary, monocephalous, slender, slightly thickened below the head, densely pubescent like the stem, 1.5 to 4 cm. long, naked or with a single leafy bract; heads 1.1 to 1.5 cm. wide; disk subglobose, 4 to 5 mm. high, 6 to 8 mm. thick; involucre 3 mm. high, appressed, densely hispidulous-pilosulous with appressed, several-celled, blackish hairs and short-ciliate with several-celled clavellate hairs, the phyllaries 10, suborbicular or broadly cuneate-oval, broadly rounded, membranous-herbaceous with thinner, subhyaline margins, blackish green, plane, 3-veined, about 2.5 mm. wide; receptacle convex or low-conical, about 1.8 mm. high; rays 5 to 7, the tube 1.2 mm. long, densely pilose with several-celled, blunt, clavellate hairs, the lamina cuneate, 4.2 mm. long, 2.6 mm. wide, emarginate, 4-nerved, pubescent dorsally with subclavellate hairs; disk corollas densely pilose on tube and teeth with several-celled clavate hairs (the longer 0.6 mm. long), sparsely so on throat, 1.8 mm. long (tube 0.3 mm., throat 1.2 mm., teeth deltoid, acutish, 0.3 mm.); ray achenes inane, trigonous; disk achenes blackish, 2 mm. long, 1 to 1.2 mm. wide.

Type in the U. S. National Herbarium, no. 1,038,788, collected in the State of Durango, Mexico, altitude 1,000 meters, by P. Ibaña García (no. 450).

The ray flowers bear short, unequally bifid, abortive styles included in the tube, and the ovule is abortive. The tube bears at apex 3 or 4 short yellow-tipped lobes, possibly representing abortive stamens.

EXPLANATION OF PLATE 63.—*Trichocoryne connata*, from the type specimen. Natural size.

Hecubaea aptera Blake, sp. nov.

Herbaceous perennial; rootstock thick, short, with numerous somewhat thickened rootlets about 7 cm. long, bearing a single flowering stem and two tufts of leaves

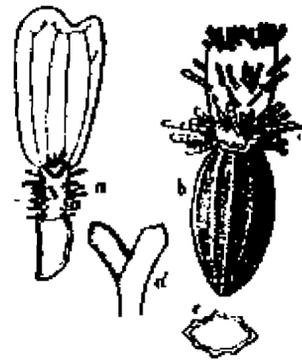


FIG. 87.—Details of *Trichocoryne connata*. a, Ray flower, scale 2.5; b, disk flower with mature achene, scale 5; c, cross-section of achene, scale 5; d, style branches, scale 10.

PLATE 62.

leaves of the basal tufts elongate-oblongate, 23 to 30 cm. long (including petioles) 1.2 to 1.8 cm. wide, obtuse, entire, light green, glabrous, densely glandular-punctate, 1-nerved and featherveined (lateral veins about 3 pairs), the blade long-tapering into the shorter or subequal, basally ampliate and subscarious-margined petiole; stem erect, about 45 cm. high, monocephalous, striate, sparsely pubescent especially above with short, several-celled, spreading, blackish hairs, bearing chiefly below the middle 3 to 6 leaves, the lower similar to the basal leaves but smaller, about 15 cm. long, the uppermost linear or elliptic-linear, 1.5 to 2.5 cm. long, all sessile, not at all or only very obscurely decurrent, the uppermost pubescent beneath like the stem; head 4 cm. wide; disk 2 cm. wide, depressed-subglobose; involucre flattish, about 1.3 cm. long, 2-seriate, obgraduate, pubescent like the stem, the phyllaries herbaceous, linear or elliptic-linear, 1.5 to 4 mm. wide, obtuse or rounded, united at base; rays about 14, neutral, yellow, the lamina broadly cuneate, deeply 3 or 4-lobed, sometimes with a short inner lobe, pilose on back, 1.8 cm. long, 1.2 to 1.5 cm. wide; disk corollas yellow, pilose on teeth with several-celled hairs, 4.8 mm. long (tube 0.5 mm., teeth 1.2 mm.); ray achenes (immature) with a pappus of about 8 suborbicular or broadly ovate, rounded or acutish, denticulate squamellae about 0.5 mm. long; disk achenes (immature) glabrous, their pappus similar to that of the ray achenes but more lacerate.

Type in the U. S. National Herbarium, no. 1,038,786, collected in the State of Durango, Mexico, altitude 1,000 meters, by P. Ibaña García (no. 408).

From *Hecubaea scorzoneraefolia* DC., the only species of this genus hitherto known, *H. aptera* is distinguished by its nondecurrent leaves, its broader, obtuse or rounded phyllaries, its more prominent pappus, and its neutral ray flowers.

***Dyssodia wootoni* Blake, sp. nov.**

Apparently annual, about 22 cm. high, branched from base, the branches procumbent or ascending, trichotomously branched; stem and branches slender, greenish, densely spreading-hirtellous, glabrescent, leafy; leaves opposite, sessile, broadly ovate in outline, 9 to 20 mm. long, 7 to 22 mm. wide, hirtellous, pinnatisect into 7 to 11 rather stiff, linear-filiform, aristate-tipped lobes 5 to 12 mm. long, about 0.3 mm. wide, somewhat narrower than the rachis; peduncles terminating stems and branches, monocephalous, glabrous or somewhat hirtellous below, erect, very slender, 7 to 10.5 cm. long, bearing several subulate, ciliate bracts about 2 mm. long; heads 12 mm. wide; disk subglobose, 5 to 6 mm. high, 6 to 8 mm. thick; involucre 5 mm. high, subtended by 5 lance-subulate, acuminate, ciliolate bracts 2 to 2.5 mm. long, the phyllaries 13, 2-seriate, equal, connate to middle (without decurrent margins), oblong, short-acuminate, short-ciliate on their free portions, otherwise glabrous, indurate-subherbaceous with thin subhyaline apex, this bearing 2 or 4 immersed elliptical glands; rays about 11, yellow, fertile, the tube sparsely hispidulous with several-celled subclavate hairs, the lamina oval, bidentate, 5-nerved, 4 mm. long, 2.3 mm. wide; disk corollas yellow, slender, similarly pubescent, 3 mm. long; achenes of ray and disk similar, obconic-linear, hispidulous, 2.2 mm. long; pappus of 5 obovate, obtuse, lacerate outer squamellae 1 to 1.2 mm. long, and 5 elliptic-oblong inner squamellae 2.5 to 2.8 mm. long, the latter with the body (1.5 mm. long) acutely 1-toothed on each side at apex, and the costa prolonged into an hispidulous awn equaling or somewhat shorter than the body; style branches obtuse, apiculate.

Type in the U. S. National Herbarium, no. 1012314, collected at Hacienda Buena Vista, about 20 miles east of Abasolo, Tamaulipas, Mexico, June 21, 1919, by E. O. Wooton.

This species belongs to the group of *Dyssodia* that by some authors is separated generically under the name *Thymophylla* (*Hymenatherum*). It is nearest *Dyssodia hartwegii* (A. Gray) Robinson, which has shorter peduncles, minutely pruinose-puberulent involucre, with the free margins of the phyllaries more finely ciliolate,

and shorter squamellae. The divisions of the leaves are decidedly rigid in the dried specimen, but Mr. Wootton informs me that they are not so when fresh.

Tagetes crassiceps Blake, sp. nov.

Frutescent; stem slender, branched, gray-barked, glabrous; branches sparsely incurved-puberulous or glabrous; leaves opposite, toward tips of branches alternate, pinnatisect, 3 to 5 cm. long, 2 to 3 cm. wide, the larger lobes 9 to 11, elliptic or oblong, 8 to 18 mm. long, 3 to 6 mm. wide, acute or obtuse, sharply serrate throughout with acute teeth, evenly glandular-punctate, glabrous or sparsely and obscurely pubescent beneath, the smaller basal lobes (1 to 3 pairs) 1.5 to 3.5 mm. long, aristate-toothed; peduncles monocephalous, 1 to 3 at apex of stem and branches, few-bracteate, glaucous, glabrous, 2 to 5.5 cm. long; disk 9 to 10 mm. high, 8 to 10 mm. thick; involucre subglobose-campanulate, glabrous except for the ciliolate teeth, 7 to 10 mm. high, 8 to 10 mm. thick, 8-toothed (teeth deltoid-acuminate, 1.5 to 2 mm. high, each with a double row of orbicular glands); rays 7, deep yellow, fertile, glabrous, the lamina oblong, bluntly 2-toothed, 17 mm. long, 8.5 cm. wide; disk flowers about 61, their corollas yellow, ciliolate with several-celled hairs on teeth, otherwise glabrous, 7.8 mm. long (tube 2.8 mm., throat cylindric-funnelform, 3.5 mm., teeth oblong, obtuse, 1.5 mm.); ray achenes linear, striate, glabrous, 4.8 mm. long, their pappus of 3 lanceolate, acuminate awns 1.8 to 2 mm. long and about 7 linear, acute or obtuse squamellae 1 mm. long or less, all free; disk achenes similar, 5 mm. long, the awns 1 to 3, 2 mm. long or less, the squamellae about 5, rhombic-lanceolate to linear, obtuse or acute, 1 mm. long or less.

Type in the U. S. National Herbarium, no. 1,023,340, collected in the vicinity of Cuenca, Ecuador, September 17 to 24, 1918, by J. N. Rose, A. Pachano, and G. Rose (no. 22859). Additional specimens, with the same data, were collected under no. 22852.

This species is well distinguished by its medium-sized, very broadly campanulate involucre, which is not at all contracted above.

SENECIONEAE.

Werneria articulata Blake, nom. nov.

Werneria lehmannii Hieron. Bot. Jahrb. Engler 28: 647. 1901. Not *W. lehmannii* Klatt, Ann. Naturhist. Hofmus. Wien 9: 368. 1894.

This species is apparently nearest *Werneria pygmaea* Hook. & Arn., differing in its articulate leaves with deciduous laminae. No specimens have been examined.

Werneria denticulata Blake, nom. nov.

Werneria brachypappus Phil. Anal. Univ. Chile 43: 501. 1873. Not *W. brachypappa* Schultz Bip. Bonplandia 4: 53. 1856.

This Chilean species, known to me only from description, is apparently nearest *Werneria cochlearis* Griseb. of Argentina. In the former the involucre is 14 to 16-fid with lanceolate, acute lobes; in the latter 8 to 12-fid, with oblong, obtuse lobes. *Werneria brachypappa* Schultz Bip. is listed in the Index Kewensis as a *nomen*, but is fully described on the page above cited.

MUTISIEAE.

Gochnatia boliviana Blake, sp. nov.

Shrub, 1 meter high; branches densely and closely griseous or ochroleucous-tomentulose; leaves alternate, usually with very short leafy branchlets in their axils; petioles 2 to 4 mm. long, ochroleucous-tomentulose; blades oval or oval-ovate to oblong, 1.8 to 3.8 cm. long, 1.1 to 1.8 cm. wide, acute to obtuse, mucronulate, at base rounded or subcordate, entire, subcoriaceous, above dull green, rather densely ochroleucous-tomentulose, glabrescent, beneath densely and closely ochroleucous-tomentulose, featherveined or somewhat triplinerved, the lateral veins 2 to 4 pairs, with the

secondaries closely prominulous-reticulate beneath, impressed above; heads solitary, terminal and in the upper axils, sessile, discoid, 42-flowered, broadly campanulate, 1.8 to 2.2 cm. high, 1.5 to 2 cm. thick; involucre about 7-seriate, strongly graduate, 12 to 13 mm. high, the outer phyllaries broadly ovate, acutish, passing gradually into the linear or lance-linear, acute innermost, all appressed, indurate, stiffly mucronate, densely ochroleucous-tomentulose, glabrescent in age; corollas "yellowish," glabrous, at maturity 13 mm. long (tube 6.5 mm., the limb parted almost to base into 5 equal, narrowly linear-lanceolate, apically somewhat thickened, recurved teeth about 6 mm. long); achenes densely subsericeous-pilose, 4.5 mm. long; pappus 9.5 mm. long, brownish-tinged, of numerous, graduate, very narrowly linear paleae, the innermost longest, bent and slightly thickened toward apex; anther tails 2.2 mm. long, ciliate, broadened at apex; style branches erect, 1.2 mm. long.

Type in the U. S. National Herbarium, no. 701956, collected at Santa Cruz, Bolivia, altitude 1,600 meters, May, 1892, by Otto Kuntze.

The type material was originally identified and recorded²¹ by Kuntze as *Gochnatia curviflora* (Griseb.) O. Hoffm. In that Argentinian species the heads are short-pedicelled and only 12 to 18-flowered, the leaves are oblong-lanceolate and repand, the involucre is 10 mm. high, and its phyllaries are white-tomentose.

Gochnatia obtusata Blake, sp. nov.

Much branched shrub, up to 2.6 meters high; branchlets densely cinereous-tomentose; older branches and stem glabrescent; leaves alternate; petioles cinereous-tomentose, 0.5 to 2.5 mm. long; blades oval, 4.5 to 20 mm. long, 3 to 13 mm. wide, broadly rounded to obtuse, sometimes emarginate or apiculate, at base rounded, entire, coriaceous, obscurely if at all revolute-margined, above deep green, thinly puberulous-tomentulose, in age glabrate and shining except along costa, beneath densely and closely cinereous-tomentose, featherveined, the lateral veins about 4 pairs, somewhat prominulous and reticulate beneath; heads discoid, 6-flowered, 11 to 13 mm. high, glomerate at tips of branches and in clusters of 1 to several in the subterminal axils, the pedicels densely scaly-bracted, 2 mm. long or less; involucre (excluding the minute bracts which cover the pedicels) 6 to 8 mm. high, about 6-seriate, strongly graduate, subcylindric, the phyllaries ovate, acute to (inner) sharply acuminate, indurate and whitish throughout, or brown-tinged above, arachnoid-ciliate or -ciliolate, glabrous on back; corollas in the dried state pale (doubtless whitish or ochroleucous when fresh), glabrous, 8 mm. long (tube 3 mm., the limb parted to base into 5 linear-lanceolate, apically thickened, recurved teeth 5 mm. long); achenes oblong, somewhat compressed, densely erect-pilose, 4.5 mm. long; pappus 7 mm. long, of numerous, graduate, very slender, minutely hispidulous awns; anther tails 2 mm. long; style branches 0.5 to 0.7 mm. long.

Type in the U. S. National Herbarium, no. 254705, collected on dry limestone hills at Tehuacan, Puebla, Mexico, altitude 1,675 meters, December 20, 1895, by C. G. Pringle (no. 6253).

ADDITIONAL SPECIMENS EXAMINED:

PUEBLA: Tehuacan, January, 1904, *Purpus* 482. Vicinity of Tehuacan, August 31, 1906, *Rose & Rose* 11225.

OAXACA: Near Huajuapam, altitude 1,705 to 1,980 meters, November 16, 1894, *Nelson* 1967.

Hitherto confused with *Gochnatia hypoleuca* (DC.) A. Gray, which ranges from Texas to Querétaro. In that plant the leaves are chiefly elliptic, acute or acutish, and mucronate, 2 to 5 cm. long, 0.8 to 1.5 cm. wide; the style branches are 0.7 to 1 mm. long; the involucre is only 5 to 6 mm. long, and its phyllaries range from obtuse to acute or obtusely acuminate.

²¹ Kuntze, *Rev. Gen. Pl.* 3²: 155. 1898.

Gochnatia viscosissima (Kuntze) Blake.

Gochnatia glutinosa α *viscosissima* Kuntze, Rev. Gen. Pl. 3²: 155. 1898.

This plant, represented in the National Herbarium by specimens of the type collection (Paso Cruz, latitude 34° S., Argentina, altitude 1,500 meters, 1892, *Kuntze*), appears to be well distinguished specifically by its foliar characters. Its leaves are elliptic or linear-elliptic, 12 to 22 mm. long, 2 to 5 mm. wide, uncinately-cuspidate at apex, entire, veiny beneath, and very strongly vernicose-resinous, like all the younger parts of the plant. The branchlets are hispidulous.

Lycoseris trinervis (D. Don) Blake.

Diazeuxis trinervis D. Don, Trans. Linn. Soc. 16: 253. 1830.

This species, originally based on material from Guayaquil, has been re-collected by Rose, Pachano, and Rose (no. 23604) at Durán, Ecuador, near Guayaquil. It is related to *Lycoseris bracteata* Benth.

Proustia cuneata Blake, sp. nov.

PLATE 63.

Much-branched, unarmed shrub; branchlets whitish, rather densely crisped-tomentulose with griseous hairs, glabrescent; stem and older branches gray-barked, glabrous; leaves alternate; petioles 1 to 2 mm. long; blades cuneate or cuneate-oblongate, 1.2 to 2.5 cm. long, 4 to 8 mm. wide, obtuse or rounded, spinose-mucronate, cuneate to base, broadest near the apex, repand-denticulate mostly above the middle with about 8 pairs of spinose teeth, coriaceous, above light bright green, inconspicuously tomentulose and viscidulous, glabrescent, densely prominulous-reticulate, beneath densely cinereous-tomentulose, the veins mostly concealed by the tomentum; heads 5 or 6-flowered, homogamous, 8 to (fruit) 10 mm. high, 4 to (fruit) 10 mm. thick, oblong-cylindric becoming turbinate-subglobose, in close clusters of 3 or 4 at tips of branches, sessile or on pedicels 3 mm. long or less; involucre about 4-seriate, graduate, 7 to 8 mm. high, the phyllaries comparatively few (about 14), the outermost broadly ovate, acute or acutish, stiffly mucronate, somewhat tomentulous, the middle ones oblong or oval, obtuse, mucronate, ciliolate and somewhat arachnoid-ciliate, the innermost oblong-elliptic, mucronulate, pubescent like the middle ones, all appressed, indurate, greenish white, with thinner, brownish or purplish-tinged, somewhat glandular apex; corollas white, glabrous, 2-labiate, 7.5 mm. long, one lip unequally 3-toothed about to middle, the other 2-parted essentially to base, the teeth all recurved above; achenes 5-angled, stipitate-glandular and sparsely hispidulous, 3 mm. long; pappus 5.5 mm. long, brownish, of about 45 very narrowly linear hispidulous awns, at apex slightly thickened and subplumose-barbellate; stamen tails linear, 1 mm. long; style branches erect, rounded, minutely papillose, 1.5 mm. long.

Type in the U. S. National Herbarium, no. 603741, collected at Ollantaytambo, Peru, altitude about 3,000 meters, May 4, 1915, by O. F. Cook and G. B. Gilbert (no. 538)

The vernacular name of this species is "humanpeta." It is nearest *P. baccharoides* D. Don., which has much larger leaves (5 to 10 cm. long) and 2 to 4-flowered heads with shorter involucre (4 mm. long).

EXPLANATION OF PLATE 63.—*Proustia cuneata*, from the type specimen. Natural size.

Perezia wislizeni minor Blake, subsp. nov.

Involucre about 6-seriate, closely graduate, about 1.3 cm. high, 1.5 to 2.2 cm. thick, the phyllaries oval to (inner) oblong-obovate, the outer indurate-herbaceous, acute or acuminate, mucronate, the inner with minutely ciliolate, thinner margins and rather abruptly acuminate spreading tips, all densely many-nerved, the inner purplish-tinged.

Type in the U. S. National Herbarium, no. 1038784, collected in the State of Durango, Mexico, altitude 1,000 meters, by P. Ibaña García (no. 376).

In typical *Perezia wislizeni*, from which var. *megacephala* A. Gray can not be separated, the heads are considerably larger, the involucre being 2 to 4 cm. high.

***Trixis peninsularis* Blake, sp. nov.**

Shrubby, divaricately branched above; stem whitish-barked, glabrous; branchlets in youth densely and cinereously subtomentose-pilose with loosely spreading to erectish hairs with subtuberculate bases, glabrescent and brownish when older; leaves alternate; petioles broad, 2 to 4 mm. long, not auriculate or decurrent, densely subsericeous-pilose; blades lanceolate or lance-elliptic, 4 to 8 cm. long, 0.8 to 2 cm. wide, acuminate to a very acute apex, somewhat falcate, at base rounded to cunate, serrulate with small, acute, callous teeth, usually strongly revolute-margined, papery, above light green, rather densely short-pilose, beneath densely and softly sericeous-pilose with antrorse hairs, featherveined, the lateral veins about 8 pairs, impressed above, whitish and prominulous beneath and with the secondaries loosely reticulate; heads about 1.8 cm. wide, about 14-flowered, homogamous, numerous, cymose-panicled on the divergent leafy-bracted branches of the inflorescence, the pedicels usually bracteate, 6 to 17 mm. long; disk subcylindric, in flower 16 mm. high, 6 mm. thick, in fruit about 18 mm. high; involucre double, the outer phyllaries 4, linear-ob lanceolate or linear-elliptic, 6 to 9 mm. long, 1 to 2 mm. wide, acuminate, herbaceous, 1-nerved and with a pair of weaker veins, hispid-pilose and ciliate and more sparsely stipitate-glandular; inner phyllaries 8, linear, 11 to 12 mm. long, acute or acuminate, subherbaceous, evenly but not densely stipitate-glandular and hispid-pilose, densely ciliolate or ciliate above; outer flowers yellow, bilabiate, glabrous, the tube 7.5 mm. long, the outer lip oblong, tridentate, 7 mm. long, 2.6 mm. wide, the inner lip 2-parted, 6 mm. long, the lobes revolute; inner corollas similar in general but smaller, the outer lip unequally 3-toothed; achenes very slenderly subcylindric 6 to 8 mm. long, densely papillose-hispidulous with 1-celled hairs; pappus of numerous, minutely hispidulous, straw-colored setae 1 cm. long.

Type in the U. S. National Herbarium, no. 638508, collected at San José del Cabo, Baja California, Mexico, March 25, 1911, by J. N. Rose (no. 16457).

ADDITIONAL SPECIMENS EXAMINED:

BAJA CALIFORNIA: San José del Cabo, March 8, 1892, *Brandegee* 347. La Paz, January to February, 1890, *Palmer* 7.

All these specimens have been identified as *Trixis angustifolia* DC. or *T. haenkei* Schultz Bip. Palmer's plant was recorded under the former name by Vasey and Rose,²² and under the latter in Robinson and Greenman's revision²³ of the Mexican and Central American species of the genus. The plant is nearest *T. haenkei*, but that species, originally described from the Sierra Madre of northwestern Mexico, differs in its densely silky-pubescent involucre.

***Trixis adenolepis* Blake, sp. nov.**

Shrub, 2 meters high; branches rather densely pilose with erectish hairs with small tuberculate bases, the stem glabrescent, gray-barked; leaves alternate; petioles 2 to 3 mm. long, narrowly margined, pubescent like the branches, usually with small densely ochroleucous-sericeous buds in their axils; blades elliptic, those of the main stem 5.5 to 7.5 cm. long, 1.7 to 2.4 cm. wide, acuminate to a sharp point, at base acutely cuneate, entire or rarely with a few small acute teeth above, not revolute-margined, papery, above rather harshly hispid-pilose with ascending hairs with small tuberculate bases, more densely so along costa and margins, glabrescent, beneath scarcely lighter green, evenly and rather densely pilose with loosely ascending or spreading hairs with slightly thickened conical bases, featherveined, the lateral veins about 7 pairs, barely prominulous beneath, the secondaries obscure; heads about 1.8 cm. wide, numerous, 13-flowered, homogamous, cymose-panicled toward tips of stem and branches, the inflorescences leafy-bracted, the pedicels 1 to 10 mm. long; disk in flower subcylindric, 1.8 cm. high, 6 mm. thick; involucre double, the outer phyllaries 5,

²² Contr. U. S. Nat. Herb. 1: 73. 1890.

²³ Proc. Amer. Acad. 40: 10, 1904.

linear-subulate or lance-linear, acuminate, revolute-margined, stipitate-glandular and short-pilose, herbaceous, 11 to 13 mm. long, 1 to 2 mm. wide; inner phyllaries 8, linear, acuminate, subherbaceous, densely stipitate-glandular, densely ciliolate, toward apex pilose, 15 to 16 mm. long; outer corollas yellow, bilabiate, the tube sparsely stipitate-glandular above, 8 mm. long, the outer lip oblong-ovate, 8 mm. long, 3 mm. wide, tridentate, stipitate-glandular on back and near apex short-pilose, the inner lip 2-parted, 5.5 mm. long, the lance-linear lobes recurved; inner corollas similar but smaller; achenes very slenderly fusiform-cylindric, 7 mm. long, densely papillose-hispidulous with spreading, yellowish, 1-celled hairs; pappus of numerous, very slender, hispidulous, straw-colored setae 1 cm. long.

Type in the U. S. National Herbarium, no. 576968, collected at Gualán, Guatemala, altitude about 125 meters, January 12, 1905, by C. C. Deam (no. 324).

The type collection has been identified as *Trixis frutescens* P. Br., which is *T. radialis* (L.) Kuntze. It differs from that species in pubescence and various other characters. It is nearest *T. rugulosa* Robins. & Greenm., but is distinguished by its longer and narrower outer and longer, densely stipitate-glandular inner phyllaries.

***Trixis grandis* Blake, sp. nov.**

Herb 2 meters high, branched at least above; stem stout, fistulose, 1 cm. thick, densely accumbent-pilosulous with sordid glandular-based hairs, winged by the long-decurrent leaf bases, the wings 1 to 5 mm. wide; stem leaves rather remote, elliptic-lanceolate or oblong-lanceolate, 20 to 30 cm. long, 3.5 to 4 cm. wide, acute, sessile by a scarcely narrowed, decurrent base, remotely denticulate, papery, dark dull green, rather densely pilosulous on both sides with spreading or ascending glandular-based hairs, featherveined, loosely prominulous-reticulate beneath; branch leaves much smaller, 3 to 7.5 cm. long; heads subglobose, about 76-flowered, 3 cm. wide and 1.8 cm. high in flower, 3.5 to 4 cm. wide in fruit, in loose panicles of about 8 toward end of branches, the peduncles swollen above, monocephalous, 4 to 8 cm. long; involucre distinctly 2-seriate, equal, 1 to 1.2 cm. high, densely accumbent-pilosulous, the outer phyllaries about 7, oblanceolate or linear-oblong, acute, usually denticulate toward apex, 1.5 to 2.8 mm. wide, the inner about 18 to 21, linear, acuminate, about 1.5 mm. wide; corollas "orange-red," bilabiate, 1.4 cm. long, hirsute toward apex of tube and on the back of both lips above, the outer lip elliptic-oblong, tridenticulate, 6.5 mm. long, the inner 2-parted, 5 mm. long; achenes distinctly rostrate, 9 to 12 mm. long, densely spreading-pilosulous with slender subglandular-based hairs; pappus brownish, 8 to 10 mm. long.

Type in the U. S. National Herbarium, no. 1,110,858, collected in swamps at Novo Friburgo, State of Rio de Janeiro, Brazil, altitude 900 meters, January 7, 1922, by E. W. D. and M. M. Holway (no. 1470).

Allied to *Trixis glaziovii* Baker and *T. gigas* Wawra. The former, according to Baker's description, has much smaller leaves, 30-flowered heads, and achenes only 5 mm. long. The latter, while agreeing in general features with *T. grandis*, has leaves flavescent-villous beneath, an involucre 2.5 cm. high or more, and achenes only 5 mm. long and not distinctly rostrate.

***Trixis verbascifolia* (Gardn.) Blake.**

Bowmania verbascifolia Gardn. in Hook. Icon. Pl. 6: pl. 519, 520. 1843.

Trixis bowmanii Baker in Mart. Fl. Bras. 6³: 390. 1884.

A specimen of the type collection, Gardner 5797, is now in the National Herbarium.

CICHORIEAE.

***Pinaropappus parvus* Blake, sp. nov.**

Dwarf perennial, about 4 cm. high; caudex short, with short thick branches (3 to 4 mm. thick), bearing rosettes of leaves and 1 to 4 scapes; scapes very slender, curved glabrous, pale green, naked or bearing 1 to 4 subulate bracts 1 to 4 mm. long, rarely

with a branch below the middle; leaves densely rosulate, narrowly oblanceolate or spatulate-oblanceolate, 5 to 15 mm. long, 1 to 2 mm. wide, acute, callous-apiculate, narrowed gradually into a petioliform base, minutely serrulate, subcoriaceous, pale green or glaucescent, glabrous; heads solitary, about 12 mm. wide; involucre campanulate, about 5-seriate, graduate, the outermost phyllaries very short, triangular or lance-ovate, the others narrowly linear-oblong or linear-lanceolate, all acute or acutish to obtusish, submembranous, with purplish center and narrower whitish margins, without sphacelate tips or these minute, obscurely ciliolate at apex; receptacle paleaceous, the pales membranous, subulate-attenuate, glabrous, 7 mm. long; lamina of the corollas about 8 mm. long; achenes (immature) contracted above, glabrous, about 4-angled; pappus of unequal hispidulous bristles, about 3 mm. long.

Type in the U. S. National Herbarium, no. 1,120,372, collected on rocks, Hilton Canyon, Lincoln National Forest, New Mexico, altitude 2,075 meters, September 12, 1916, by W. R. Chapline (no. 660).

Distinguished from its closest relative, *Pinaropappus spathulatus* T. S. Brandeg.,²⁴ of Veracruz and Puebla, by its lower growth, thick short-branched caudex, smaller and somewhat firmer leaves, and lack of obvious sphacelate tips to the phyllaries. Comparison of *Purpus* 1165, the type collection of *P. spathulatus*, which has been sent from the Gray Herbarium, with *Purpus* 5816, type collection of *P. caespitosus* T. S. Brandeg.,²⁵ in the National Herbarium, has shown that the two supposed species are identical and should be combined under the name *P. spathulatus*.

Malacothrix floccifera (DC.) Blake.

Senecio flocciferus DC. Prodr. 6: 426. 1837.

Malacothrix obtusa Benth. Pl. Hartw. 321. 1849.

DeCandolle's description of *Senecio flocciferus*, which was evidently based on imperfect material, agrees well with *Malacothrix obtusa*, and his name is referred to the synonymy of that species by Gray. As this was not a homonym, it is necessary to adopt it in place of *Malacothrix obtusa* Benth.

Hieracium arsenei Blake, sp. nov.

Herbaceous perennial, 1-stemmed, about 23 cm. high; caudex short, oblique, with long somewhat thickened rootlets, at apex densely tufted-pilose with golden-brown hairs about 15 mm. long; basal leaves few (about 2), obovate-oval, short-petioled, about 2.5 cm. long, 1.2 cm. wide, rounded, glandular-apiculate, remotely glandular-serrulate, thickish, purple beneath, rather densely hirsute-pilose above with golden-brown hairs about 4 mm. long and with obscurely tuberculate bases, sparsely so beneath; stem slender, densely pilose for about one-quarter its length with golden-brown hairs (4 to 10 mm. long) with small tuberculate bases, sparsely so above and there slightly stipitate-glandular, simple below the inflorescence, bearing 2 to 4 linear-subulate densely pilose bracts (7 to 12 mm. long, 1 mm. wide or less); heads several, about 27-flowered, in a thyriform panicle 9 cm. long or less, this densely stipitate-glandular (the glands golden, the hairs yellowish or blackish-based, about 0.5 mm. long) and very sparsely or rather densely pilose with long yellow hairs; involucre 9.5 to 12.5 mm. high, 4 to (young fruit) 9 mm. thick, the chief phyllaries 13, linear lanceolate, blackish green, rather densely stipitate-glandular especially below, and loosely long-pilose with yellowish hairs about 2.5 mm. long, the outer phyllaries or bracteoles few, half as long as the inner or less; corollas yellow (when dry); achenes bright reddish brown or purplish brown, narrowed at base, slightly attenuate at apex, striate, 3.5 to 4.6 mm. long; pappus somewhat sordid, 5 mm. long.

Type in the U. S. National Herbarium, no. 42962, collected at Cerro Azul, near Morelia, Michoacán, Mexico, March 9, 1911, by G. Arsène.

²⁴ Zoe 5: 241. 1906.

²⁵ Univ. Calif. Publ. Bot. 4: 388. 1913.

A very distinct species, characterized by its slender habit, dense basal tuft of golden-brown hairs, small basal leaves, merely bracteate stem, and comparatively large achene. It is apparently nearest *H. junceum* Fries, a little known Mexican species, of which no specimens have been examined by the writer. This is said to have flocculent-pubescent pedicels, densely floccose, epilose involucre (only 5.5 to 7 mm. high), and reddish pappus. In general appearance *H. arsenei* is similar to *H. mexicanum* Less., but in that the achenes are only 2 to 3 mm. long.

Hieracium nicolasii Blake, sp. nov.

Herbaceous perennial, single-stemmed, 35 to 55 cm. high; rootstock short, oblique, with fibrous rootlets; basal leaves few or wanting at flowering time, obovate or oblanceolate, 10 cm. long (including the margined petiole) and 2 cm. wide, or smaller, rounded to acutish, cuneate at base, remotely glandular-denticulate, sparsely or rather densely hirsute-pilose with pale brownish hairs about 3 mm. long with scarcely tuberculate bases; stem rather densely setose for most of its length with spreading brownish hairs 3.5 mm. long, with scarcely tuberculate bases, and above toward and in the inflorescence very densely stipitate-glandular (hairs spreading, blackish below, yellow above like the glands, several-celled, mostly about 0.6 mm. long), somewhat pilosulous, and sparsely or rather densely setose with long hairs similar to those of the stem below but usually blackish; stem leafy to middle or above, the leaves 5 to 8, the middle and lower ones obovate or oblanceolate, 6 to 9.5 cm. long, 1 to 2 cm. wide, acutish to acute or subacuminate, narrowed to a sometimes clasping base, remotely glandular-denticulate, pubescent like the basal leaves, the uppermost smaller, lanceolate or elliptic-lanceolate, about 3 cm. long; heads medium-sized, about 5 to 7 in a close terminal cyme or cymose panicle, about 57-flowered, the pedicels 6 mm. long or less, densely pubescent like the upper part of the stem; involucre 9 to 13 mm. high, 5 to (young fruit) 12 mm. thick, the principal phyllaries about 19, linear-lanceolate, blackish green, densely stipitate-glandular below (hairs blackish below, yellowish above like the glands, 1.5 mm. long or less), less densely so above, and sometimes sparsely pilosulous at base or along midline, the outer phyllaries or bracteoles few, two thirds as long as the inner or less; corollas greenish yellow (when dry), the lamina 4.8 mm. long, shorter than the tube, the styles pale; achenes very gradually tapering above, deep purplish brown, striate, glabrous, 4 to 4.3 mm. long; pappus sordid-whitish, 6 mm. long.

Type in the U. S. National Herbarium, no. 42961, collected at Cholulá, vicinity of Puebla, Puebla, Mexico, July 14, 1910, by Brother Nicolas (distr. Arsène no. 5252).

Hieracium nicolasii is related to *H. prionobium* Robins. & Greenm. and *H. crepidispermum* Fries. From the former it differs in its broader (oblanceolate or obovate) stem leaves, from the latter in its densely stipitate-glandular involucre and sordid pappus.

Hieracium jaliscopolum Blake, sp. nov.

Herbaceous perennial, 35 to 60 cm. high, about 3-stemmed; rootstock thick, oblique, about 2.5 cm. long; basal leaves essentially absent at flowering time; stem rather slender, leafy below the middle, with few linear bracts above, simple below the inflorescence or few-branched near base, sparsely or densely hirsute-pilose about to middle with spreading or reflexed rufid hairs (1.5 to 4 mm. long, with small tuberculate bases), above the middle rather sparsely stipitate-glandular with blackish hairs (about 0.5 mm. long) bearing yellowish glands; lower stem leaves about 5 to 8, rather crowded, elliptic to elliptic-oblanceolate, the larger sessile and somewhat clasping or the lower petiolate, 5 to 17 cm. long, 1.3 to 2.3 cm. wide, acuminate, apiculate, narrowed to base, pale and glaucescent, ciliate and hirsute-pilose like the stem or sometimes nearly glabrous beneath; heads several or rather numerous, loosely paniced, medium-sized, about 53-flowered, the pedicels densely stipitate-glandular like the upper part of the stem, sometimes slightly tomentulose at apex, 1.5 to 4 cm. long; involucre 8 to 9.5 mm. high, 5 to (fruit) 12 mm. wide, the chief phyllaries 21, linear

lanceolate, blackish green, rather densely stipitate-glandular (hairs blackish, 0.5 to 0.8 mm. long, the glands yellow) and toward base sparsely pilosulous, the outer phyllaries or bracteoles few, half as long as the proper phyllaries or less; corollas not well seen; achenes columnar, contracted at base, not narrowed above, deep purplish brown or almost black, ribbed, minutely hispidulous on the ribs, 2.5 to 3 mm. long; pappus somewhat sordid, about 5 mm. long.

Type in the U. S. National Herbarium, no. 301606, collected near Colotlán, Jalisco, Mexico, August 29, 1897, by J. N. Rose (no. 2680).

ADDITIONAL SPECIMEN EXAMINED:

JALISCO: Road between Huejuquilla and Mesquitac, August 25, 1897, *Rose*.

Hieracium jaliscopolum is nearest *H. wrightii* (A. Gray) Robins. & Greenm., differing chiefly in the character of its pubescence. In that species the long rufid hairs of the stem extend to the inflorescence, without the short dark gland-tipped hairs that occur on the upper half of the stem in *H. jaliscopolum*, and the pedicels are densely to rather sparsely tomentulose, as well as stipitate-glandular. The vernacular name of Rose's no. 2680 is given as "lechugilla."

Hieracium abscissum morelosanum Blake, subsp. nov.

Herbaceous perennial, about 1 meter high, similar to *H. abscissum*; stem pilose on the lower third with rufidulous hairs with small, tuberculate, blackish bases, very sparsely so toward the middle, glabrous above; inflorescence thyrsoidal, up to 60 cm. long, many-headed, the pedicels 1.3 to 2.4 cm. long, sparsely stipitate-glandular toward apex (the glands yellowish, the hairs sometimes blackish-based), very sparsely so or glabrous below, quite without tomentum; involucre 6 to 7 mm. high, rather densely stipitate-glandular at base (glands yellowish, the hairs 0.5 mm. long or less, sometimes blackish below), sparsely so along midline above; achenes columnar, slightly narrowed at base, reddish brown, minutely hispidulous on the ribs, 2 to 2.2 mm. long; pappus sordid, rather sparse, 4 mm. long.

Type in the U. S. National Herbarium, no. 342756, collected in mountain woods above Cuernavaca, Morelos, Mexico, altitude 2,285 meters, February 5, 1899, by C. G. Pringle (no. 8053).

The type collection has been recorded by Robinson and Greenman²⁶ as *Hieracium abscissum* Less. From the abundant material of that species examined it differs in the entire absence of tomentulose indument on the pedicels and involucre.

Hieracium panámense Blake, sp. nov.

Herbaceous perennial, single-stemmed, about 90 cm. high; rootstock short, thick, emitting very numerous rootlets 15 cm. long or more; basal leaves 12 or more, obovate, 6 to 11 cm. long (including the very short, margined petiole), 2.5 to 3.5 cm. wide, broadly rounded and sometimes emarginulate, cuneate at base, obscurely glandular-denticulate or slightly repand, thin, hirsute-pilose and ciliate with rufidulous, etuberculate hairs 3 to 7.5 mm. long, beneath lighter green and often more sparsely pubescent; stem stoutish, branched from near the middle, sparsely hirsute-pilose to middle with rufidulous hairs about 3 mm. long, rather sparsely pilosulous throughout with loosely accumbent whitish hairs; stem leaves about 8, similar to the basal leaves, sessile, scarcely or not clasping, 6 to 11 cm. long, 2 to 3.5 cm. wide; inflorescence loosely thyrsoid-paniculate, about 40 cm. long, many-headed, the branches and pedicels densely subtomentulous-pilosulous with subappressed griseous hairs and rather densely stipitate-glandular with yellowish glands, the pedicels 4 to 16 mm. long; heads small, 31-flowered; involucre 7 to 8 mm. high, about 4 mm. thick in flower, the phyllaries 13, linear-lanceolate, light green, toward base sparsely pilosulous and stipitate-glandular with yellowish glands (about 0.3 mm. long including stipe), above the middle sparsely pilosulous along midline or subglabrous, the bractlets few, 2.5 mm. long or less; corollas apparently pale yellow, the lamina about 4 mm.

²⁶ Proc. Amer. Acad. 40: 21. 1904.

long, equaling the tube, the styles pale; achenes (immature) columnar, scarcely narrowed at either end, pale, glabrous, 1.2 mm. long; pappus straw-color, 4.5 mm. long.

Type in the U. S. National Herbarium, no. 1,083,884, collected near Alhajuela, Panama, April, 1911, by August Busck (no. 1).

This species is nearest *Hieracium abscissum* Less., but is very distinct in its broadly rounded basal leaves.

***Hieracium melanochryseum* Blake, sp. nov.**

Herbaceous perennial, 2-stemmed, about 16 cm. high, from a short caudex; basal leaves several, elliptic or elliptic-obovate, 5 to 8 cm. long (including the short margined petiole), 1.5 to 2 cm. wide, acute or obtusish, cuneate at base, sparsely glandular-denticulate or subentire, pale green, thin-papery, hirsute-pilose on both sides and ciliate, the hairs rufidulous, slightly thickened below, not tuberculate; stem densely spreading-hirsute-pilose like the leaves (the hairs with conical blackish bases), and chiefly above densely stipitate-glandular (the glands yellow, the hairs blackish, 1 mm. long or less) and sordid-tomentulous; stem leaves 2 or 3, the lower similar to the basal leaves, scarcely clasping, the uppermost much smaller; heads rather large, about 56-flowered, about 7, approximate, the pedicels pubescent like the upper part of the stem, 7 mm. long or less; involucre 1 to 1.2 cm. high, 7 to (fruit) 12 mm. thick, the phyllaries about 19, linear-lanceolate, blackish green with paler margins, densely pubescent at base like the pedicels, above similarly pubescent along midline, the inner nearly glabrous, the outer phyllaries or bracteoles few, half as long as the proper phyllaries or less; corollas apparently pale yellow, the lamina 4.5 mm. long, shorter than the tube, the styles dark; achenes columnar, striate, deep reddish brown, glabrous, 3.8 mm. long; pappus sordid, rather copious, 8 mm. long.

Type in the U. S. National Herbarium, no. 450229, collected between Pachuca and Real del Monte, Hidalgo, Mexico, August 31, 1903, by J. N. Rose and J. H. Painter (no. 6673).

Perhaps nearest *Hieracium bulbisetum* Arv.-Touv.,²⁷ but distinguished by its much larger heads and achenes.

***Hieracium comaticeps* Blake, sp. nov.**

Herbaceous perennial, 15 to 35 cm. high, single-stemmed, from an oblique root-stock up to 3.5 cm. long; leaves chiefly or entirely basal, several, obovate or elliptic-oblanccolate, 5 to 9 cm. long (including the slender or broad, 0.5 to 3.5 cm. long petiole), 1 to 2.3 cm. wide, acute or obtuse, glandular-apiculate, cuneate at base, remotely glandular-denticulate, papery, often purplish-tinged, loosely pilose and ciliate with pale rufid, ctuberculate hairs about 2 mm. long; stem slender, simple, rather densely cinereous-tomentulose especially above, more sparsely pilosulous especially below with blackish several-celled hairs, and very sparsely hirsute-pilose with dark hairs about 2 to 5 mm. long, in age glabrescent below; stem leaves none to 2, oblanceolate, the lower similar to the smaller basal leaves, the upper oblanceolate, about 3.5 cm. long, 5 mm. wide, petioled; head 1 to 7, medium-sized or (if solitary) rather large, approximate, the pedicels 1.3 cm. long or less, densely sordid-tomentulose and less densely pilose with blackish hairs 1.5 to 3 mm. long, about 34 to (when solitary) 64-flowered; involucre 9 to 12 mm. high, 6 to (fruit) 15 mm. thick, very densely and loosely sublanate-pilose (the hairs blackish below, griseous above, 4 to 7 mm. long), and beneath the hairs minutely and densely black-papillose, rarely with a very few short gland-tipped hairs intermixed, the chief phyllaries 13 to 20, blackish green,

²⁷ *HIERACIUM BULBISETUM* ARV.-TOUV. Ann. Cons. Jard. Genève 3: 27. 1899.

Hieracium oaxacanum Robins. & Greenm. Proc. Amer. Acad. 40: 21. 1904; Zahn in Engler, Pflanzenreich 4²⁶⁰: 1106. 1922.

Both these specific names are based on the same type, *Pringle* 4715.

the outer phyllaries or bracteoles few, about half as long as the proper phyllaries, or less; corollas apparently whitish (when dry), the lamina 5 mm. long, exceeding the tube, the styles rather dark; achenes columnar, short-tapering at base, not contracted above, reddish or purplish-brown, minutely hispidulous on the ribs, 2 to 2.5 mm. long, about 10-ribbed and with 5 of the ribs somewhat more prominent than the others; pappus sordid-whitish or brownish, about 6 mm. long.

Type in the U. S. National Herbarium, no. 570623, collected on wet rocks near timber line, Mount Ixtaccihuatl, State of Mexico, Mexico, October, 1905, by C. A. Purpus (no. 1829).

The type collection was distributed as *Hieracium mexicanum* Less. *Hieracium comaticeps* is nearest that species, but differs specifically in its densely long-pilose heads, which are similar in pubescence to those of some South American species of the genus, such as *H. frigidum* Wedd.

***Hieracium maxonii* Blake, sp. nov.**

Herbaceous perennial, 25 cm. high or less, erect, single-stemmed; rootstock apparently short and erectish, densely silky-pilose above with rufous hairs about 1 cm. long; basal leaves several, oblanceolate, obtuse, bluntly apiculate, acuminate at base, mucronulate-denticulate or repand-denticulate with 10 to 15 pairs of unequal obtusely gland-tipped teeth 0.3 to 0.8 mm. high, often purplish-tinged, rufid or whitish-pilose particularly toward margin and on costa beneath, somewhat stipitate-glandular especially on costa beneath, the petiole 2 to 8.5 cm. long, marginate above, the blade 7.5 to 10.5 cm. long, 1 to 1.5 cm. wide; stem slender, purplish, simple below the inflorescence, densely rufid-pilose on the lower third with spreading hairs about 5 mm. long, sparsely or rather densely stipitate-glandular throughout with very short hairs, bearing about 4 leaves in the lower half and 1 or 2 reduced ones above the middle, the lower ones similar to the basal leaves but smaller and usually sessile, 4 to 12 cm. long, 3 to 10 mm. wide, the upper linear or linear-lanceolate, 2.2 to 3.5 cm. long, 1 to 3 mm. wide; heads about 7, about 31-flowered, approximate, at first glomerate, the lowest one subremote, the pedicels densely and sordidly subtomentulose and stipitate-glandular, 11 mm. long or less at maturity; involucre 7 to 9.5 mm. high, 5 to (submaturity) 12 mm. wide, bracteolate at base, the bracteoles 2-seriate, lanceolate, acuminate, about 3 mm. long, sordid-pilosulous and sparsely stipitate-glandular, the proper phyllaries about 18, linear-lanceolate, acuminate to an obtusish apex, greenish with blackish costa, sparsely pilosulous with whitish and blackish hairs and sparsely stipitate-glandular with yellowish glands, somewhat graduate, a few of the outer only half or two-thirds as long as the inner; corollas yellow, the lamina 4.5 mm. long, equaling the tube, the styles dark (when dried); achenes subcylindric, 2.8 to 3 mm. long, slightly narrowed toward base, not narrowed at apex, striate, obscurely hispidulous on the ribs, bright reddish brown; pappus nearly straw-color, rather sparse, 5 mm. long.

Type in the U. S. National Herbarium, no. 675708, collected on an open rocky slope, summit of Chiriquí Volcano, Panama, altitude 3,374 meters, March 12, 1911, by William R. Maxon (no. 5351).

Nearest *Hieracium irasuense* Benth., of Costa Rica, but without the tomentulose indument of the stem found in that species.

***Hieracium herrerae* Blake, sp. nov.**

Herbaceous perennial, single-stemmed, 25 cm. high; rootstock oblique, 3 cm. long, with many long fibrous rootlets; leaves about 7, crowded within 4 cm. of base of stem, the lower obovate, 6 cm. long (including the 1.5 to 2.5 cm. long, margined petiole), 1.5 to 2 cm. wide, rounded to obtuse, glandular-apiculate, cuneate at base, remotely glandular-denticulate, papery, pale green, densely lanate-pilose on both sides with canescent hairs, the upper obovate to lanceolate, acute to acuminate, 2.5 to 4.8 cm. long, 6 to 18 mm. wide; stem simple below the inflorescence, griseous-tomentulose throughout and setulose with mostly gland-tipped hairs, these spread.

ing, blackish below, pale above, many-celled, 1 mm. long or less, the glands yellowish; heads about 8, about 29-flowered, subracemose, remote; peduncles mostly 1-headed, 3 to 5 cm. long, densely pubescent like the stem, the lowest subtended by a linear-oblongate bract 1.5 cm. long, 1.5 mm. wide; involucre 1 to 1.1 cm high, 6 to (fruit) 20 mm. thick, the chief phyllaries 13, linear-lanceolate, blackish-green with thinner paler margins, densely stipitate-glandular (hairs 0.5 to 2 mm. long, similar to those of the stem) and sparsely pilosulous, the outer phyllaries or bracteoles few, two-thirds as long as the inner or less; corollas pale yellow, the lamina 4.5 mm. long, exceeding the tube, the styles pale; achenes gradually but slightly tapering from near base to apex, abruptly contracted at extreme apex, deep reddish or purplish brown, striate, glabrous, 4.2 to 4.5 mm. long; pappus bright white, rather soft and sparse, 6 mm. long.

Type in the U. S. National Herbarium, no. 1,038,789, collected in the State of Durango, Mexico, altitude 1,000 meters, by P. Ibaña García (no. 466).

Related to *Hieracium pringlei* A. Gray and *H. jaliscense* Robins. & Greenm., but readily distinguished from either by its much longer achenes, as well as by marked differences in pubescence.

The species is named for Dr. A. L. Herrera, director of Biological Studies in Mexico.



STEVIA TEPHROPHYLLA BLAKE



GUTIERREZIA GRANDIS BLAKE



ERIGERON MAXONII BLAKE



ACHYROCLINE CRASSICEPS BLAKE



PARTHENIUM DENSIPILUM BLAKE



FLOURENSIA HIRTISSIMA BLAKE



VERBESINA BACCHARIDEA BLAKE



CALEA OVALIS BLAKE



TRICHOCORYNE CONNATA BLAKE



PROUSTIA CUNEATA BLAKE