

No. 5.— *Contributions from the Gray Herbarium of Harvard University. New Series.*— No. 17.

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## 1. REVISION OF THE GENUS GYMNOLOMIA.

THE genus *Gymnolomia*, so far as known, is exclusively American and extends from the northwestern parts of the United States to Brazil. More than half its species, however, are confined to Mexico and Central America. The genus in its present circumscription has never been monographed. Kunth when founding it in 1820 described 4 species. De Candolle in the *Prodromus*, 5, 561 (1836) changes rather arbitrarily *Gymnolomia* to *Gymnopsis* under which 10 species are described of which several have since been referred to other genera. In 1873, Bentham and Hooker f. ascribe to the genus *Gymnolomia* 16 species. Baillon in his *Histoire des plantes* regards the genus *Gymnolomia* as of doubtful value. Hoffmann in Engler and Prantl's *Nat. Pflanzenfamilien* maintains the genus and ascribes to it 20 species. Aside from the brief citations of the *Index Kewensis* by far the best bibliographic enumeration of the *Gymnolomias* is that of Hemsley (*Biol. Cent.-Amer. Bot.*, 2, 161) who cites literature and stations for 15 species, found in Mexico and Central America.

The present revision, including 37 recognized species and several varieties, has been chiefly based upon the specimens in the Gray herbarium, now largely supplemented by the incorporation of the Klatt herbarium. But through the kindness of Mr. Coville and Dr. Rose, the representation of the genus in the U. S. national museum has also been examined with profit.

The revision of the genus has presented three chief difficulties, viz.:—1. The distinction of our own western and southwestern forms, which have, notwithstanding great diversity of foliage, pubescence, size of heads, and duration, been loosely grouped under *G. multiflora*. 2. The exact interpretation of the Central American *G. subflexuosa*, Benth., upon which must depend the varietal and specific nomenclature of some of the nearly related species. 3. The explanation and proper treatment of several large-headed



Mexican species which although they differ conspicuously among themselves, closely simulate a parallel series of *Viguieras*. As examples of this parallelism may be mentioned

*G. ensifolia* with the habit of *V. blepharolepis*.

*G. megacephala*, var. *simulans* with the habit of *V. excelsa*.

*G. decumbens* with the habit of *V. ghiesbreghtii*.

*G. ghiesbreghtii* with the habit of *V. buddleiaeformis*.

This simulation has various degrees of closeness. In *G. ghiesbreghtii* and *V. buddleiaeformis*, although the similarity is striking, the heads are always perceptibly smaller in the *Viguiera*. *G. megacephala* var. *simulans* and *G. decumbens*, however, so closely resemble *V. excelsa* and *V. ghiesbreghtii* respectively, that no satisfactory external characters have as yet been found by which to separate them. The examination of the achenes, however, at once reveals striking differences. The achenes are in the *Gymnolomias* more compressed, quite glabrous, and completely destitute of pappus. In the *Viguieras* on the contrary they are thickish, obtusely 4-angled, upwardly villous, and provided with two stout persistent awns and several short intermediate scales. Were the pappus difference the only one, these viguieroid *Gymnolomias* might logically be reduced to "*formae epapposae*" of their pappus-bearing counterparts in *Viguiera*, there being in *Calea* and elsewhere undoubted examples of the presence and absence of pappus in what must be regarded as conspecific types. In *Gymnolomia*, however, the difficulty is increased by the presence of other although slight differences in the form and pubescence of the achene.

The writers have carefully considered the possible readjustment of generic lines in such a manner as to bring together the species of similar habit, but they have failed to find any way in which this could be accomplished without the union of heterogeneous elements or an inordinate multiplication of genera founded upon rather trivial characters. It has accordingly seemed best to maintain the genus *Gymnolomia* in its traditional interpretation, although there may be some artificiality in the classification of the large-headed forms. Further collections will doubtless throw much light, if not upon the genetic affinities, at least upon the validity or inconstancy of the characters by which they are now separated.



**GYMNOLOMIA**, HBK. (Name from γυμνός, naked, and ὤμα, margin; taken by some to refer to the rays destitute of pistils, by others the achenes lacking pappus.) Heads small, medium-sized, or large, heterogamous, many-flowered, pedunculate, solitary or more often 3 to many at the ends of the branches. Involucre hemispherical or subcylindric; the bracts mostly numerous, in 2 to 4 series, very variable in size and thickness, the outer mostly narrow; receptacle elevated, conical, chaffy; pales conduplicate, entire or somewhat 3-toothed. Ray-flowers (5 to 20) in a single series, neutral; ligules linear to elliptic-oblong, exserted and spreading, entire and slightly toothed at the tip, yellow or very rarely crimson; disk-flowers numerous, perfect, regular, concolorous; tube short, cylindrical or somewhat dilated at the base, usually puberulent; throat cylindrical or narrowly campanulate; the limb 5-toothed. Achenes of the ray-flowers abortive and empty, of the disk-flowers obovoid, thickish, but more or less compressed laterally or 4-angled, rounded at the summit; pappus none or rarely present as a short cup or ring of 2 to 4 laciniate scales. Nov. gen. et spec., 4, 217, t. 373, 374; Gray, Proc. Amer. acad., 5, 182; Syn. fl., 1, pt. 2, 66, 269; Benth. and Hook. f., Gen., 2, 363; Hemsl., Biol. Cent.-Amer. Bot., 2, 161; Baill., Hist. pl., 8, 211; Hoffmann in Engl. and Prantl, Nat. Pflanzenf., 4, ab. 5, 233. Gymnopsis, DC., Prodr., 5, 561, in part. Heliomeris, Nutt., Journ. acad. Phila., ser. 2, 1, 171. Zaluzania, Sch. Bip., Flora, 1861, p. 553; 1864, p. 216, in part.—Nearly 40 species, chiefly perennial herbs, in habit passing almost imperceptibly from plants of the *Perymenium* type to others of the *Tithonia* type. The following arrangement is believed to show approximately the natural affinities of the species.

Subg. 1. **CALANTICARIA**. Corolla-tube in the disk-flowers considerably dilated at the very base, the expansion, thus developed, forming a sort of cap over the summit of the achene: stems shrubby, except perhaps in *G. tripartita*: heads medium-sized; scales of the involucre mostly narrow.

\* Leaves rather small, opposite, entire or merely undulate: scales of the involucre oblong, obtuse.

1. *G. GREGGII*, Gray. <sup>*Vaginaria Greggii* Gray/Blake</sup> Closely branched shrub: leaves opposite, ovate, obtuse, cuneate to short petioles, pale green above, white-tomentulose beneath, 2 to 3 cm. long (incl. petiole), 1 to 1.8 cm. broad: peduncles long, mostly solitary at the ends of the branches.—



Proc. Amer. acad., 15, 36. — Northern Mexico, *Gregg*, no. 382; and on limestone hills Carneros Pass, Coahuila, *Pringle*, no. 2387.

\*\* Leaves alternate, larger, subentire.

2. *G. CINERASCENS*, Benth. and Hook.f. Dichotomous under-shrub with brownish purple soft-pubescent leafy stems terminating in compound irregular many headed corymbs: leaves ovate-elliptic, 5 to 6 cm. long, 3 to 4 cm. broad; the upper oblong, attenuate at each end, acute, minutely serrulate, subtriplinerved, pubescent above: heads borne on white clavate peduncles: ligules (white?) neutral: achenes glabrous, without pappus. — Gen., 2, 362; Hemsl., l. c., 161. *Zaluzania cinerascens*, Sch. Bip., Flora, 1864, p. 219, whence above desc. is compiled. — S. Mexico, Mineral del Monte, *Ehrenberg*, no. 346. We have not been able to see specimens of this species but from Schultz statement that the corolla is cucullate over the achene there can be little doubt that it is to be referred to Subg. Calanticaria.

\*\*\* Leaves lobed, scales of the involucre lance-linear, acute to attenuate.

3. *G. PINNATILOBATA*, Benth. and Hook.f. Shrub: branches covered with a fine white at length deciduous pubescence: leaves pinnately several-lobed, pale green above, white-tomentulose beneath, 3 to 6 cm. long (including the winged petiole), half as broad; lateral lobes blunt, the lower large, the upper smaller. — Gen., 2, 364; Hemsl., l. c., 163. *Zaluzania pinnatilobata*, Sch. Bip., Flora, 1864, p. 219. — South Mexico, Tehuacan, *Liebmann*, no. 384, *Pringle*, no. 6252; Cordillera of Oaxaca, *Galeotti*, no. 2124, acc. to Hemsl.; limestone mesas, San Antonio, Oaxaca, *Pringle*, no. 5731. Mr. E. W. Nelson's no. 1638 from Oaxaca forms a puzzling intermediate between this and the otherwise well-marked *G. tripartita*.

4. *G. TRIPARTITA*, Robinson and Greenman. Stems smooth and glabrous: leaves deeply and palmately 3-parted; segments narrow, oblong, acute, often bluntly lobed near the base, the lateral sometimes very short or in upper leaves wanting, paler but green beneath: heads numerous, slender-peduncled in an open corymb. — Amer. journ. sci., ser. 3, 50, 154. — Oaxaca, Cuicatlan, *L. C. Smith*, no. 239; Jayacatlan, *L. C. Smith*, no. 386.

5. *G. TENUIFOLIA*, Benth. and Hook.f. Low shrub, 1 m. or more high: leaves numerous, deeply 3-fid or pinnatifid with lobes few, linear to lance-linear, acute, green above, finely white pubes-



cent beneath, the margins revolute: peduncles long, solitary at the ends of the branches; bracts of the involucre attenuate. — Gen., 2, 364; Hemsl., l. c., 163; Gray, Syn. fl., 1, pt. 2, 269. *Helioomeris tenuifolia*, Gray, Pl. Fendl., 84; Pl. Wright., 1, 107; 2, 87. — Southwestern Texas, rocky cliffs of Turkey Creek and beyond the Pecos, *Wright*, no. 329; rocky hills near Eagle Springs, *Wright*, no. 1223, *Sutton Hayes*, no. 444; at Presidio, *Havard*, El Paso, *Gray*, *Jones*, no. 4347; Santa Maria, *Nealley*, no. 163; and Chénantes Region, *Nealley*, no. 576; New Mexico in the Organ Mts., *Wootton*, no. 442; Mexico, Tamaulipas, *Berlandier*, nos. 814, 2234, *E. W. Nelson*, no. 4507; Saltillo, *Gregg*, nos. 21, 125; Coahuila, *Palmer*, nos. 620 to 624 (coll. of 1880), *Pringle*, no. 148; Chihuahua, *Thurber*, no. 834; San Luis Potosi, *E. W. Nelson*, no. 4532.

Subg. 2. EUGYMNOLOMIA. Corolla-tube in the disk-flowers cylindrical or slightly enlarged at the base; leaves (often serrate) not lobed; stems mostly herbaceous.

\* Heads usually numerous, pedunculate, small or more often medium-sized (disk 7 to 12 mm. broad excl. of the rays); involucre scales linear, acutish to attenuate: leaves mostly lance-linear to linear, rarely oblong.

+ Outer involucre bracts herbaceous, attenuate (1.1 to 1.7 cm. long) coarsely ciliate on the margin, otherwise nearly or quite glabrous: ligules 5 to 9, elliptic, showy: Georgia.

6. *G. PORTERI*, Gray. *V. Porteri* (Gray) Blake. Tall slender erect corymbosely branched annual with lance-linear to linear chiefly alternate leaves coarsely ciliate near the base; those of the stem 6 to 12 cm. long: disk narrowly conical; pales striate, entire, pungent. — Proc. Amer. acad., 12, 59; Syn. fl., 1, pt. 2, 269; Meehan, Native fl., ser. 1, 2, 137, pt. 35; Chapm., Fl., ed. 3, 251. *Rudbeckia? porteri*, Gray, Pl. Fendl., 83; Chapm., Fl., ed. 3, 228. — Growing on scanty humus in hollows and crevices of granite rock on the summit and slopes of Stone Mountain, Georgia, where curiously local, *Porter* (type, in herb. Gray), *Ravenel*, *Hendee*, *Canby*, *J. D. Smith*, *Curtiss*, no. 1434, *Small*; fl. August to October. = *Helioomeris porteri* (Gray) Blake

+ + Outer involucre bracts (rarely elongated) usually appressed-pubescent or even hoary: ligules 10 to 14, linear or oblong: western U. S. and Mexico.

7. *G. MULTIFLORA*, Benth. and Hook.f. *V. multiflora* (Nutt.) Blake. Perennial: stems usually several (1.5 to) 9 or 12 dm. high, from a thickish lignescent stock, finely striate and covered with a very short-appressed grayish pubescence: leaves lanceolate or linear-lanceolate and acutish to lance-oblong or oblong and obtuse, 4 to 7 cm. long, 4 to 20 mm.



broad, attenuate at the base, finely pubescent, becoming scabrous especially above: heads (exclusive of rays) 1.2 cm. in diameter; involucre scales canescent with appressed hairs. — Benth. and Hook. f., acc. to Rothr. in Wheeler Rep., 6, 160, as to synonym; Gray, Syn. fl., 1, pt. 2, 269 only in part. *Helioomeris multiflora*, Nutt., Journ. acad. Phila., ser. 2, 1, 171; Wats., Bot. King exp., 170, at least in great part. — Rocky mountains and plains of Idaho, *Palmer*, no. 422; Wyoming, *Hayden*, no. 34, *Tweedy*, *Burglehaus*, *A. Nelson*, nos. 39, 1064, 2663; Colorado, *Rothrock*, no. 551, *Parry*, no. 420, *Greene*, no. 194, *Jones*, *C. S. Sheldon*, nos. 152, 468, *Cowen* (low and many-stemmed), *Miss Eastwood* (coll. July, 1889); Utah, *Jones*, nos. 5820, 5996; Nevada, in the Uintas, *Watson*, no. 606; New Mexico, *Wootton*, no. 484; California, *Gambel*, *Co-ville* and *Funston*, no. 806; and in the Rocky Mountains, without locality, by *Gordon*, *Burke*, and by *Frémont*, no. 121. Toward the southwest this species passes into somewhat narrower-leaved forms (Utah, *Ward*, nos. 647, 652, *Jones*, no. 5996 r; Arizona, *Palmer*, coll. of 1869 without number and no. 241 coll. of 1877, *Knowl-ton*, no. 6; S. E. California, *Purpus*, no. 5025), which, however, retain their perennial character.

8. *G. longifolia*. — *G. longifolia* (Robt + Green) Blake. Erect paniculately branched annual: stem single, 6 to 12 dm. high, finely pubescent with appressed hairs: leaves lance-linear or oblong-linear, narrowed at both ends, those of the stem 8 to 11 cm. long, 5 to 10 mm. broad, entire or obscurely and remotely crenate-serrate, finely pubescent on both surfaces, becoming very scabrous and tuberculate-hispid above, often ciliate toward the base; peduncle and involucre bracts covered with fine appressed pubescence; heads numerous, in size and floral characters essentially like those of *G. multiflora*. — *G. multiflora*, Hemsl., l. c., 162, as to Mex. pl.; Gray in Wats., Proc. Amer. acad., 21, 432; Syn. fl., 1, pt. 2, 269, in part; not Benth. and Hook. f. *Helioomeris multiflora*, Gray, Pl. Wright., 1, 107; 2, 87, in part, not Nutt. — W. Texas, *Wright*, no. 328, *Havard*, *Nealley*, no. 432 (depauperate), *Dr. Smart*, no. 422; New Mexico, "on pine hills between the copper mines and the mimbres," *Wright*, no. 1221; Burro Mts., *Rusby*, no. 172; Arizona, Rucker's Valley, *Lemmon*, nos. 345, 2765, and 383 (a form with double flowers); Nagle's Ranch, *Jones*, no. 6054 p.; Mexico, between San Luis Potosi and Tampico, *Palmer*, no. 1102; hills and plains near the town of Chihuahua, *Pringle*, no. 615; S. W. Chihuahua, *Palmer*, no. 392; Strawberry Valley,



Chihuahua, *Hartman*, no. 777; vicinity of Durango, *Palmer*, no. 754; Chiapas, *Ghiesbreght*, no. 63. Types in herb. Gray.

9. ***G. annua***. <sup>*V. annua (Gray) Blake*</sup> Annual, slender, often branched from the base, 3 to 5 dm. high, copiously branched above: leaves linear or nearly so, finely appressed-pubescent and even somewhat canescent, slightly ciliated at the base or not at all, the cauline 4 to 7 cm. long, 2 to 3 mm. broad, the rameal smaller: pubescence on the peduncles and on the involucre bracts fine and appressed; heads rather small, usually 7 to 10 mm. in diameter (exclusive of rays): rays 10 to 14, yellow, 4 to 12 mm. long: otherwise like *G. multiflora*. — *G. multiflora*, Gray, Syn. fl., 1, pt. 2, 269, in part, not Benth. and Hook. f. *G. multiflora*, var. *annua*, Jones, Proc. Calif. acad. sci., ser. 2, 5, 698. *Heliomeris multiflora*, Gray, Pl. Fendl., 84, as to pl. of Wislizenus; Pl. Wright., 2, 87, in part, not Nutt. — W. Texas, *Wright*, no. 334, *Pope*; New Mexico, on sides of mountains near the copper mines, *Wright*; Arizona, on sandy river bottoms, near Ft. Whipple, *Coues* and *Palmer*, no. 559; at Patano, *Pringle*; near Defiance, *Marsh*, no. 229; Arizona, *Knowlton*, no. 283, *Wilcox*, no. 455, *Rothrock*, no. 779; Mexico, at Llanos, *Wislizenus*; in Sonora, *Wright*, no. 1220, *F. E. Lloyd*, nos. 410, 411. Distinguished from *G. multiflora* by its annual root, much narrower leaves, somewhat smaller heads, shorter rays and distinctly Sonoran range; from *G. hispida*, var. *ciliata* less satisfactorily by the different pubescence of its leaves and involucre scales.

10. ***G. hispida***. <sup>V</sup> Probably annual, 6 to 8 dm. high, densely hispid and hoary throughout with long stiff white hairs, those of the stem and peduncles widely spreading: leaves alternate, narrow, linear, 5 to 7 cm. long, 3 or 4 mm. broad, thickish, channeled above: involucre bracts considerably exceeding the disk, hirsute and hoary: flowers as in *G. multiflora*. — *Heliomeris multiflora*, var. *hispida*, Gray, Pl. Wright., 2, 87, as to typical canescent form. — Low damp soil, near Sta. Cruz and San Bernardino, Sonora, *Wright*, no. 1220 in part. In the almost shaggy pubescence of the leaves and copious spreading pubescence of the peduncles this form differs rather markedly from the others here enumerated, but it certainly passes to

**var. *ciliata***. Slender annual, commonly branched from the base, 3 to 6 dm. high: stems with sparse spreading pubescence or nearly glabrous below: leaves linear, green, conspicuously ciliate



for the greater part of their length: pubescence of the peduncles sparing, mostly appressed; involucre scales ciliate but scarcely pubescent otherwise. — *Helimeris multiflora*, var. *hispida*, Gray, l. c., in part, i. e., as to greener forms. — S. Utah at Beaver, *Palmer*, no. 245; New Mexico, Zuni Mts., *Sitgreaves Exp.*, San Antonita, *Bigelow* in part; S. California at Sta. Monica, *Hasse*; Sonora, Mexico, *Wright*, no. 1222 in part.

\* \* Heads small or medium-sized; involucre scales linear and acute or the inner narrowly oblong and obtusish: leaves ovate or ovate-lanceolate: perennials so far as the duration is known.

+ Heads small and numerous, corymbose at the ends of the branches: leaves petioled (shortly so in var. *abbreviata*).

+ Leaves distinctly serrate.

= Pappus none: Mexico to Venezuela.

11. *G. PATENS*, Gray. *= Hymenostephium cordatum* Smoothish: stems flexuous, reclining, becoming 5 m. in length, at length soft-woody at the base, striate-angulate, sparingly and minutely appressed-pubescent; leaves ovate, acuminate, serrate, thin, obliquely truncate at the base, finely pubescent, more or less scabrous above; petioles slender, 1 to 3.2 cm. long; peduncles slender, finely appressed-pubescent; involucre cylindric, 5 mm. in diameter; outer scales lanceolate acute or attenuate, the inner longer, oblong, striate, obtusish: ligules 6 to 10, 1 cm. long, yellow turning whitish during or after drying; disk-flowers, 30 to 35. — *Proc. Amer. acad.*, 5, 182; *Hemsl.*, *Biol. Cent. Amer. Bot.*, 2, 163. ? *Wedelia cordata*, Hook. and Arn., *Bot. Beech.*, 435. *Microcephalum ehrenbergianum*, Sch. Bip., and *Gymnolomia ehrenbergiana*, Klatt, *Leopoldina*, 23, 90. *Montanoa thomasii*, Klatt, *Abh. naturf. gesell. Halle*, 15, 328. — State of San Luis Potosi, *Palmer*, no. 1099, *Pringle*, no. 3937; Orizaba, *Schaffner*, *Botteri*, no. 497, 810, *Thomas*; Wartenberg in Huasteca, *Ervendberg*, no. 95; Oaxaca, El Pariánetla, *Conzatti* and *González*, no. 906; Guatemala, *von Tuerckheim*, no. 287.

var. *ABBREVIATA*, Robinson and Greenman. Stems 1 to 2 m. long, sparingly appressed-pubescent: petioles very short, 4 to 6 mm. in length; leaves somewhat narrower and thicker than in the type: pappus none. — *Proc. Amer. acad.*, 29, 387. — Jalisco at Tequila, *Pringle*, no. 4595; Guerrero, between Chilapa and Tixtla, altitude 1,600 to 2,100 m., *E. W. Nelson*, no. 2164.

var. *GUATEMALENSIS*. With copious spreading pubescence on the stem: pedicels 1 to 2.5 cm. long: pappus none. — Guatemala,



San Miguel Uspantán, Dept. Quiché, *Heyde and Lux*, no. 3370 of Mr. J. Donnell Smith's sets.

**var. brachypoda.** Pubescence, at least on the upper part of the stem, spreading: pedicels very short (2 to 5 mm. in length): pappus none. — Guatemala, Alta Verapaz, altitude 1,300 m., *von Tuerckheim*, no. 852 of Mr. J. Donnell Smith's sets; also in Colima, S. W. Mexico, *Palmer*, no. 1223 (coll. of 1891).

**var. macrophylla.** Pubescence of the stem copious, spreading: leaves (1.5 dm. long, 8 to 10 cm. broad) much larger than in the other forms of the species, subcrenately serrate: pappus none. — Venezuela near Tovar, at 1,000 m. altitude, *Fendler*, no. 686.

12. *G. COSTARICENSIS*, Benth. Habit, foliage, and pubescence as in *G. patens*: heads larger (disk-flowers about 50); involucre campanulate: pubescence fine, appressed or subappressed: rays about 10: achenes of the disk-flowers destitute of pappus but sometimes crowned with an obscure ring or rim. — Benth. acc. to Klatt, Bull. soc. bot. Belg., 31, 199, at least as to pl. of Oersted (Pittier's no. 2614, referred to this species by Klatt, is, in herb. Klatt, *Baltimora scolosperum*, Steetz!). *G. rudbeckioides*, Hemsl., Biol. Cent.-Amer. Bot., 2, 163, in part, probably not HBK. *Gymnopsis? costaricensis*, Benth. in Oerst., Vidensk. meddel., 1852, p. 90. *G. vulcanica*, Steetz in Seem. Bot. herald, 157. *Aspilia costaricensis*, Klatt, l. c., 201, as to synonym. and Pittier's no. 3276 in part. — Costa Rica, Aguacate, and Ujaras, *Oersted*; Rodeo de Pacaca, *Pittier*, no. 3276 in part, San Francisco de Guadalupe, *Tonduz*, nos. 7251, 7288; Rio Maria near S. José, *Tonduz*, no. 7271; Panama Boquete, Veraguas, *Seemann*, no. 1588.

= = Pappus none: Peruvian.

13. *G. RUDBECKIODES*, HBK. Of habit and foliage of the last two species but with short petioles (4 to 6 mm. long), spreading pubescence, and (ex icon.) more axillary or irregular (less definitely corymbose) inflorescence. — Nov. gen. et spec., 4, 219, t. 374. — Temperate regions, Agavaca, Peru, *Humboldt* and *Bonpland*. Not seen by the writers, who have been unable to match satisfactorily the original description and figure of this species with any Mexican or Central American plant.

= = = A definite pappus present, consisting of several fimbriate scales.

14. ? *G. SUBFLEXUOSA*, Benth. and Hook. f. Habit, foliage, pubescence, and inflorescence much as in *G. patens*, from which we are



able to separate it solely by the pappus.— Gen., 2, 364; Hemsl., l. c., 163. *Wedelia subflexuosa*, Hook. and Arn., Bot. Beech., 435.— Realejo, Nicaragua, *Sinclair*; Orizaba, *Botteri*, no. 435 (acc. to Hemsl.). To this species of which we have seen but a single achene we refer with doubt specimens from the following localities: Vera Cruz, Valley of Cordova, *Bourgeau*, no. 1961; Oaxaca, Jayacatlan, *L. C. Smith*, no. 896, Monte Alban, *Pringle*, no. 4859, *C. L. Smith*, no. 244, Valley of Etla, *L. C. Smith*, no. 849, *Alvarez*, no. 723; Costa Rica, Prov. of San José, *J. Donnell Smith*, no. 4871. A better knowledge of the type of this species will doubtless justify at least a varietal separation of some of the specimens here mentioned.

++ ++ Leaves entire or nearly so, canescent-sericeous beneath.

15. *G. CANESCENS*, Robinson. *V. dotosina Blake* Leaves opposite, ovate, subtruncate or subcordate at the base, acute or often obtuse at the apex, finely gray pubescent above, silky and silvery beneath; petioles 2 cm. long: branches of the naked inflorescence long, bearing few clustered heads at their ends.— Proc. Amer. acad., 27, 174.— San Luis Potosi, brackish marsh, Las Tablas, *Pringle*, no. 3611, alkaline plains, Hacienda de Angosture, *Pringle*, no. 3763.

+ + Heads somewhat larger (of medium size) rather few, mostly solitary or borne by 3's at the ends of the branches.

++ Outer bracts of the involucre shorter than or little exceeding the inner: species of Mexico, Cent. America, and Andean South America.

= Leaves sessile or petioles short (2 to 8 mm. long).

a. Pappus none: species of Mexico.

16. *G. OVATA*, Gray. *V. ovata (Gray) Blake* Stem 4 to 8 dm. long or more, covered with a short spreading pubescence: leaves ovate, subsessile, 3 to 7 cm. long, 2 to 4 cm. broad, serrate, mostly acute: heads 3 to 8, long, unequally long-peduncled, 1.5 to 1.8 cm. in diameter (exclusive of rays), many-flowered; the bracts of the involucre narrow, loose, very numerous.— Proc. Amer. acad., 19, 4.— Chiapas, *Ghiesbreght*, no. 554; Oaxaca, Sierra de San Filipe, altitude 1,800 to 2,500 m., *Pringle*, no. 5674, *Conzatti* and *González*, no. 551.

17. *G. LIEBMANNII*, Klatt. *V. ovata* Smaller: leaves sessile, cordate, green on both sides, 2 cm. long, nearly as broad: heads few, 1 or 2 or perhaps 3 at the ends of the branches; involucre 6 mm. in diameter; bracts 2-seriate, rather few, lanceolate; rays about 9, conspicuously 5-nerved.— Leopoldina, 23, 90. *Microcephalum lieb-*



*mannii*, Sch. Bip., acc. to Klatt, l. c.—S. Andres, Mecatlan, Mexico, *Liebmann*, no. 588. Type in the herbarium of the Botanic garden of Copenhagen; a tracing and fragment in herb. Gray.

- A rudimentary pappus generally present as a short-fringed cup: South American species.

18. *G. TENELLA*, HBK. = *Aspilic (?)* Prostrate, much-branched: stems slender, hard: leaves opposite, ovate, subcordate, obtusish, thick, rugose, very scabrous above, short-petioled, serrate or serrulate, 2 to 5 cm. long: heads solitary, terminal, on filiform peduncles; involucre 8 to 10 mm. in diameter; the bracts oblong-lanceolate, canescent-pubescent; disk achenes obovate, appressed-pubescent, somewhat contracted above into the at length obscure pappus-cup. — Nov. gen. et spec., 4, 218, t. 373; Klatt in Engl. Jahrb., 8, 42. — New Granada near Ibague and Contreras, *Humboldt*; in bushy undergrowths and on savannas of the Rio Dagua, Cauca, altitude 1,000 to 1,800 m., *Lehmann*, nos. 1956, 2865, 2994.

19. *G. HONDENSIS*, HBK., l. c., 218. From description close to if not identical with the preceding: leaves said to be subacuminate at the apex and rounded at the base. — Torrid regions of New Grenada near Honda, *Humboldt*. Sprengel (Syst., 3, 610) reduces this species to *G. tenella*, where it may well belong.

20. *G. TRIPLINERVIA*, HBK. Branches terete, smooth, glabrate, the younger with appressed pilosity: leaves opposite, ovate, narrowly subacuminate, acute at the base, crenate-dentate, reticulate-veiny, 3-nerved, hispidulous with appressed hairs on both surfaces, about 6 cm. long, half as broad; petioles 6 to 8 mm. long: heads solitary on long appressed-pubescent peduncles; involucre bracts numerous, appressed-pubescent, the outer slightly exceeding the inner: disk-flowers and achenes unknown. — Nov. gen. et spec., 4, 219. — On high plains of Bogota, U. S. Colombia, *Humboldt*. Not seen by the writers, the descr. compiled.

= = Petioles longer (8 to 20 mm. in length): ligules rather showy, 1 to 2 cm. long.

a Rays about 12, narrow, strongly carinate or conduplicate.

21. *G. CRUCIATA*, Klatt. = *Wulffia (?)* Tall erect shrub, 3 m. high: branches tetragonal, rough: leaves ovate-oblong, shortly cuneate or one-sided at the base, 7 cm. in length, half as broad; the petioles 1 cm. long: rays about 12. — Bull. Herb. Boiss., 4, 480. — Near Castañal, U. S. Colombia, *Sonntag*, no. 3, June, 1888. Type in herb. Univ. of Zurich; a head and sketch in herb. Gray.



b. Rays 8 to 10, not conspicuously carinate or conduplicate: South American.

22. *G. QUITENSIS*, Benth. and Hook. f. Shrub with rather copious pubescence: leaves all opposite, acuminate, from subcordate to shortly cuneate at the base, 4 to 9 cm. long, half as broad: heads cymose, the peduncles rather short, 2 to 2.5 cm. long, much exceeded by the leaves. — Gen., 2, 364. *Andrieuxia quiten-sis*, Benth., Pl. Hartw., 206. — Andes of Ecuador, *Hartweg*, no. 1142, *Hall*, *Couthouy*.

++ ++ Outer bracts of the involucre elongated, the inner short: species of Central Brazil.

23. *G. KUNTHIANA*, Baker. Erect perennial pubescent herb: leaves petiolate, ovate, serrate, the upper alternate: involucre 1 to 1.2 cm. in diameter; outer bracts oblong, large, unequal, acute, 1.2 to 2.4 cm. long: ligules 10 to 15. — Baker in Mart. Fl. Bras., 6, pt. 3, 172. *Gymnopsis kunthiana*, Gardner in Hook. Lond. journ. bot., 7, 292. — Dry mountainous regions near Conceição Goyaz, Brazil, *Gardner*, no. 3846.

\*\*\* Heads and involucre as in the last group: leaves (all opposite) narrowly lanceolate: pappus none: South American.

+ Pedicels bracteolate.

24. *G. GOEBELII*, Klatt. Finely and cinereously appressed-pubescent: leaves rather small: branches terminated by 3-headed cymes; pedicels long and slender, bearing above the middle two subulate bractlets; heads 1.2 to 1.5 cm. broad exclusive of the 16 to 20 narrow linear rays. — Klatt in Goebel, Pflanzenbiologische schilderungen, 2, 49. — Dry slopes near the small town of Muruchies, Venezuela, *K. Goebel*.

+ + Pedicels naked.

25. *G. HIRSUTA*, Klatt. Branching shrub, scarcely or not at all canescent: leaves long-lanceolate, caudate-attenuate, obtusish at the base, 7 cm. long, 1.5 cm. broad, bullate-rugose above, veiny and pubescent beneath: ligules about 12, oblong, 5 mm. broad. — Klatt in Engl. Jahrb., 8, 42 (1886). — Among shrubs, borders of woods, Tungu-ragua, Ecuador, altitude 2,200 m., *Lehmann*, October, 1879, no. 360 a.

\*\*\*\* Heads large, but ligules short; involucral scales oblong, the tips slightly squarrose; peduncles long: leaves oblong or elliptic, sessile, harsh in texture and hirsute: perennial herb.

26. *G. PARKINSONII*, Hemsl. Erect, coarsely pubescent and



scabrous: leaves alternate or scattered (the middle ones occasionally verticillate), 6 to 13 cm. long, 1.2 to 3.4 cm. broad, prominently 3-nerved: heads on long stout ascending alternate peduncles, subglobose, 2 to 2.5 cm. in diameter. — Biol. Cent.-Amer. Bot., 2, 163. *G. rudis*, Gray, Proc. Amer. acad., 22, 424. *G. rudis*, var. *minor*, Rob. and Greenm., ibid, 29, 387 (small form). — The type (in herb. Kew), collected in Mexico, without locality, by *Parkinson*, has brownish-purple flowers. This form is represented also by *Palmer's* no. 531 from the Rio Blanco, Jalisco, *Pringle's* no. 4584 from rocky hills near Tequila (small form), and *Rose's* no. 3031, coll. between Bolaños and Guadalajara, and no. 3700 coll. at Bolaños. This typical form is connected by variegated transitions with a forma **flaviflora** in which both disk- and ray-flowers are golden yellow. The latter form is represented by *Pringle's* no. 2460, from hillsides near Guadalajara, *Palmer's* no. 533 from the Rio Blanco, and *Rose's* no. 2827, coll. between Colotlan and Bolaños, Jalisco. No morphological differences between the individuals with brown-purple flowers and those with yellow flowers have been detected.

\*\*\*\*\* Heads large (1.6 to 1.8 cm. broad excl. of rays), terminal, solitary; involucral bracts narrow, lance-linear, attenuate: rays long: leaves lance-oblong.

27. *G. serrata*. Perennial: stems several, 5 dm. high, unbranched, striate, terete, puberulent, leafy, 1 (-2)-headed: leaves lance-oblong, opposite or alternate, attenuate, conspicuously serrate, shortly petiolate, scabrous-puberulent above, scarcely paler, pubescent, and reticulate veiny beneath, 6 to 12 cm. long, 1 to 2 cm. broad: involucral bracts herbaceous, lance-linear, attenuate, appressed-canescant-pubescent especially on the mid-nerve, 1 to 1.2 cm. long: rays deep yellow, oblong, 1.5 to 2.5 cm. long, 5 to 8 mm. broad: disk-corollas yellow, essentially glabrous, 6 mm. long: immature achenes 4 mm. long, glabrous, destitute of pappus. — Collected in S. W. Chihuahua on Mt. Mohinora, 1 September, 1898, *E. W. Nelson*, no. 4891. Types in herb. U. S. nat. museum and herb. Gray.

\*\*\*\*\* Heads of medium size, most of them sessile or shortly peduncled in few many-headed leafy corymbs: involucral bracts ovate, obtuse, conspicuously squarrose: leaves ovate, sessile.

28. *G. squarrosa*, Benth. and Hook. f. Erect perennial herb, simple below, coarsely and copiously pubescent: leaves serrate



scabrous above, paler and somewhat canescent-pubescent beneath, 5 to 7 cm. long: ligules (about 13) 1 to 1.3 cm. long.—Gen., 2, 362; Hemsl., l. c.; Gray in Wats., Proc. Amer. acad., 22, 424. *Zaluzania squarrosa*, Sch. Bip., Flora, 1864, p. 217. — Ravines near Guadalajara, Jalisco, *Oliva* (1854), *Palmer*, nos. 486, 741 (1886), *Pringle*, nos. 2194, 2474 (1888–89). Flowering from September to November.

\*\*\*\*\* Heads small or medium-sized, slender-peduncled: involucre bracts (all but a few of the outermost) broad, obovate or oblong, mostly obtuse or rounded at the apex: leaves ovate or lanceolate to linear-oblong.

+ Scales of the involucre not canescent.

29. *G. LATIBRACTEATA*, Hemsl. *V. latibracteata Hemsl.* Stems terete, striate, purple, alternately branched above, sparingly scabrous-pubescent: leaves alternate (so far as known), lanceolate, attenuate at each end, short-petioled, obsoletely serrate, 6 to 8 ("to 13") cm. long, 1 to 3 cm. broad: peduncles 5 to 7 cm. long, 1-headed; heads (excl. of ligules), 1.5 cm. in diameter; involucre campanulate: rays few, 1.2 to 1.4 cm. long.—Hemsl., l. c., 162. — Cerro Pinar, North Mexico, *Seemann*, no. 1485. Collected but once.

+ + Scales of the involucre canescent.

30. *G. ENSIFOLIA*, Benth. and Hook. f. *V. ensifolia (Sch. Bip.) Blake* Stems slender, terete, strigillose, and scabrous: leaves opposite, sword-shaped, 1 to 1.2 dm. long, 1 to 1.5 cm. broad, gradually narrowed from near the sessile base to the attenuate apex, very scabrous above, pale beneath: heads cymose; involucre scales all rounded at the apex, the outer much shorter. — Gen., 2, 364; Hemsl., l. c., 161. *Montagnea ensifolia*, Sch. Bip. in Seem. Bot. herald, 304. *Zaluzania ensifolia*, Sch. Bip., Flora, 1864, p. 216. — Sierra Madre, Northern Mexico, *Seemann*, no. 2007 in part; Tepic, *Palmer* (coll. of 1892).

31. *G. SERICEA*, Klatt. "Suffrutescent": leaves chiefly opposite, ovate, shortly connate-petiolate, entire, 3-nerved, acute, acuminate, 3 to 4 cm. long, half as broad, above green and scabrous, beneath silky canescent: heads 1.2 cm. in diameter; involucre bracts biseriate, oblong, subequal: rays about 20, narrowly oblong. — Leopoldina, 23, 90. *Microcephalum sericeum*, Sch. Bip. acc. to Klatt, l. c. — Mexico, without locality, *Liebmann*, no. 609. Type in herb. Botanic garden of Copenhagen; excellent drawing and some fragments in herb. Gray.



\*\*\*\*\* Heads large (1.7 to 7 cm. broad excl. of rays); involucral bracts broad, the inner large, spatulate with rounded apex: perennial herbs: leaves lanceolate to oblong or ovate; petioles short winged, or almost none.

+ Leaves oblong-lanceolate, pale beneath.

32. *G. GHIESBREGHTII*, Hemsl. Erect, simple or branched from the base, 6 to 15 dm. high: leaves all alternate or some opposite, serrate or serrulate, mostly acute at each end, 5 to 10 cm. long, 1 to 4 cm. broad: heads few, 2 to 2.5 cm. in diameter; outer scales short, squarrose: ligules about 20, golden yellow, 2 cm. long. — Hemsl., l. c., 162. — South Mexico, hills of Oaxaca, *Ghiesbreght*, nos. 385 (acc. to Hemsl.), 382, *Pringle*, no. 4963, *E. W. Nelson*, nos. 1371, 1464, *L. C. Smith*, no. 799, *Conzatti* and *González*, no. 553; Michoacan on wooded hills near Patzcuaro, *Pringle*, no. 3339.

+ + Leaves elliptical, green beneath.

33. *G. DECUMBENS*, Robinson. Stems several from a lignescent stock, decumbent, 4 to 5 dm. long: leaves chiefly opposite, 2.5 to 4 cm. long, half as broad, scabrous upon both surfaces: heads solitary or borne by threes at the summit of each stem; outer scales of the involucre ovate-lanceolate, acute, not squarrose, dark colored, covered with appressed white hairs. — Proc. Amer. acad., 26, 165. — Rocky hills, Tultenango, State of Mexico, *Pringle*, no. 3263 in part; Zacatecas between Bolaños and Guadalajara, *Rose*, no. 3044 (leaves somewhat longer).

The achenes of this species are perfectly glabrous, obovate-oblong, strongly compressed, striate, and completely destitute of pappus. It is now found that another plant of astonishing similarity was also collected and distributed under the type number (*Pringle's* no. 3263). While in all observed external characters it cannot be distinguished from the former, it has thick obtusely 4-angled mottled and pubescent achenes which are crowned with 2 (to 4) paleaceous awns and intermediate scales. The latter plant seems to be identical with *Viguiera ghiesbreghtii*, Gray.

+ + + Leaves ovate, large and broad.

++ Petioles not auricled.

= Outer involucral bracts large, squarrosely spreading or reflexed, about as long as the inner ones, acute or acuminate.

34. *G. FLAVA*, Hemsl. Stems strigillose becoming hirsute with coarse spreading hairs toward the summit and upon the peduncles:



leaves 7 to 10 cm. long, 2 to 3 cm. broad, above scabrous, beneath hirsute upon the veins and finely canescent-pubescent upon the surface: heads (excl. the rays) 2.5 to 3.5 cm. in diameter: ligules about 15. — Hemsl., l. c., 161. — Oaxaca, *Ghiesbreght*, no. 216 (type in herb. Kew). We follow Dr. Gray in referring to this species *Ghiesbreght's* no. 383, from which the above characterization is drawn.

35. *G. megacephala*. Stems simple, striate, scarcely at all scabrous, covered with minute appressed hairs, also lanate in lines decurrent each from either side of the short winged petioles: leaves ovate-lanceolate with short slender caudate acumination, serrate, scabrous above, hirsutulous upon the veins, but green and glabrous upon the surface beneath, 8 to 12 cm. long, 2 to 4.5 cm. broad: heads terminal, solitary, about 7 cm. broad: no rays observed. — Collected between Tlapa and Ayusinapa, Guerrero, Mexico, altitude 1,380 to 1,700 m., 13 December, 1894, *E. W. Nelson*, no. 2105, distributed as *G. flava*.

var. *simulans*. Pubescence of the stem coarser, spreading: bases of the hairs enlarged, white, tuberculate: leaves somewhat larger, less pubescent, merely cuspidate at the obtusish tip: rays about 13, oblong, bright yellow, 3 cm. long, 7 to 10 mm. broad. — Collected on the Sierra de los Morones near Plateado, Zacatecas, altitude 2,300 m. 1 September, 1897, *Dr. J. N. Rose*, no. 2740. This variety closely simulates *Viguiera excelsa*, Benth. and Hook.f., which, however, differs technically and, as it appears, with constancy in its pubescent achenes which bear at the summit two conspicuous awns and some intermediate scales.

= = Outer involucre bracts much shorter than the large inner ones.

36. *G. PLATYLEPIS*, Gray. Hirsute shrub, 1 to 3 m. high: leaves chiefly opposite, acuminate or attenuate at each end, very scabrous above, paler and densely soft-pubescent beneath, 1 dm. long, 3-nerved from considerably above the base: peduncles thickened upwards; heads (excl. of rays) 2 to 3 cm. in diameter; ligules 15 to 20 in number, 2 to 3 cm. long. — Proc. Amer. acad., 19, 5; Klatt, Bull. soc. bot. Belg., 31, 199. *G. decurrens*, Klatt, Leopoldina, 23, 90. *Perimeniopsis perfoliata*, Sch. Bip., acc. to Klatt, l. c. *Tithonia scaberrima*, Benth. in Oerst., Vidensk. meddel., 1852, p. 91. *T. platylepis*, Sch. Bip., acc. to Benth. and Hook.f., l. c., 368 (name only). *Mirasolia scaberrima*, Benth. and Hook.f.



acc. to Hemsl., l. c., 168. — South Mexico, Mirador, *Liebmann*, no. 251; Chiapas, *Ghiesbreght*, no. 572, Caec. and Ed. Seler, no. 2187; Valley of Cordova, *Bourgeau*, no. 1851; Vera Cruz, *Pringle*, no. 6087; Orizaba, *Gray*; Guatemala, *von Tuerckheim*, no. 354 of Mr. J. Donnell Smith's sets; Costa Rica, *Pittier*, nos. 3136, 3735, *Tonduz*, no. 7196.

++ ++ Cuneately winged petioles tending to enlargement and usually auricled at the base.

37. *G. CALVA*, Gray. Shaggy-pubescent with long white silky hairs: habit as in *Tithonia*: leaves alternate, broadly ovate, acuminate, abruptly contracted to winged and (sometimes obsoletely) auriculate petioles: involucre hirsute. — Proc. Amer. acad., 19, 5; Hook. f. and Jacks., Ind. Kew., 1, 1076. *Tithonia calva*, Sch. Bip. in Seemann, l. c., 305. *Mirasolia calva*, Benth. and Hook. f., Gen., 2, 368; Hemsl., l. c., 168. Sierra Madre, Northern Mexico, *Seemann*, no. 2045; Durango, *Rose*, no. 2293.

**var. lancifolia.** Stem sparingly hirsute or villous: leaves lanceolate. — Tepic, Acaponeta, February, 1895, *F. H. Lamb*, no. 539. Types in herb. Gray and herb. U. S. nat. museum.

#### DOUBTFUL SPECIES.

*G. CONNATA*, Spreng., Syst. 3, 610 (*connatum*). — Branches hispid: leaves oblong, attenuate at either end, connate, hispidulous: peduncles terminal, short: foliaceous involucre subsimple. — Brazil, *Sello*. A species not mentioned in Martius, Fl. Bras., and probably not of this genus. The description is a translation of the original characterization.

*G. MICROCEPHALA*, Less. Herb with 3-nerved leaves, small cylindrical discoid short-pedicelled heads: leaves petiolate, opposite, paler beneath, oblong-ovate, long-acuminate, very obtuse at the base, sharply serrate, hirsute-hispid, scabrous, 3.1 to 5 cm. long, 1 to 3 cm. broad: scales of the involucre passing from flat semilanceolate foliaceous bracts, hirsute on the midnerve, to longer (about 4 mm. long) and broader dry linear shortly acuminate glabrous bracts, fimbriate-dentate at the apex, scarious on the margin, and traversed by green nerves: branches opposite, diverging at the apex into 3 short filiform branchlets bearing several heads (4 mm. long) above. — Linnaea, 5, 153, whence the foregoing description is



translated. — Near Hacienda de la Laguna, October, *Schiede* and *Deppe*; also Cordillera of Oaxaca, *Galeotti*, no. 2090 (acc. to Hemsl.). Exceptional in its discoid heads and perhaps not of this genus.

#### TRANSFERRED OR SUPPRESSED SPECIES.

*G. DECURRENS*, Klatt, *Leopoldina*, 23, 90, is *G. platylepis*, Gray, — an identity recognized by Dr. Klatt himself as shown by a manuscript note in his herbarium.

*G. EHRENBURGIANA*, Klatt, *Leopoldina*, 23, 90, is *G. patens*, Gray.

*G. RUDIS*, Gray (in Wats., *Proc. Amer. acad.*, 22, 424) is *G. parkinsonii*, Hemsl., *Biol. Cent.-Amer. Bot.*, 2, 163, — an identity kindly verified by Mr. Hemsley by comparison of the types.

*G. SILVATICA*, Klatt, *Leopoldina*, 25, 104 (1889); *Bull. soc. bot. Belg.*, 31, 199 (1892). Representing this species in the Klatt herbarium we find two specimens collected by Lehmann at Cuenca, altitude 2,000 m., 16 October, 1879, Pittier's no. 6987, collected at San Rafael de Carthago, altitude 1,500 m., 28 August, 1892, and an excellent drawing of a specimen collected at Mt. Irazu, Costa Rica, by Dr. Hoffman. All of these appear to be identical and to agree in all more conspicuous characters with the original description. Nevertheless, careful dissections show that the ray-achenes are fertile and the ligules sessile indicating that the species is a *Heliopsis*.

*G. TRILOBA*, Gray, with fertile ray-flowers and an unequal scale-like pappus, is certainly a *Zaluzania*. The specific name *triloba* having been used in the latter genus the species may be transferred as ***Z. grayiana***, n. comb.

*G. TRIPLINERVIA*, Klatt, in *Engl. Jahrb.*, 8, 42 (not HBK.), is a *Heliopsis*, the ray-flowers being distinctly pistillate and fertile, while the ligules are sessile, not contracted into a slender tube at the base.

*GYMNOPSIS VERBESINOIDES*, DC. (*Prodr.*, 5, 561) of the Island of Trinidad is an *Aspilia*.

*GYMNOPSIS VULCANICA*, Steetz in *Seem. Bot. herald*, 157, appears from the description and the examination of a single head to be *Gymnolomia costaricensis*, Benth.





Robinson, Benjamin Lincoln and Greenman, J. M. 1899. "Revision of the genus *Gymnolomia*." *Contributions from the Gray Herbarium of Harvard University* (17), 87–104. <https://doi.org/10.5962/p.335911>.

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