

The dashed line on Figure 2 indicates the western limit of the Duplin marl at the south and of beds of the upper Yorktown of approximately the same age as the Duplin at the north. On the same figure (Fig. 2), two of the most westerly patches of the Duplin marl are indicated by letter *b* and the approximate separation of the late Miocene beds carrying a "colder water fauna" at the north and a "warmer water fauna" at the south by the line *c-c*.

#### CONCLUSIONS

The distribution of the formations in Virginia seems to show that the St. Marys formation at the south overlaps the Choptank and Calvert formations, and that the Yorktown formation transgresses westward over all older formations of the Coastal Plain and laps over a few miles on the crystalline rocks which underlie the eastern border of the Piedmont Plateau.

The somewhat hypothetical section drawn from Crisfield, Md., to Wilmington, N. C., indicates that the down-warping which initiated the deposition of the Chesapeake group began at the north and progressed southward to the Carolinas. As the section becomes thinner at the south by the pinching out of formations older than the Yorktown, it indicates that the more northern area constituted a basin for the deposition of the sediments of the Chesapeake group, and that during the early and middle Miocene time and during the upper Miocene time prior to the deposition of the beds of the Yorktown formation as developed around Suffolk, Va., the area now occupied by the Duplin marl in the Cape Fear region practically as far out as the coast was a land area undergoing erosion.

The new map of the Chesapeake group of Virginia, as compared with the former map of the State based on the work of Clark and Miller on the Coastal Plain province of Virginia, published as Bulletin 4, Virginia Geological Survey, 1912, shows, in general: Less areal distribution of the Calvert formation; the presence of the Choptank formation; less extensive areal distribution of the St. Marys formation south of James River; more extensive areal distribution of Yorktown formation.

BOTANY.—*New Asteraceae from the United States, Mexico, and Honduras.*<sup>1</sup> S. F. BLAKE, Bureau of Plant Industry.

This paper contains descriptions of eight new species and several varieties as well as reallocations of several species already described.

SOLIDAGO WRIGHTII A. Gray, Proc. Amer. Acad. 16: 80. 1880.  
*Solidago bigelovii* A. Gray, (Proc. Amer. Acad. 16: 80. 1880, nomen nudum;)  
 Proc. Amer. Acad. 17: 190. 1882.

<sup>1</sup> Received April 16, 1929.

*Solidago bigelovii* var. *wrightii* A. Gray, Proc. Amer. Acad. 17: 190. 1882.

The name *Solidago bigelovii*, in use for many years for a southwestern goldenrod, must give place to *S. wrightii*. Both names first appeared in 1880, *S. bigelovii* having precedence on the page but not being provided with description, while *S. wrightii* was fully described. The treatment of *S. bigelovii* at this place is as follows: "S. BIGELOVII is a New Mexican species founded on *S. petiolaris*, var., Gray in Bot. Mex. Bound. 79, collected by Bigelow, Wright, and Parry, and placed next to *S. Lindheimeriana* of Scheele, which was in Pl. Lindh. referred to *S. speciosa*, var. *rigidiuscula*." On p. 79 of the Botany of the Mexican Boundary there is no word of description; hence the species dates from its first publication with description in 1882.

*Solidago wrightii* was properly published in 1880, with description and reference to two synonyms,<sup>2</sup> as well as citation of range and collectors ("W. Texas to Arizona, Wright, Bigelow, Rothrock"). From the name given and the first cited reference and collector it is evident that *Wright* 281, the plant on which the mention in "Plantae Wrightianae" was based, is properly to be taken as type of the species. The specimen of this number in the U. S. National Herbarium (collected on "mountains between the Limpia and the Rio Grande," Texas) is rather slender, about 35 cm. high, simple below the inflorescence, with elliptic middle leaves about 3.5 cm. long and 1 cm. wide, and heads in small cymes of 2 to 4 at tips of the erectish branches, the whole forming a 12-headed cymose panicle about 7 cm. wide. *Solidago* "*bigelovii*" is variable in inflorescence, the heads being sometimes very few and clustered, sometimes numerous and thyrsoid on the stem and branches, but the differences appear to be purely individual and of no taxonomic or geographic significance, and I find no grounds for distinguishing *S. wrightii* from *S. bigelovii*, either varietally, as by Gray, or specifically, as by Wootton and Standley in their "Flora of New Mexico."

The only specimen examined from Texas is *Wright* 281, the type. *Solidago bigelovii* was included by the writer in Tidestrom's "Flora of Utah and Nevada,"<sup>3</sup> on the basis of a specimen in the U. S. National Herbarium originally labelled "*Solidago remoralis*, Ait. var. Nevada. Wheeler Exp. 1872." As all the Arizona specimens examined are from the southeastern part of the State, it seems probable that the species does not range so far north, and that this specimen is mislabeled as to locality.

A remarkable form with many or most of the hairs gland-tipped occurs in Arizona and New Mexico; although very distinct in its extreme, too closely connected by intermediate specimens to rank as more than a variety.

***Solidago wrightii* var. *adenophora* Blake, var. nov.**

(?) *Solidago subviscosa* Greene, Pittonia 3: 348. 1898.

Habit, foliage, and inflorescence as in the typical form, and similarly variable; involucre, sometimes also the pedicels, leaves, and stem, glandular-puberulous.

ARIZONA: Between Bar-foot fire station and Paradise, Chiricabua National Forest, Cochise County, alt. 2200-2400 m., 22-23 Sept. 1914, *Eggleston* 10833, 10867 in part. Rincon Mountains, 1891, *Neally* 205. Mt. Graham, alt. 2745 m., Sept. 1874, *Rothrock* 730. Mt. Lemmon, alt. 2285 m., 4 Sept. 1926, *G. J. Harrison* 3016 (type no. 1,285,413, U. S. Nat. Herb.) NEW

<sup>2</sup> *S. petiolaris* var., A. Gray, Pl. Wright. 1: 94. 1852; *S. californica* var., Rothrock in Wheeler, Rep. U. S. Surv. 100th Merid. 6: 145. 1878.

<sup>3</sup> Contr. U. S. Nat. Herb. 25: 539. 1925.

MEXICO: Near Gray, Lincoln County, alt. 1830 m., July 1898, *Skehan* 70. In pine belt, El Capitan Mountains, alt. 2135 m., 28 July 1900, *Earle* 489. Copper Canyon, Magdalena Mountains, alt. 2805 m., 3 Sept. 1909, *Goldman* 1673. Tularosa Creek, Sacramento Mountains, Otero County, 18 Aug. 1899, *Wooton*. Pecos River, alt. 2135 m., 23 Aug. 1903, *Bailey* 550.

When practically all the hairs are gland-tipped, as they are in the type, the difference between this plant and typical *S. wrightii* with its grayish puberulence of spreading (rarely incurved) hairs seems too great to be merely varietal. In most of the specimens cited, however, the glandularity is confined to the involucre, and it is evident that no specific line can be drawn. In the genus as a whole the presence of glandular hairs is of rare occurrence. The description of *Solidago subviscosa* Greene is strongly suggestive of this plant, but in the absence of the type specimen (Chiricahua Mountains, 15 Sept. 1896, *Toumey*) its identity is uncertain. It was said by Greene to combine some of the characteristics of *S. bigelovii* and *S. parryi*, and the description applies about as well as some specimens of *S. parryi*.

***Acamptopappus sphaerocephalus* var. *hirtellus* Blake, var. nov.**

Stems and leaves more or less densely hirtellous; leaves often relatively shorter and wider than in the typical form.

CALIFORNIA: Near Lone Pine, Inyo Co., alt. 1150 m., 7 June 1891, *F. V. Coville* & *F. Funston* 890 (type no. 1,203,074, U. S. Nat. Herb.); Randsburg to Rand, *K. Brandegee*; Mojave, *Eastwood* 3184; Willow Springs, *F. Grinnell* 427,443; Antelope Valley, *Grinnell*; Lancaster, *Elmer* 3621, *Hall & Chandler* 7388 (non-typical); Palmdale, *Abrams & McGregor* 513; Kramer, *K. Brandegee*; Barstow, *Jepson* 5835; desert near Hesperia, alt. 975 m., *Blake* 9885; Mohave Desert, *Parish* 139, *Pringle* (24 May 1882), *Purpus* 5443; without definite locality, 1876, *Palmer* 219.

*Acamptopappus sphaerocephalus* (Harv. & Gray) A. Gray can be divided readily into two varieties with definite characters and definite geographical range. The plant growing in southern Utah, western Arizona, extreme southwestern Nevada (*Goodding* 1423, from Bunkerville, which is in Nevada, not Utah as printed on the label), and the Colorado Desert region has glabrous stems and branches, and the leaves are glabrous or hispidulous-ciliolate. This is the typical form, originally described, under the name *Aplopappus sphaerocephalus* Harv. & Gray, as "fruticosa ? glabra." The type was collected by Thomas Coulter in "California." The other form (var. *hirtellus*) with hirtellous stem, branches, and leaves, ranges from Antelope Valley, in the western part of the Mohave Desert, east to Kramer and north to Lone Pine, Inyo County.

*Acamptopappus microcephalus* Jones, the description of which suggests the variety here described, is shown by the type collection to be *Aplopappus cooperi* (A. Gray) Hall.

***Erigeron inornatus* forma *subradiatus* Blake, forma nov.**

Heads with about 7-11 pale yellow imperfectly developed rays 6.5-7 mm. long (tube 1.5-1.8 mm., throat 2-3.2 mm., lamina elliptic, concave, spreading,

usually 3-denticulate, 2.2–3.3 mm. long), pistillate and bearing 3–5 abortive and separated stamens.

CALIFORNIA: Along path in dry woods, Tahoe Tavern, Eldorado County, alt. 1900 m., 15 Aug. 1927, *S. F. Blake* 10302 (type no. 1,436,302, U. S. Nat. Herb.).

*Erigeron inornatus* A. Gray is one of several western species of *Erigeron* which have hitherto been supposed to have always discoid heads. The present plant, a colony of which I found growing in company with discoid plants (no. 10301) near the shore of Lake Tahoe, is consequently of considerable interest. Both the subradiate and discoid plants found here represent the var. *viscidulus* A. Gray rather than the typical glabrous form of *E. inornatus*, having the stem (short-hirsute below) and leaves hirsutulous and the involucre evidently glandular.

***Lessingia leptoclada* var. *arachnoidea* (Greene) Blake.**

*Lessingia arachnoidea* Greene, Leaflets 2: 29. 1910.

This variety, characterized by its very short pappus (only 1–1.5 mm. long, that of the typical form being 3.5–6 mm. long), is known only from the vicinity of Crystal Springs Lake, San Mateo County, California, where it occurs to the exclusion of typical *L. leptoclada* A. Gray.

***Archibaccharis standleyi* Blake, sp. nov.**

Erect, suffrutescent; stem subsimple, somewhat zigzag, leafy, densely and finely puberulous with several-celled, conical, spreading or incurved, brownish hairs; leaves ovate, acuminate, rounded at base, short-petioled, chartaceous, mucronulate-serrulate, finely hispidulous, scabrid above, gland-dotted beneath; staminate heads 4–5 mm. high, slender-pedicelled, in small panicles at tip of stem and the few branches, 9–20-flowered.

Stem 35 cm.–1 m. high, 1–3 mm. thick, subterete or somewhat round-angled; internodes 8–15 mm. long; leaves alternate; petioles naked, 1.5–3 mm. long; blades ovate or lance-ovate, 2–5.5 cm. long, 1–2.5 cm. wide (smaller toward base of stem), acuminate, somewhat falcate, apiculate (apiculus 0.8–1.5 mm. long), at base rounded or subcordate, near middle mucronulate-serrulate or shallowly crenate-serrate (teeth about 6 pairs, very depressed, 2–6 mm. apart, the curved callous mucros about 0.5 mm. long), firmly chartaceous, above rather densely antrorse-hispidulous, beneath slightly lighter green, similarly but less densely and more softly hispidulous and rather densely gland-dotted, feather-veined and prominulous-reticulate on both sides, the chief lateral veins 4–5 pairs, sometimes impressed above, prominent beneath; heads about 6–10, in convex panicles 2–4 cm. wide, the filiform straightish pedicels 5–10 mm. long, puberulous like the stem, the bracts of inflorescence minute, linear-subulate, mostly 2 mm. long or less; involucre campanulate, 4–6-seriate, 3 mm. high, the phyllaries lanceolate to lance-linear, acuminate, with greenish center and narrow scarious margin, often purplish-tipped, erect, rather densely antrorse-puberulous and gland-dotted; pistillate flowers 2–5, their corollas whitish, sparsely pubescent with somewhat clavate hairs, 4 mm. long (tube 3–3.3 mm. long, ligule erect, concave, minutely 2–3-denticulate, 0.7–1 mm. long), much shorter than style, the achenes (immature) hispidulous, 1 mm. long, the pappus whitish, 4 mm. long, the bristles finely hispidulous-denticulate, not clavate; hermaphrodite flowers 7–15, their corollas whitish, puberulous, 5.2 mm. long (tube 2.2 mm., throat essentially absent, teeth linear, acute 3 mm. long), the achenes hispidulous,

1 mm. long, the pappus whitish, 4.5 mm. long, the bristles denticulate-hispidulous, slightly clavellate at apex; style branches oblong, acute, finely hispidulous, erect, 0.8 mm. long.

HONDURAS: Open rocky or brushy banks, vicinity of Siguatepeque, Dept. Comayagua, alt. 1080-1400 m., 14-27 Feb. 1928, *P. C. Standley* 56193 (type no. 1,308,936, U. S. Nat. Herb.), 56356.

This species, of which only the staminate plant is known, is nearest *Archibaccharis hirtella* (DC.) Heering, differing from that species in its erect (not scandent) habit, the very fine and dense puberulence of the stem, the much firmer leaves, and the slightly larger heads. In its combination of erect habit with definitely zigzag stem and small panicles it to some extent breaks down the distinctive characters of the two principal groups into which the small-headed species of the genus are divided.

#### *Trigonospermum hispidulum* Blake, sp. nov.

Herb, apparently unbranched, the stem rather densely hispidulous with several-celled, spreading, conical, acute hairs; leaf blades rhombic-ovate, unequally callous-dentate and -denticulate, somewhat hastately so near the basal angle, lepidote-tuberculate-hispidulous above, hispidulous with antrorse hairs beneath, cuneate-decurrent on upper part of petiole; heads small, numerous, in a somewhat rounded panicle; lamina of rays 4-4.5 mm. long.

Stem more than 60 cm. high, purplish brown, below subterete, striatulate, and 4 mm. thick, above sulcate; internodes about 9-11 cm. long; leaves opposite; petioles incurved-pubescent and with longer spreading several-celled hairs, the unmarginated part 1.5-2 cm. long, broadened at base and shallowly connate; blades 8.5-11 cm. long (including margined portion of petiole, this 1.5-4 cm. long) 4.5-6.5 cm. wide, acute, often short-pointed, at base broadly cuneate-rounded and abruptly cuneate-decurrent on petiole, rather thin, dark dull green and in age lepidote-tuberculate above, scarcely paler and gland-dotted beneath, triplinerved from base of proper blade, prominulous-reticulate especially beneath; panicle 11 cm. wide, the ascending lower branches about 8 cm. long, densely spreading-hispidulous and with sparser stipitate yellowish glands, the pedicels 4 mm. long or less; involucre 2-seriate, subequal, 3 mm. high, the outer phyllaries 5, subherbaceous, oblong or ovate-oblong, obtusely callous-tipped, 3-nerved, the inner broader and thinner, ovate, acute or acuminate, all yellowish green, finely and rather densely hispidulous and ciliolate; rays 7, golden, fertile, hispidulous and stipitate-glandular on tube and back, the tube 0.7 mm. long, the lamina quadrate-cuneate, 3-lobed nearly to middle, 4-4.5 mm. long and wide, 9-11-nerved; disk flowers about 26, their corollas 5-toothed, golden, pilose with several-celled hairs and somewhat glandular, 3 mm. long (tube 0.8 mm., throat funnelliform-campanulate, 1.7 mm. long, teeth ovate, 0.5 mm. long, papillate especially near margin within); pales lanceolate to linear, acute, ciliate, about 1.5 mm. long; immature ray achenes obovoid, obcompressed, glabrous, 1.3 mm. long; ovaries of disk glabrous; style of disk short-hispid, barely bifid.

MEXICO: On streambank, Hacienda de Ototal, Arroyo de Ototal, west of San Sebastian, Sierra Madre Occidental, Jalisco, alt. 1500 m., 9 March 1927, *Ynez Mexia* 1852 (type no. 1,318,113, U. S. Nat. Herb.).

Allied to *Trigonospermum floribundum* Greenm., in which the stem is more or less densely pilosulous and usually provided with rather dense,

dark, stipitate glands, the leaves rather evenly dentate or denticulate without tendency to hastation, and rays 6-9 mm. long. Only a single plant found.

**Echinacea laevigata** (Boynton & Beadle) Blake.

*Brauneria laevigata* Boynton & Beadle in Small, Fl. S. E. U. S. 1261, 1340. 1903.

This species is apparently still known only from the original specimens in the United States National Herbarium collected near Seneca, western South Carolina, in June 1888, by Gerald McCarthy.

**Echinacea angustifolia** var. **tennesseensis** (Beadle) Blake.

*Brauneria tennesseensis* Beadle, Bot. Gaz. 25: 359. 1898.

In the original description this plant was compared only with *Brauneria pallida* (Nutt.) Britton (= *Echinacea pallida* Nutt.). It is much nearer *Echinacea angustifolia* DC., differing in its generally smaller size, narrower only 1-3-nerved leaves, and spreading-hispid stems and leaves (especially the margins and petioles), but as it intergrades in all these characters it is best considered a variety of that species.

**Verbesina microcarpa** Blake, sp. nov.

Shrub; stem pubescent; leaves alternate, ovate, acuminate at each end, serrate, rough above with tuberculate-based hairs, beneath griseous-subtomentose, the naked portion of petiole 6-12 mm. long; heads rather small, in an irregular concave cymose panicle, on pedicels mostly twice their length; involucre about 3 mm. high, the oblong-ovate pilosulous phyllaries with reflexed tips; pales spreading-cuspidate; lamina of rays about 7 mm. long.

"Bushy shrub, 2.5 m. high;" branches simple, terete, striatulate, brownish, densely pilose with several-celled, curved, spreading-ascending hairs, these in age mostly deciduous except for the subtuberculate bases; internodes 2.5-4.5 cm. long, wingless; petioles exauriculate, pubescent like the stem; blades 8-11.5 cm. long, 3-4 cm. wide, acuminate, slightly falcate, rounded toward base and then cuneately decurrent on the petiole for 1.5-2 cm., serrate above the entire base with 15-18 pairs of depressed bluntly callous-apiculate teeth, papery, above green, evenly but not densely hirsutulous with antrorse-curved hairs with small tuberculate bases, beneath when young canescently silky-pilose, at maturity uniformly and densely subtomentose-pilose with antrorse-curved hairs, feather-veined (lateral veins 7-9 pairs, prominulous on both sides, the secondaries obsolete); heads about 2 cm. wide, in cymes of about 3 at tips of stem and subterminal branches, forming a convex panicle of about 20 heads, about 11 cm. wide, the pedicels of the terminal heads short, about 5 mm. long, of the lateral 1-2 cm. long, pubescent like the stem, the bracts linear or lance-linear, 1.5 cm. long or less; disk subglobose, 1 cm. thick in mature flower; involucre 2-seriate, 3-4 mm. high, subequal, the outer phyllaries about 5, ovate-oblong, 2 mm. wide, greenish-stramineous, with more herbaceous tips, apiculate, the inner similar to the pales, with reflexed cusps; receptacle small, convex; rays about 10, "lemon-yellow," fertile, the tube pilosulous, 1.5 mm. long, the lamina elliptic, 7 mm. long, 3-3.8 mm. wide, 3-denticulate, 6-8-nerved; disk corollas numerous, "lemon-yellow," pilosulous on tube and base of throat, about 3.4 mm. long (tube 0.6-0.8 mm. long, throat funnelform-campanulate, 1.6-1.8 mm. long, teeth ovate, 1 mm. long, ciliolate on inner margin with long papillae); pales boat-shaped, firm, whitish, hirsutulous above, 4 mm. long, terminated by spreading cusps

about 0.8 mm. long; disk achenes 2.2 mm. long, 1.5–1.8 mm. wide (including wings), the body blackish, tuberculate-hispidulous above, 1.8–2 mm. long, 1–1.2 mm. wide, the wings ciliolate, adnate to base of awns, 0.3–0.5 mm. wide; awns 2, subequal, 1.4 mm. long.

MEXICO: Open oak and pine forest, trail from El Batel to Pico del Aguila, Sierra Madre, Sinaloa, alt. 1220 m., 14 Nov. 1925, *Ynez Mexia* 459 (type no. 141815, herb. Calif. Acad. Sci.; photogr. and fragm., U. S. Nat. Herb.).

A species of the section *Saubinetia*, without striking characters, yet clearly distinct from related species. Of these, *V. seemannii* Sch. Bip. has much narrower leaves (blade about 14 cm. long and 2.5 cm. wide or less), these merely hirsutulous on costa and chief veins beneath, and the shorter involucre is nearly glabrous; *V. liebmanni* Sch. Bip., which vacillates between the sections *Verbesinaria* and *Saubinetia*, has leaves very much less pubescent beneath; *V. cinerascens* Robins. & Greenm. has much narrower leaves with much finer pubescence beneath; and *V. olivacea* Klatt, while similar in pubescence of lower leaf surface, has considerably larger heads and larger involucre.

#### *Zexmenia melastomacea* Blake, sp. nov.

Suffrutescent; stem spreading-hispid or -hirsute; leaves ovate, acute, rounded at base, serrulate, short-petioled, harsh-pubescent above, more densely pubescent beneath, 3–5-plinerved, impressed-veined and more or less bullate above, prominulous-reticulate beneath; heads radiate, golden yellow, medium-sized, 1–4 at tips of stem and branches, on peduncles usually 1.5 cm. long or less, occasionally to 3.5 cm.; involucre about 3-seriate, 7–9 mm. high, the phyllaries mostly oblong, densely strigose, with squarrose deltoid herbaceous tips; achenes neither winged nor definitely margined, their pappus of 2 or 3 awns, and 2–7 squamellae about 1 mm. long.

Erect, about 0.5–1 m. high, with erectish or divergent branches; stem gray-barked below and 4 mm. thick, subangulate, densely or sometimes rather sparsely spreading-hispid or hirsute, particularly at the nodes, with several-celled whitish hairs up to 2.5 mm. long; internodes 3.5–12 cm. long; leaves opposite; petioles naked, sulcate above, hispid or hirsute and hispidulous, 3–7 mm. long; blades ovate or broadly ovate, or the smaller ones sub-orbicular, 3–6.5 cm. long, 1.5–3.8 cm. wide, mucronulate-serrulate except toward base and apex with 5–8 pairs of small teeth, above hispid and hispidulous with tuberculate-based hairs, beneath paler green or griseous, densely strigose, strigose-hispid, or rather softly hispid-hirsute (the hairs longer along the veins); peduncles stoutish, strigose or antrorse-hirsute, usually shorter than the subtending leaves; involucre campanulate, the phyllaries oblong or oblong-ovate, 2–3.5 mm. wide, the body indurated-subherbaceous, the deltoid acutish tips (2–3 mm. long) squarrose except in the inmost phyllaries, these with subscarious ciliolate but otherwise glabrous purplish margin below; rays about 8, pistillate, the tube glabrous, 2.5 mm. long, the lamina oval, about 12 mm. long, 7 mm. wide, 2-denticulate, about 18-nerved, hirsute and hirsutulous on back; disk flowers rather numerous, their corollas glabrous except for the appressed-hirsutulous, papillose-margined teeth, 7.3 mm. long (tube 2 mm., throat cylindric-funneliform, 3.5 mm., teeth ovate, 1.8 mm.); pales firm, acute, purplish above, finely ciliolate, on back above stigillose and sparsely hispid, about 10 mm. long; ray achenes trigonous, not winged,

hispidulous, 5 mm. long, their pappus of 3 lanceolate trigonous ciliolate awns 2-3.8 mm. long and about 4-7 basally united, oblong or triangular, ciliolate squamellae 1-1.5 mm. long; disk achenes cuneate-oblong, 4-angled, 4.3 mm. long, 1.3 mm. wide, tuberculate-hispidulous, their pappus of 2 unequal hispidulous-ciliolate awns 2.5-4.2 mm. long, and 2 broad ciliolate squamellae 1 mm. long; style branches linear, somewhat enlarged toward the tip of the stigmatic region and there dorsally hirsute, the linear appendages 1 mm. long, hispidulous above.

HONDURAS: In pine forests, vicinity of Siguatepeque, Dept. Comayagua, alt. 1080-1400 m., 14-27 Feb. 1928, *P. C. Standley* 56389 (type no. 1,308,960, U. S. Nat. Herb.), 55826.

Nearest *Zexmenia michoacana* Blake, but quite distinct in involueral and other characters. The two collections referred here differ in density or at least in degree of persistence of stem pubescence and in density and character of leaf pubescence, but undoubtedly represent a single species.

#### ***Coreopsis congregata* Blake sp. nov.**

Low, slender, erect, nearly simple, sparsely pubescent annual; leaves opposite, nearly uniform, shorter than internodes, short-petioled, once or twice pinnatifid, with mostly oblong or ovate lobes; heads small, few, yellow; phyllaries pilose; rays neutral, inner disk flowers apparently infertile; outer disk achenes small, obovoid-meniscoid, with narrow, thick, incurved, lobed, crustaceous margin; pappus none.

Stem 13-32 cm. high, whitish, sulcate-striate, sparsely pilose especially above with chiefly ascending hairs; internodes 2-5 cm. long; leaves about 5 pairs, the lower (shrivelled) about 3 cm. long (including petiole, this about 0.7 cm. long), pilose especially on petiole (the hairs there longer and flatter), apparently bipinnatifid; the middle and upper short-petioled or subsessile, triangular in outline, 1.8-3.5 cm. long, 1.2-2 cm. wide, acute, cuneate-rounded at base, deeply pinnatifid with 2-4 pairs of lobes, these oblong to ovate or lance-ovate, acute or obtuse, callous-mucronulate, the lowest pair nearly separate from the others and entire or similarly pinnatifid, all thin, green and pilose on both sides; heads 1-7 per stem, solitary or in 2's or 3's from the axils of reduced leaves at tip of stem and the few erect branches, 2 cm. wide or less; peduncles very slender, naked or with 1-2 very small bracts, 2-5 cm. long, pubescent like the stem; disk about 5 mm. high and thick; involucre double, reflexed in age, the outer phyllaries 8, thin, herbaceous, narrowly spatulate to linear, obtusely callous-tipped, 2.5-3.5 mm. long, about 0.7 mm. wide, 3-nerved (the middle nerve stronger and darkened), pilose and ciliate with several-celled hairs; inner phyllaries membranous, elliptic-oblong, 4.5-4.8 mm. long, about 1.8 mm. wide, obtusely pointed, golden-yellow, sparsely pilose on back, ciliolate at apex, 5-7-nerved; receptacle small, flattish; rays 8, golden yellow, neutral, the tube about 0.7 mm. long, stipitate-glandular, the lamina elliptic-oblong, subentire, 5-nerved, 5.5-6.5 mm. long, 2.5-2.8 mm. wide; disk flowers 15 or more, their corollas golden yellow, stipitate-glandular on tube, papillate on inner margin of teeth, 2.5-2.8 mm. long (tube 0.7-1 mm., throat campanulate, 1.5 mm., teeth deltoid, 0.3-0.5 mm.); pales linear, acutish or obtuse, glabrous, yellow, about 4-vittate, about 3.5 mm. long; outer disk achenes slightly depressed at apex, 2-2.3 mm. long, 1.3-1.5 mm. wide, glabrous, dark brownish or mottled, on outer face smooth or slightly blunt-muricate above, on inner face calloused at base, 1-ridged



and crustaceous-mamillate, the thickened brownish margin (about 0.3 mm. wide) longitudinally rugulose, sinuate below, above divided into a few rounded lobes; inner disk achenes slender, about 2.2 mm. long, with small imperfectly developed embryo; style branches broadened and dorsally hispid above, passing into a papillate cusp 0.2 mm. long.

MEXICO: Common, growing in masses, in damp places in openings in oak and pine forests, trail from El Batel to Pica del Aguila, Sierra Madre, Sinaloa, alt. 1220 m., 14 Nov. 1925, *Ynez Mexia* 445 (type in Gray Herb.; photogr. and fragm., U. S. Nat. Herb.).

A species belonging to the section *Leachia*, without any very close ally.

***Plummera ambigens* Blake, sp. nov.**

Ray achenes villous with straight hairs, and with a pappus of about 6 unequal, oblong, obtuse, lacerate, ribless, hyaline squamellae about 1 mm. long; disk achenes usually trigonous, thicker than in *P. floribunda*, with evident but imperfect ovule, villous with straight hairs and with a pappus of about 4 or 5 unequal, oblong or lanceolate, obtuse to acuminate, lacerate, ribless hyaline squamellae 0.5–1.3 mm. long; style branches of disk with stigmatic lines; otherwise as in *P. floribunda* A. Gray.

ARIZONA: Fairly common on lower slopes of Mt. Graham, about 1370 m. alt., 22 July 1927, *R. H. Peebles*, *T. H. Kearney*, & *G. J. Harrison* 4395 (type no. 1,436,073, U. S. Nat. Herb.).

*Plummera floribunda* A. Gray, the only member of the genus hitherto known, is one of the rarest of United States Asteraceae in herbaria. In it both the ray and disk achenes are completely without pappus and are loosely villous with flexuous hairs, the disk achenes are stipitiform and without trace of embryo, and the style branches of the disk lack any trace of stigmatic lines. Aside from the achenes, pappus, and style branches *P. ambigens* is so precisely similar to *P. floribunda* that I have been unable to find any distinctive characters. The pedicels and young tips are more hairy—essentially cinereous-tomentose—than in the two collections of *P. floribunda* available for comparison, and the inner phyllaries more strongly ciliate and more abruptly cuspidate, but these slight differences are not likely to prove constant when more material is examined. The differences between the somewhat more obovoid ray achene of *P. floribunda*, with its rather definite stipitiform base or carpopod, and that of *P. ambigens* are probably due to the greater maturity of the former. The presence of a well developed pappus in *P. ambigens* and the tendency toward fertility of the disk flowers, however, not only sharply differentiate the new plant from *P. floribunda* but tend to break down the gap between the section of *Actinea* often separated as a distinct genus *Hymenoxys* and the hitherto well distinguished genus *Plummera*.

*Plummera* was placed by Gray<sup>4</sup> in the Helianthoideae-Millerieae, although he recognized<sup>5</sup> that “the natural affinity of this plant may rather be with *Actinella* [= *Actinea*] in the Helenioideae.” O. Hoffmann<sup>6</sup> put it in the

<sup>4</sup> Syn. Fl. 1<sup>2</sup>: 59, 237. 1884.

<sup>5</sup> Proc. Amer. Acad. 17: 215. 1882.

<sup>6</sup> In Engler & Prantl, Nat. Pflanzenfam. 4<sup>5</sup>: 263. 1890.



Fig. 1. *Plummera ambigens* Blake and *P. floribunda* A. Gray.—*Plummera ambigens* (a-i): a, plant  $\times \frac{1}{2}$ ; b, head,  $\times 5$ ; c, ray flower,  $\times 5$ ; d, disk flower,  $\times 5$ ; e, ray achene,  $\times 5$ ; f, disk achene,  $\times 5$ ; g, inner phyllary,  $\times 5$ ; h, style branches,  $\times 7$ ; i, stamens,  $\times 5$ ; *Plummera floribunda*: j, ray flower,  $\times 5$ ; k, disk flower,  $\times 5$ ; l, ray achene,  $\times 5$ ; m, stamens,  $\times 5$ ; n, style branches,  $\times 7$ .

Helenieae-Heleninae between *Gaillardia* and *Blennosperma* and in the neighborhood of *Actinella*, and more recently Rydberg<sup>7</sup> has placed it in what is unquestionably its proper position next to *Hymenoxys*, in the group he calls Helenieae-Tetraneuranae. From *Hymenoxys*, which I regard as a group to be included under *Actinea*, the genus *Plummera* as represented by its type, *P. floribunda*, differs chiefly in its few-flowered heads, sterile disk, absence of pappus, and obovoid (not obpyramidal), somewhat obcompressed, many-ribbed ray achenes. The first of these characters is here of no more than specific value, the second is weakened by the new species, and the third now disappears. For the present it seems advisable to retain *Plummera* as a genus distinguished by its nearly or quite sterile disk and different ray achenes and to regard *P. ambigens* as specifically distinct from *P. floribunda*, while recognizing that further collections are likely to show that it is no more than a papiferous variety of the latter.

The ray achenes of *Plummera floribunda* are described by Gray as turgid and nearly nerveless, and by Rydberg as "cuneate-obovoid, villous." Mature achenes on Lemmon's plant (no. 352) are obovoid, elliptical in cross-section, and definitely about 15-ribbed with low blunt ribs. Those of *P. ambigens* are also about 15-ribbed.

***Eriophyllum wallacei* var. *calvescens* Blake, var. nov.**

Pappus in both ray and disk reduced to a mere border, 0.1 mm. high or less, about 5-lobed or parted; otherwise as in the typical form.

CALIFORNIA: Lone Pine, 16 April 1891, *T. S. Brandegee*; north of and near Victorville, Mohave Desert, 11 May 1926, *M. E. Jones* (type no. 1,436,074, U. S. National Herb.); desert near Hesperia, 14 June 1927, *S. F. Blake* 9881A; mesas, San Bernardino Valley, May 1882, *S. B. & W. F. Parish* 348 in part.

The pappus in *Eriophyllum wallacei* A. Gray normally consists of about 6 to 10 blunt opaque white squamellae or paleae 0.5–1.2 mm. long. In the form here described, which sometimes, apparently, occurs by itself and at others with the typical form and intergrading with it, the pappus is so reduced as to be evident only on close examination. It has already been mentioned by Dr. H. M. Hall<sup>8</sup> from the Santa Ana River bottoms near Redlands (*F. M. Reed* 784 and *Greata* 572 in part).

***Actinea subintegra* (Cockerell) Blake.**

*Hymenoxys subintegra* Cockerell, Bull. Torrey Club **31**: 480. *pl.* 22, *f.* 1. 1904.

This apparently well-marked species, which, according to Rydberg's treatment,<sup>9</sup> has been known only from the type locality, Nagle's ranch, Arizona, was collected in the upper drainage of North Canyon, Kaibab National Forest, Coconino County, Arizona, altitude 2440 meters, 30 July 1926, by Leon W. Hornkohl (no. 35; specimen in Forest Service Herbarium).

<sup>7</sup> N. Amer. Fl. **34**: 118. 1915.

<sup>8</sup> Univ. Calif. Publ. Bot. **3**: 182. 1907.

<sup>9</sup> N. Amer. Fl. **34**: 116. 1915.

It has also been collected near Jacobs Lake, Kaibab National Forest, 14 August 1926 (specimens received through Dr. C. D. Marsh). Prof. M. E. Jones informs me that Nagle's Ranch, the type locality, is about 60 miles south of Kanab, Utah, on the west slope of the Buckskin Mountains (i.e., the Kaibab plateau), and was the first watering place on the old wagon road to the Grand Canyon from Kanab. The old Valley Tan ranch was about 15 miles further up on the plateau, and was the first ranch reached on the way to the Canyon after ascending the plateau. The present wagon road now ascends the plateau many miles farther north. The term Buckskin Mountains, as applied to the Kaibab Plateau, is now obsolete. Recent maps of the state show another range of the same name just south of Williams River (Bill Williams Fork).

*Cacalia eriocarpa* Blake, sp. nov.

Scapose, about 85 cm. high; leaves orbicular, peltate, about 14 cm. wide, hirsute-pilose, shallowly about 6-lobed, the lobes broader than long, repandly about 3-angled; scape spreading-pilose with many-celled hairs and stipitate-glandular; heads about 12-flowered, apparently erect, in a narrow panicle, on pedicels about 3 times as long; involucre 8-9 mm. high, sparsely pilosulous, essentially without bractlets; achenes densely silky-pilose.

Rootstock short and stout, bearing tufts of rusty wool, and clustered slender roots; well developed basal leaves 2, with an abortive one; petioles stout, 3-6 cm. long, very densely spreading-pilose with loose many-celled hairs; blades firm, peltate below middle, prominulous-reticulate especially beneath, above deep green, pilose with many-celled hairs with somewhat swollen bases, beneath lighter green, somewhat lucid, pilose on venation with loose many-celled hairs; scape subterete, striatulate, 4 mm. thick below, densely pilose toward base, sparsely so above, bearing 2 bracteiform leaves 1.5 cm. long or less, their blades tiny or none; panicle about 35 cm. long, about 28-headed, the slender erectish branches 11 cm. long or less, about 3-headed, subtended by linear bracts 9 mm. long or less; pedicels slender, mostly 2-3 cm. long, thickened toward head, bearing mostly above middle 3-6 minute erectish linear-subulate bracts 2 mm. long or less; involucre naked at base or occasionally with 1 approximate bract like those of the pedicel, the phyllaries 8, linear or lance-linear, 1.5-2 mm. wide, narrowed to an obtuse ciliolate apex, about 5-7-nerved, green or purplish on their exposed parts and there short-pilose with several-celled hairs especially toward apex, and sparsely stipitate-glandular, the inner with rather broad whitish subscarios margins; corollas white, glabrous, 9.2 mm. long (tube 4.2 mm., throat campanulate, 0.8 mm., teeth nearly linear, acutish, recurved, 3-nerved, 4.2 mm. long); achenes 3.8 mm. long; pappus copious, white, 8 mm. long, the minutely barbellate bristles united at extreme base, a few of the outer about 1.8 mm. long; style branches elongate, linear, recurved, hispidulous on back especially toward the rounded unappendaged apex.

MEXICO: Steep slopes in open pine and oak woods, Arroyo de Santa Gertrudis, San Sebastian, Jalisco, alt. 1500 m., 21 Jan. 1927, *Ynez Mexia* 1539 (type no. 1,406,195, U. S. Nat. Herb.).

A species of the group which Rydberg<sup>10</sup> recognizes as a distinct genus, *Psacalium* Cass. *Cacalia eriocarpa* is rather closely allied to *C. holwayana* Robinson (*Psacalium holwayanum* Rydb.), of which *P. langlassei* Rydb. is a

<sup>10</sup> Bull. Torrey Club 51: 370-376. 1924.

synonym, as shown beyond. *Cacalia holwayana* is similar in habit, foliage, and pubescence to *C. eriocarpa*, but its heads are much larger (involucre 10–13 mm. long), normally strongly nodding, clustered or racemously arranged toward tips of branches on much shorter pedicels, and the bractlets of the involucre or thickened tip of pedicel are conspicuous, linear-subulate, 4–9 mm. long.

*Langlassé 576* is cited by Dr. Rydberg under both the first (*P. holwayanum*) and the last (*P. langlassei* Rydb., described as a new species) of his 14 species of *Psacalium*. Both come in his key in the group with strongly pubescent involucre, and are separated to this distance by the use of a character drawn from the "deeply cleft" or "sinuately lobed" leaves. Through the kindness of Dr. B. L. Robinson, it has been possible for me to compare the specimen in the National Herbarium (no. 386047) which is the type of *P. langlassei* with the specimen of the same number in the Gray Herbarium, which is apparently the one referred by Dr. Rydberg to *P. holwayanum*. The specimen in the National Herbarium differs from the one in the Gray Herbarium in its apparently erect heads and somewhat more shallowly lobed leaves (with sinuses 1–2 cm. deep; in the Gray Herbarium specimen 1.8–3.5 cm. deep), but their entire agreement in all other characters, including the very definite ones of involucre and achene, makes it certain that they represent the same species. The achenes of *P. holwayanum* are described by Dr. Rydberg as tomentulose, but are really densely short-hirsute with erectish or subappressed hairs.

*Cacalia trigonophylla* Blake, sp. nov.

Stem slender, from a tuberous root, few-leaved near middle, glabrous and glaucous throughout; lower leaves pentagonal, cordate, sharply 5-lobed, remotely callous-denticulate, the middle ones similar but trigonous, hastate-cordate, green above, strongly glaucous beneath, glabrous, all long-petioled, 4.5–6.5 cm. wide; heads 3–4, subracemose, discoid, about 29-flowered; involucre 8–9 mm. high, glabrous; bractlets about 1 mm. long.

Root about 1.5 cm. long, 0.9 cm. thick; stems apparently solitary, somewhat flexuous, 43–58 cm. high, about 6-leaved, whitish, more or less purplish-tinted and -lined; petioles unmarginated, glabrous, 4–7.5 cm. long; leaf blades chartaceous, prominulous-reticulate above, less closely so beneath, repand between the lobes, 3.2–4.5 cm. long; the uppermost one or two much smaller, 3-lobed, 2.5 cm. wide or less; inflorescence about 9 cm. long, the slender peduncles 1-headed, 3–3.5 cm. long, minutely few-bracted, subtended by filiform bracts 5 mm. long or less; involucre thick-cylindric, subtended by about 10 linear acute fleshy bractlets 1.3 mm. long or less, the phyllaries 13, linear or lance-linear, 1–1.8 mm. wide, obtuse, ciliolate at apex, otherwise glabrous, thickened at base and along midline, greenish and glaucescent, with narrow subscarios whitish margins; corollas white, at maturity 10 mm. long, the tube 3.5 mm. long, the slender funnel-form throat 4 mm. long, the recoiled lance-linear acute teeth (1-nerved in middle) 2.5 mm. long; achenes oblong-prismatic, 10-ribbed, glabrous, 2.5 mm. long, about 1 mm. thick; pappus soft, white, about 7 mm. long, the bristles slightly thickened at apex, rather easily deciduous except for the extreme bases which form a minutely denticulate

collar at apex of achene; style branches truncate-rounded, of medium length, hispidulous on back, without obviously penicillate tip.

MEXICO: In dense growth beside stream on steep hillside, San Sebastian, trail to La Sabala Mine, Sierra Madre Occidental, Jalisco, alt. 1500 m., 10 Feb. 1927, *Ynez Mexia* 1656 (type no. 1,318,107, U. S. Nat. Herb.).

This species is a member of the group of the old genus *Cacalia* for which Dr. Rydberg has adopted the name *Pericalia* Cass. Its only close relative is *Cacalia michoacana* Robinson, a species of very similar habit but with the stem pilose from base to middle with many-celled, crisped hairs, the petioles and veins of the leaves similarly pubescent, the leaves all 5 (-7)-lobed and not glaucous beneath, and the bractlets of the involucre 3-6 mm. long.

ZOOLOGY.—*A new antelope squirrel from Lower California.*<sup>1</sup> E. W. NELSON and E. A. GOLDMAN, U. S. Biological Survey.

Recent field work in Lower California and the publication of the description of *Ammospermophilus leucurus canfieldae* by Laurence M. Huey,<sup>2</sup> Curator of Birds and Mammals, San Diego Society of Natural History, have contributed materially to knowledge of the antelope squirrels of the central part of the peninsula. Further study of these ground squirrels, which range the entire length of Lower California, has led to the segregation of a more southern subspecies described as follows:

***Ammospermophilus leucurus extimus*, subsp. nov.**

Southern Peninsular Antelope Squirrel

*Type*.—From Saccaton, 15 miles north of Cape San Lucas, Lower California, Mexico. No. 146587, ♀ adult, U. S. National Museum (Biological Survey collection), collected by E. W. Nelson and E. A. Goldman, December 29, 1905. Original number, 18805.

*Distribution*.—Ranging from sea level to about 1,000 feet altitude on the slopes of the mountains from about latitude 28°; south to Cape San Lucas, except in Vizcaino Desert region.

*General characters*.—Most closely allied to *Ammospermophilus leucurus canfieldae*, but larger; color darker, usually with a near mikado brown (Ridgway, 1912) instead of vinaceous cinnamon suffusion; winter pelage shorter, thinner, more hispid; skull larger, but in detail essentially as in *canfieldae*. Similar to *A. l. peninsulae* in color but upper parts with a mikado brownish instead of a more or less distinctly orange cinnamon suffusion, and cranial characters distinctive. Differing from *A. l. leucurus* in darker color, longer tail and cranial details.

*Color*.—*Type*: Upper parts in general light mikado brown moderately mixed with black, except on outer sides of limbs and shoulders where the mikado brownish element is nearly pure, interrupted by the usual white

<sup>1</sup> Received May 27, 1929.

<sup>2</sup> Trans. San Diego Soc. Nat. Hist. 5(15): 243. Feb. 27, 1929.