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CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD  
UNIVERSITY.—NEW SERIES, No. XXXVI.

Presented by B. L. Robinson, March 10, 1909. Received March 12, 1909.

I. SYNOPSIS OF THE MEXICAN AND CENTRAL AMERICAN  
SPECIES OF CASTILLEJA.

BY ALICE EASTWOOD.

THE genus *Castilleja* was published by Linnaeus fil. in 1771 (Suppl. 293). It was named by Mutis in honor of Domingo Castillejo of the botanical garden of Cadiz and rested upon the two species collected by Mutis in New Granada, *C. integrifolia* and *C. fissifolia*. At that time *C. pallida* and *C. coccinea* had been described by Linnaeus but under *Bartsia*, so that altogether four species were known. In 1818 Nuttall established the genus *Euchroma* (Gen. ii. 55) founded upon *Bartsia coccinea* and *B. sessiliflora* Pursh. The first satisfactory arrangement, however, came in 1846, when Bentham revised the genus *Castilleja* (DC. Prodr. x. 528-534), establishing four sections. At that time thirty-four species were known, fifteen of which belonged to Mexico and Central America. The subdivisions established by Bentham seem to mark off natural groups, which, however, show connecting characteristics that often render the true position of certain species doubtful. *Epichroma* is probably the most individual subdivision and has, perhaps, the best claim to generic rank; but some species placed in the present synopsis under *Euchroma* have floral characteristics that closely approach those of *Epichroma*, while other species under the same section are difficult to separate from *Hemichroma*. On account of this interrelationship any key must be more or less artificial. Perhaps when the knowledge gained from books and herbarium specimens is supplemented by that of the living plants in their natural environment, an entirely different system of classification may be arranged. Dried specimens often conceal the form of the flower, and when mounted frequently render dissection difficult, so that it is not always possible to obtain accurate knowledge of all of the parts; especially is this true of the lower lip of the corolla, which gives much of the characteristic

form. Great variation and closely related species indicate a recent genus still in process of evolution. The line separating *Orthocarpus* from *Castilleja* is not definitely fixed, and the species on the border may suffer changes in name frequently. At present the tendency is to remove all these doubtful species from *Orthocarpus* and include them in *Castilleja*, thus leaving the former genus represented only by annuals. The two genera are certainly very closely related, for there is scarcely a character of *Orthocarpus* which cannot be found in some species of *Castilleja*. Indeed, it is doubtful if the differences between the two genera are much more pronounced than are the differences between some of the sections of *Castilleja*. The last enumeration of the Mexican and Central-American species of *Castilleja* was in 1881-1882, when Hemsley enumerated 26 species (Biol. Cent.-Am. Bot. ii. 459-463). Since then great activity has prevailed in the biological exploration of Mexico and Central America, and specimens of *Castilleja* have been accumulating in all the large herbaria. The present paper is based upon the specimens in the Gray Herbarium and some from the herbarium of the U. S. National Museum. Besides the key a short diagnosis of each species has been added, sometimes modified from the original description and sometimes quoted.

SECTIO I. EPICHROMA Benth. in DC. Prodr. x. 528 (1846).

Calyx vix fissus, breviter et obtuse sinuato-lobatus. Folia pinnatisecta; rhachi et laciniis filiformibus vel anguste linearibus. Folia floralia caulinis minora et concolora. Flores laxè spicati vel racemosi. Annua.

Flores 2.5 cm. longi. Calyx coccineus infundibuliformis. Galea flava a basi exserta. . . . . 1. *C. tenuifolia*.  
 Flores 2 cm. longi. Calyx flavus. Galea flava exserta. . . . . 2. *C. aurea*.  
 Flores 1.5 cm. longi. Calyx viridi-purpureus. Galea viridi-flava paulo exserta. . . . . 3. *C. gracilis*.

SECTIO II. EUCHROMA (Nutt.) Benth. l. c. 529. *Euchroma* Nutt. Gen. ii. 54 (1818).

Calyx in duas partes subaequaliter fissus, segmentis integris vel obtuse bilobatis vel acute bifidis. Folia floralia caulinis latiora, apice dilatata et semper colorata. Flores et bracteae in spicis confertae, demum interruptae.

- a. Annuæ vel biennis, radice brevi, b.
- b. Caules recti solitarii vel pauci 1-2 dm. alti. Stigma crassum, c.
- c. Folia nunc integra nunc pinnatisecta. Bracteae floribus breviores. Puberulens. Folia lanceolata. Stigma exsertum bisectum, partibus recurvatis. . . . . 4. *C. macrostigma*.  
 Pilosa et glandulosa. Folia lanceolata. Stigma vix exsertum bilobatum. . . . . 5. *C. pediaca*.  
 Albo-puberulens. Folia vulgo pinnatisecta, laciniis linearibus. Stigma globosum vix exsertum. . . . . 6. *C. sphaerostigma*.
- c. Folia et caulinea et floralia integra.
- Glandulare puberulens. Folia lanceolata saepe undulata. Bracteae obovatae flores excedentes. Stigma bilobatum exsertum. . . . . 7. *C. Palmeri*.  
 Sublanata. Folia linearia. Bracteae lanceolatae flores aequantes vel excedentes. Stigma bilobatum vix exsertum. 8. *C. angustata*.  
 Glandulare pilosa. Folia oblonga vel lanceolata. Bracteae spatulatae floribus breviores. Stigma bilobatum. Styli superior pars et galea exsertae. . . . . 9. *C. ornata*.
- b. Caules a basi ramosi, infra ramulos squamulose tuberculati, e.
- c. Folia oblanceolata basi angustata. Capsula apice truncata. Bracteae paulo dilatatae. Stigma bilobatum vix exsertum. . . . . 10. *C. communis*.  
 Bracteae dilatatae. Stigma bilobatum exsertum. Flores foliaque eis praecedentis majora. . . . . 11. *C. arvensis*.
- c. Folia lineari-lanceolata basi dilatata. Capsula apice acuminata. . . . . 12. *C. nitricola*.
- a. Perennis nana saepe caespitosa. Alpina vel subalpina. Folia integra vel pinnatisecta, f.
- f. Caules recti, non caespitosi. Spici breves densique. Galea lata. Labium inferius exsertum. . . . . 13. *C. saltensis*.
- f. Caules caespitosi. Galea exserta. Flores 3-3.8 cm. longi. . . . . 14. *C. Pringlei*.  
 Flores 2.5 cm. longi. . . . . 15. *C. Schaffneri*.  
 Galea vix exserta. Folia apice obtusa. Corolla et calyx subaequantur. . . . . 16. *C. tolucensis*.  
 Folia acuta. Corolla calycem vix superans. . . . . 17. *C. moranensis*.
- a. Perennis. Caules alti saepissime recti. Bracteae latae coloratae, g.
- g. Calycis segmenta integra. Folia integra valde nervata, inferiora basi angustata. . . . . 18. *C. nervata*.  
 Folia integra vel saepissime pinnatisecta. Calyx viridis 1.2-2 cm. longus. . . . . 19. *C. Conzattii*.  
 Calyx viridis apice coccineus 2.3 cm. longus. . . . . 20. *C. rigida*.  
 Calyx subfalcatus apice coccineus 3-3.2 cm. longus, segmentis vix dilatatis. . . . . 21. *C. falcata*.  
 Calyx divaricatus, usque ad ovarium coccineus; segmentis dilatatis. . . . . 22. *C. hirsuta*.

- g. Calycis segmenta apice emarginata vel obtuse bilobata, h.
- h. Folia basi dilatata.
- Folia bracteis longiora.
- Pilosa. Corollae labium inferius quinquedentatum. 23. *C. scorzoneriifolia*.
- Pilosa et glandulosa. Corollae labium inferius tridentatum, sinibus latis involutis. . . . . 24. *C. glandulosa*.
- Folia superiora bracteis breviora. Scabrido-hispida. Folia ovata valde nervata. . . . . 25. *C. cryptandra*.
- h. Folia basi non dilatata, bracteis longiora.
- Scabrido-hispida. Folia lanceolata valde nervata. 26. *C. lithospermoides*.
- Glabrescens. Inflorescentia pilosa. Folia ovato-acuminata longa lataque. . . . . 27. *C. Nelsoni*.
- Lanata densissime. Folia lineari-lanceolata. . . . . 28. *C. lanata*.
- Caules in vetustate glabri. Folia lanata anguste longeque spatulata. 29. *C. guadalupensis*.
- g. Calycis segmenta acute bilobata, i.
- i. Folia integra.
- Tomentosa. Folia lineari-lanceolata. . . . . 30. *C. integra*.
- Scabrido-hispida et glandulari-pilosa. Folia valde nervata lanceolata. 31. *C. aspera*.
- i. Folia saepissime pinnatisecta. Flores subfalcati. (Transitio ad Hemichromam.)
- Folia regulariter pectinata, laciniis brevibus subfiliformibus. 32. *C. ctenodonta*.
- Folia filiformi-pinnatisecta. Corolla breviter exserta. Capsula anguste et oblique cylindracea. . . . . 33. *C. Bryanti*.
- Folia lanceolata saepe pinnatisecta. Corolla exserta 5-15 mm. 34. *C. affinis*.
- Folia anguste linearia apice attenuata. Flores parvi pedicellati. Capsula anguste cylindraceo-ovoideo. . . . . 35. *C. minor*.

### SECTIO III. CALLICHROMA Benth. l. c. 531 (1846).

Calyx postice breviter, antice profundius fissus, lobis bifidis, laciniis ovatis vel oblongis vel linearibus plerumque acutis vulgo coloratis. Folia floralia (praesertim superiora) caulinis saepius magis incisa, latiora et colorata.

Folia caulinia et floralia pinnatifida, lobis linearibus elongatis. Calycis segmenta linearia bifida. Corollae labii subaequales calycem multo superantes. 36. *C. mexicana*.

*C. sessiliflora* auct. quoad specimenibus mexicanis est me iudice ad *C. mexicanam* referenda.

## SECTIO IV. HEMICHBOMA Benth. l. c. 532 (1846).

Calyx incurvus, antice profunde fissus, postice vix vel paulo fissus integer vel 2-4-dentatis. Folia floralia vulgo caulinis minora et apice vix colorata. Corolla e fissura calycis saepius longiuscule exserta.

- a. Flores spicati, b.  
 b. Folia distincte auriculata, auriculis 1-2 mm. longis et latis, c.  
 c. Pubescentia dense canescens et minute glandulosa, caulibus idem pilosis.  
 Folia deltoidea densissime imbricata. . . . . 37. *C. auriculata*.  
 Folia ovato-lanceolata non imbricata. . . . . 38. *C. longiflora*.  
 c. Pubescentia divaricate pilosa et scabrido-puberula. Folia viridia lanceolata. Flores subrecti. . . . . 39. *C. subalpina*.  
 c. Pubescentia plerumque adpressis et scabrido-puberula. Flores divaricati.  
 Folia lineari-lanceolata saepe 5 cm. longa divaricata, in siccitate atra. . . . . 40. *C. tenuiflora*.  
 Folia eis praecedentis breviora et crassiora. Pubescentia densior. . . . . 41. *C. canescens*.  
 b. Folia obscure auriculata.  
 Folia lineari-lanceolata viridia, divaricate pilosa. . . . . 42. *C. xylorrhiza*.  
 Folia linearia viridia scabridula. . . . . 43. *C. scabridula*.  
 b. Folia basi non dilatata.  
 Folia lineari-lanceolata saepe deflexa, canescente pubescentia. Flores multo exserti divaricati. . . . . 44. *C. laxa*.  
 Folia subfiliformia in siccitate atra. Flores recti. . . . . 45. *C. stenophylla*.  
 a. Flores racemosi, c.  
 c. Folia integra.  
 Bractae summae obovatae apice fimbriatae. . . . . 46. *C. longibracteata*.  
 Bractae summae lineares. . . . . 47. *C. integrifolia*.  
 c. Folia pinnatisecta, laciniis elongatis.  
 Folia scabrido-hispidula tenuia, laciniis linearibus plurimis. . . . . 48. *C. patriotica*.  
 Folia hispida, superiora trifida, lobo medio lateralibus multo longiori. . . . . 49. *C. Purpusi*.  
 Folia pectinato-laciniata, laciniis linearibus distantibus 2-3-jugis. . . . . 50. *C. pectinata*.  
 c. Folia pinnatisecta, laciniis crassis obtusis, saepissime in siccitate atris.  
 Folia pubescens, laciniis brevibus. . . . . 51. *C. fissifolia*.  
 Folia glabra. . . . . 52. *C. irasuensis*.  
*C. linearifolia* Benth., Sonora, *Geo. Thurber*, no. 981, species hujus sectionis sed valde dubia est.  
 Locus in clave dubius . . . . . { 53. *C. tapeinclada*.  
 . . . . . { 54. *C. katakypitusa*.

1. *C. TENUIFOLIA* Mart. & Gal., herbacea glabra vel puberula 1.5-6 dm. alta ramosa; foliis pinnatisectis, segmentis filiformibus vel lineari-subulatis elongatis in siccitate contortis, floralibus simplicioribus

et minoribus; spicis vel racemis gracilibus; floribus divaricatis ca. 2-3 cm. longis; calyce tubuloso vel saepissime infundibuliformi 1.5-2.5 cm. longo; galea 5-10 mm. exserta obtusa inferiore labio protuberanti nunc exserto nunc incluso; styli superiore parte et stigmatibus bilamellato exsertis; capsula oblonga 7 mm. longa apice truncata. — Mart. & Gal. in Bull. Acad. Brux. xii. pt. 2, 30 (1845); Walp. Rep. vi. 651; Hemsl. Biol. Gent.-Am. Bot. ii. 463; Loesen. in Bull. Herb. Boiss. ser. 2, iii. 285. *C. anthemidifolia* Benth. in DC. Prodr. x. 528 (1846). — Southern Mexico in the states of Oaxaca, Michoacan, Guerrero, Morelos. The type was collected in Oaxaca, *Galeotti*, no. 995. OAXACA: Zimatlan, Sta. Ines del Monte, altitude 2800 m., *C. Conzatti*, no. 1358; Sierra de Clavellinas, altitude 2440 m., *C. G. Pringle*, no. 5692. MICHOACAN: Ignatio, *C. & E. Seler*, no. 1209; dry hills near Patzcuaro, *C. G. Pringle*, no. 3348; rock fields near Coru Station, altitude 1830 m., *C. G. Pringle*, no. 13,142. GUERRERO: between Tlapa and Ayusinapa, altitude 1372-1740 m., *E. W. Nelson*, no. 2106. MORELOS: thin soil of the knobs of the Sierra de Tepoxtlán, altitude 2287 m., *C. G. Pringle*, no. 9123.

2. *C. AUREA* Robinson & Greenman, glabra supra puberula 3 dm. alta graciliter ramosa; laciniis pinnatisectis 2.5-4 cm. longis; laciniis 6-9 lineari-filiformibus; floribus 2-2.5 cm. longis subsecundis in racemis, pedicellis 2-10 mm. longis rectis, saepe in fructu divaricatis; galea obtusa exserta 8 mm.; labio inferiore saepissime exserto; capsula oblongo-acuminata ca. 6 mm. longa. — Proc. Am. Acad. xxxii. 39 (1896). — MORELOS: wet bluffs of barrancas above Cuernavaca, altitude 2135 m., *C. G. Pringle*, no. 6204 (type, in hb. Gray).

3. *C. GRACILIS* Benth., praecedenti similis; floribus 10-15 mm. longis, saepe sessilibus; galea obtusa 4-6 mm. exserta, calyce non ampliato et viridi-flavo. — Benth. in DC. Prodr. x. 528 (1846); Hemsl. l. c. 460. — OAXACA: Cerro de San Felipe, altitude 1800 m., *Conzatti & González*, no. 490; dry banks in same mountain range, altitude 2287 m., *C. G. Pringle*, no. 4968. FEDERAL DISTRICT: lava fields, valley of Mexico, altitude 2287 m., *C. G. Pringle*, no. 7977. These specimens have not been compared with authenticated ones.

4. *C. MACROSTIGMA* Robinson, caule basi ramoso et saepe cum ramulis gracilibus brevibus sterilibus in axillis, puberulenti 1-2 dm. alto; foliis viridibus, inferioribus subimbricatis, superioribus integris undulatis vel sparse pinnatisectis lineari-lanceolatis 1-4 cm. longis 2-3 mm. latis 1-5 nerviis; floribus flavis 1.5-2 cm. longis; spicis brevibus demum elongatis; calyce fisso 4-5 mm., segmentis bidentatis; corollae galea obtusa; labio inferiore non protuberanti, laciniis lineari-acuminatis 1-5 cm. longis, media brevioribus; stigmatibus exsertis, 1-2 mm. longis,

recurvatis; capsula elliptica acuta compressa 8 mm. longa. — Proc. Am. Acad. xxvi. 173 (1891). — STATE OF MEXICO: grassy slopes, Flor de Maria; 28 July, 1890, *C. G. Pringle*, no. 3194 (type, in hb. Gray), also from same locality, altitude 2440 m., no. 9429. To this species, at the time of its original description, was doubtfully referred a specimen collected in Chihuahua by *C. G. Pringle*, no. 1545, which is below made the type of *C. pediaca*. In hb. U. S. Nat. Mus. sheet no. 396,150 contains a specimen of *C. macrostigma* collected at the type locality by *Rose & Hay*, no. 6330, together with a specimen of *C. Schaffneri*.

5. *C. pediaca*, n. sp., annua albo-pilosa et glandulare puberulens; caulibus prope basim recte ramosis, 2 dm. altis; foliis tenuibus lanceolato-acuminatis integris 3-5-nerviis, 2-3 cm. longis 1-2 mm. latis, basi amplexicaulibus 5-10 mm. latis; floribus sessilibus interruptis acclini-bus ad axim spicae gracilis; bracteis flores subaequantibus et investi-entibus, spatulatis 10-12 mm. longis, superiorè parte flavo densissime glandulare puberulenti, apice truncato vel obtuso, inferiore parte pilosa nervia; calyce membranacea 12 mm. longo, fisso 6 mm., duobus partibus truncatis vel emarginatis 5 mm. latis; corolla recta 18 mm. longa, galea acuminata apice glandulare pilosa, labio inferiore membranaceo non protuberanti, laciniis linearibus obtusis glandulare ciliatis 1.5 mm. longis, sinibus inter laciniis 1 mm. latis; stigmatè bilobo crasso, fere exserto; ovario subcylindrico; capsula compressa oblonga 8 mm. longa 3 mm. diametro, apice acuminata; seminibus rhomboideis 1 mm. diametro, testa membranacea profunde foveolata. — CHIHUAHUA: plains, base of the Sierra Madre, 27 September, 1887, *C. G. Pringle*, no. 1545 (type, in hb. Gray), distributed as *C. lithospermoides*, var. (?) *flava* Watson; also included under *C. macrostigma* Robinson in Proc. Amer. Acad. xxvi. 173 (1891). From this latter species it differs in having a more closely flowered spike, pilose instead of puberulent indumentum and less exserted stigma. The flowers too are dissimilar, but the differences are not so obvious. It is even further removed from *C. lithospermoides*, being a slender-stemmed annual, while that is a robust perennial with somewhat harsh pubescence. The slender spikes of *C. pediaca* have flowers about 1 cm. apart, somewhat distichous and appressed to an axis that is slightly tortuous, and are quite unlike the showy thickly flowered spikes of *C. lithospermoides*.

6. *C. sphaerostigma*, n. sp., caulibus 1-2 simplicibus 1.5-2.5 dm. altis gracilibus adpressi-pubescentibus; foliis integris vel pinnatisectis 1-3-nerviis puberulenti-subscabridis, basi amplexicaulibus, apice obtusis, margine frequente involutis, laciniis 2-6 anguste linearibus; floribus in spicis elongantibus sessilibus, bracteis galeam fere aequantibus vel (sub floribus primis) eam superantibus simplicibus cum margine undulata



vel 2-3-lobatis pruinosis; calycis segmentis 1 cm. longis 3 mm. latis emarginatis pruinosis tubum aequantibus; galea apice acuta 1 cm. longa purpurea glandulare puberulenti; labio inferiore membranaceo, laciniis linearibus acutis 2 mm. longis; stylo crasso; stigmatе globoso 1.25 mm. diametro vix exserto; capsula elliptica acuta compressa. — DURANGO: Otinapa, July-August, 1906, *E. Palmer*, no. 361 (type, in hb. Gray). The peculiar pruinose appearance of the inflorescence is due to the white puberulence closely covering the purplish bracts and flowers.

7. *C. Palmeri*, n. sp., sparse pilosa et glandulari-puberulens; caulibus 1-2 simplicibus rectis 1.5 dm. altis; foliis radicalibus imbricatis caulinis lanceolatis 2-3 cm. longis 1-3 mm. latis trinerviis, basi amplexicaulibus 5-10 mm. latis, apice obtusis vel acutis, margine integris vel undulatis; spicis flavis brevibus compactis, fructiferis elongatis; bracteis flores sessiles superantibus vel aequantibus spatulatis 2-3 cm. longis integris, apice rotundatis; calyce fisso 7 mm., laciniis emarginatis 5 mm. latis; corolla 14 mm. longa, galea acuta, dorso glandulari-puberulenti, calycem superanti; labio inferiore membranaceo protuberanti, lobis subulatis acuminatis 2 mm. longis glandulari-ciliatis; stigmatе bilobato crasso paulo exserto; capsula ovato-acuminata compressa; seminibus foveolatis cum testa membranacea. — DURANGO: Otinapa, July-August, 1906, *E. Palmer*, no. 376 (type, in hb. Gray). This species is related to *C. macrostigma*, differing in pubescence, densely flowered spike, and large bracts; from *C. angustata* it differs in pubescence, stigma, foliage, and flowers. There are resemblances to *C. glandulosa* chiefly in the form of the spike, but the bracts in *C. Palmeri* are rounded at apex rather than rhomboid. The corolla is quite dissimilar, the lower lip with three long almost equal divisions, and the body extending outward like a shelf, being very different from the trisaccate lower lip of *C. glandulosa* with its short divisions separated by the folds forming the sacs.

8. *C. angustata* (Robinson & Seaton), n. comb., caulibus 1-2 rectis gracilibus purpurascensibus 1-1.5 dm. altis, basi squamulosis, inferiore parte minute adpresso-pubescenti, superiore parte spicisque albo-tomentosis; foliis integris linearibus 2-4 cm. longis 1-3 mm. latis; bracteis lanceolatis acutis flores subaequantibus, supra viridibus glabrescentibus, subter albo-tomentosis, confertis cum floribus in spicis brevibus; calycis segmentis bidentatis vel crenatis albo-puberulentibus; corollae galea calycem paulo superanti, apice acuta, dorso glandulari-puberulenti; labio inferiore non protuberanti, laciniis 3 lineari-obtusis ciliatis 1.25 mm. longis, sinibus angustis; stigmatе crasso bilobato, paulo exserto; capsula ovato-oblonga acuta 5-7 mm. longa. — *C. pallida* Kunth, var. ? *angustata* Robinson & Seaton in Proc. Am. Acad. xxviii. 114 (1893). MICHOACAN: grassy slopes near Patzcuaro, 18 July, 1892,

*C. G. Pringle*, no. 4117 (type, in hb. Gray).—This is well distinguished in the group in which it has been placed by the almost lanate pubescence. Often at the base of the stem there is a peculiar thickening due to the old crowded leaf-bases. The leaves are probably present during the wet season.

9. *C. ornata*, n. sp., caulibus 1-2 rectis simplicibus 1.7-2.5 dm. altis glandulari-pilosis striatis; foliis lanceolatis vel oblongis, apice acutis vel obtusis, basi amplexicaulibus, margine integris vel crispis-undulatis, 2-3.5 cm. longis 2-6 mm. latis trinerviis; foliis radicalibus rosulatis, caulinis propinquis, supremis apice coccineis; floribus bracteisque confertis in spicis ornatis; bracteis spatulatis glandulari-puberulentibus, apice rotundatis vel rhomboideis 2-2.5 cm. longis 5-10 mm. latis calycem excedentibus; calyce fisso 1 cm., segmentis undulatis 5 mm. latis; galea exserta 5 mm., apice acuta, dorso viridi puberulenti, antice albo-membranacea; labio inferiore trisaccato membranaceo, laciniis subulati-acuminatis 2 mm. longis; stylo filiformi exserto, stigmatate crasso bilobato, in fructu galea stigmatateque contortis; capsula oblongo-ovata acuminata compressa 1 cm. longa. — CHIHUAHUA: near Colonia Juárez, Sierra Madre, June-July, 1899, *E. W. Nelson*, no. 6073 (type, in hb. Gray). This approaches more closely to *C. glandulosa* than any other species and resembles it in the trisaccate lower lip with the divisions separated by the folds forming the three sacs below. It has different pubescence and generally obtuse leaves. *C. glandulosa* does not appear ever to have the basal leaves rosulate, but their persistence in this species may be due to a season or locality of greater moisture.

10. *C. COMMUNIS* Benth., pilosa et hispida ramosa alta; caulis inferiore parte squamulose tuberculata; foliis lanceolatis integris basi angustatis apice acutis vel obtusis; spicis elongatis basi interruptis; bracteis apice coloratis vix dilatatis flores parum aequantibus apice glandulosis viridibus; corolla non exserta; capsula lata obtusa siccitate nigra. — Benth. in DC. Prodr. x. 529; Hemsl. Biol. Cent. Am. Bot. ii. 460; Schmidt in Mart. Fl. Bras. viii. pt. 1, 323, t. 56, fig. 2; Loesen. l. c. 285. — Southern Mexico, Central America to South America. — GUATEMALA: Alta Verapaz, *H. von Turckheim*, no. II. 1318, also Coban, no. 28; San Miguel Uspantan, *Heyde & Lux*, no. 2878 (both ex hb. John Donnell Smith). NICARAGUA: *Oersted*. COSTA RICA: San Jose, *Tonduz*, no. 7096; Cartago, *Juan J. Cooper*, no. 5873 (both ex hb. John Donnell Smith). YUCATAN: *G. F. Gaumer*, no. 416. VERA CRUZ: Santa Lucrecia, Isthmus Tehuantepec, *Chas. L. Smith*, no. 1102. TEPIC: San Blas, *Frank H. Lamb*, no. 608. Additional specimens in hb. U. S. Nat. Museum. — ORIZABA: Boca del Monte, *E. W. Nelson*, no. 204. This is mounted on sheet no. 257,518 with a specimen of *C. canescens*.

GUERRERO: between Tlapa and Tlaliscatilla, *E. W. Nelson*, no. 2048.

JALISCO: vicinity of San Sebastian, *E. W. Nelson*, no. 4070.

11. *C. ARVENSIS* Schlecht. & Cham., *precedenti similis, omnifariam major, bracteis obovatis dilatatis coloratis corollam superantibus.* — *Linnaea*, v. 103 (1830); *Benth.* l. c. 529; *Mart. & Gal.* l. c. 31; *Hemsl.* l. c. 460; *Loesen.* l. c. 285. — ORIZABA: *Botteri*, nos. 339, 437. MICHOACAN: near Guanajuato, *C. & E. Seler*, no. 1148; corn fields near Patzcuaro, *C. G. Pringle*, no. 3349. AGUAS CALIENTES: *Hartweg*, no. 192. JALISCO: Guadalajara, *C. G. Pringle*, nos. 5348, 11,646; *E. Palmer*, no. 575, coll. of 1886. OAXACA: Sierra de San Felipe, altitude 3050 m., *C. G. Pringle*, no. 5664; same locality, altitude 2000 m., *Conzatti & González*, no. 507; Etna, altitude 1600 m., *Lucius C. Smith*, no. 963. STATE OF MEXICO: Vallée de Mexico, *Schaffner*, no. 375; Atusco, *L. Hahn*, 1865-1866; Salto de Agua, *C. A. Purpus*, no. 1712. VERA CRUZ: Zacuapan and vicinity, dry meadows, *C. A. Purpus*, no. 1925; Cordoba, *Bourgeau*, no. 1893; same locality, altitude 850 m., *Conzatti & González*, no. 1135. S. W. CHIHUAHUA: *E. Palmer*, year 1885, number missing. MEXICO: without locality, *Bilimek*, no. 296; *Uhde*, no. 945.

12. *C. nitricola*, n. sp., herbacea; caule basi ramoso piloso 2 dm. alto; foliis lineari-oblongis apice obtusis basi amplexicaulibus, integris 3-4 cm. longis 2-5 mm. latis, investis pilis basi subpapillosis; foliis superioribus et floralibus flores aequantibus vel floribus brevioribus ovatis vel spatulatis, apice obtusis glandulosis; floribus sessilibus in spicis angustis; calycis segmentis obtusis integris 6 mm. longis puberulente glandulosis; corolla calycem paulo superanti; galea acuta, dorso puberula exserta curvata, labium inferius duplo superanti, 7 mm. longo; labii laciniis membranaceis acuminatis 1.5 mm. longis; stigmatibus vix exserto capitato-emarginato; capsula ovato-acuminata. — SAN LUIS POTOSI: knolls of alkaline meadows, Hacienda de Angostura, 10 July, 1891, *C. G. Pringle*, no. 3756 (type, in hb. Gray). This was distributed as *C. scorzonifolia*, "a narrow-bracted form." It seems quite distinct, peculiar in the group in the erect divisions of the lower lip which somewhat resemble those of *C. mexicana*. The plant has a pallid fleshy appearance like many of the *Chenopodiaceae*. The lower part of the stem is marked by bunches of leaf-scales resembling tubercles like those on *C. communis* and *C. arvensis*. The flowers are ochroleucous.

13. *C. saltensis*, n. sp., herbacea sparse arachnoidea 1 dm. alta; caulibus 2-4 simplicibus; foliis radicalibus subrosulatis lineari-lanceolatis 1-1.5 cm. longis; foliis caulinis pinnatisectis, laciniis 3-5 divaricatis linearibus, imis saepe tantum longis quantum mediis; bracteis coloratis similibus foliis superioribus, laciniis latioribus; flori-

bus purpureis sessilibus in spicis brevibus; calyce 18 mm. longo, fisso 7 mm., laciniis obtuse lobatis vel profunde emarginatis binerviis arachnoideo-pilosis et glandulosis; corollae galea et labio inferiore calycem superantibus, priori 8 mm. longa, basi 3-4 mm. lata, apice acuta, dorso glandulari-puberulenti, antice purpurea membranacea; labio inferiore viridi protuberanti tridentato, dentibus obtusis incurvis infra triplicatis; stigmatibus exserto bilobato, apice styli curvato; capsula ovato-acuminata 1 cm. longa. — DUBANGO: near El Salto, altitude 2440-2600 m., 12 July, 1898, *E. W. Nelson*, no. 4553 (type, in hb. U. S. Nat. Mus., dupl. in hb. Gray). This is related to *C. Schaffneri* and *C. Pringlei*, but differs from all of the same alliance in general habit of growth, pubescence, and most especially in the lower lip of the corolla, which has the divisions separated by a plicate sinus that is often toothed at the top.

14. *C. PRINGLEI* Fernald, caulibus plurimis decumbentibus 3-6 cm. altis; foliis imis confertis et bracteiformibus ovatis 3-4 mm. longis, superioribus lanceolatis vel oblongo-lanceolatis simplicibus vel apice trilobatis pilosis 1.5-2 cm. longis; bracteis foliis similibus, laciniis angustis coloratis; calyce tubuloso 2.5-3.5 cm. longo, infra ochroleuco piloso, supra rubro puberulenti, segmentis 6-8 mm. longis obtuse bilobatis; corolla vix exserta, galea angusta pilosa, labio inferiore trisaccato, lobis 1 mm. longis. — Proc. Am. Acad. xl. 56 (1904). — HEDALGO: Sierra de Pachuca, *C. G. Pringle*, nos. 9647, 8666 (type, in hb. Gray); *Rose & Hay*, no. 5581. MORELOS: Mount Popocatepetl, *Rose & Hay*, no. 6022. Related to *C. Schaffneri* but with much larger flowers and densely pilose calyx.

15. *C. SCHAFFNERI* Hemsl., hirsuta scabrida basi ramosa, ramis vel caulibus erectis vel adscendentibus, 2.5-5 cm. altis densissime foliosis; foliis integris anguste linearilanceolatis subacutis ca. 2 cm. longis; bracteis trinerviis trifidis, lobis linearibus acutis, medio longiore; calycis lobis rotundatis vel obscure emarginatis; corollae galea paulo exserta, dorso hirsuta; labio inferiore tridentato. — Hemsl. l. c. 462, t. lxiii. B. f. 7-13 (1882). — STATE OF MEXICO: in the valley of Mexico, *Schaffner*, no. 373 (dupl. of type, in hb. Gray); Desierto Viejo, same region, *Bourgeau*, no. 874; Flor de Maria, *C. G. Pringle*, no. 3193; Mount Ixtaccihuatl, altitude 3355-3660 m., *C. A. Purpus*, no. 218. MORELOS: meadows about Tres Marias, altitude 2897 m., *C. G. Pringle*, no. 13,141.

Var. *cinerascens*, n. var., nana pallida foliosa cinerascens; caulibus ramosis caespitosis 1 dm. altis retrorse pilosis; foliis linearibus vel saepissime divaricate pinnatisectis, laciniis 3-5 attenuatis (media elongata) nervatis scabrido-hispidis; bracteis foliis superioribus similibus, apice ochroleucis puberulenti-glandulosis; calyce 1.5 cm. longo

fisso 7 mm., segmentis oblique emarginatis 4 mm. latis 4-nerviis scabrido-glandulosis; corollae galea calycem superanti 1.5 mm. lata 8 mm. longa, dorso puberulenti-glandulosa; labio inferiore paulo protuberanti triplicato, dentibus acutis; stigmatate exserto capitato; capsula elliptica acuta 1 cm. longa, in calyce inclusa. — PUEBLA: dry hills about Chalicomula, altitude 2592 m., 27 July, 1901, *C. G. Pringle*, no. 8545 (type, in hb. Gray); same locality, *Rose & Hay*, no. 5809.

16. *C. TOLUCENSIS* HBK., procumbens ramosa; caulibus vel ramis 5-6 cm. altis; foliis lanceolatis obtusis hispidis, inferioribus integris, superioribus apice trifidis, laciniis obtusis ca. 2 cm. longis; bracteis trifidis trinerviis, lobo intermedio oblongo obtuso, lateralibus linearibus intermedium subaequantibus; floribus 2 cm. longis sessilibus; calycis segmentis rotundatis; corollae galea vix exserta, dorso hirta; labio inferiore acute tridentato. — HBK. *Nov. Gen. et Spec.* ii. 329 (1817); Benth. l. c. 530; Mart. & Gal. l. c. 29; Hemsl. l. c. 463. — High mountains of southern MEXICO: Mt. Ixtaccihuatl, *C. A. Purpus*, no. 230; bare summits of Nevada de Toluca, *C. G. Pringle*, no. 4250; Mt. Orizaba, *Rose & Hay*, no. 5770. In hb. U. S. Nat. Mus. there is also a specimen collected by *E. W. Nelson* on Mt. Toluca.

17. *C. MORANENSIS* HBK. "caulibus suffruticosis, simplicibus, prostratis, pubescenti-hispidis; foliis lanceolatis, acutis, hispidis, integris, superioribus trifidis; floribus axillaribus, sessilibus; corolla calycem paulo superante; calycis lobis rotundatis emarginatis; corollae labio inferiori brevissimo, dentato." — HBK. *Nov. Gen. et Spec.* ii. 329 (1817); Benth. l. c. 530; Mart. & Gal. l. c. 30; Hemsl. l. c. 462. — There seem to be no specimens of this in hb. Gray. The type was collected in temperate localities between Pachuca and Moran, State of Hidalgo probably.

18. *C. nervata*, n. sp., herbacea, caulibus 1-5, 1-3 dm. altis divaricate pilosis et glandulare pubescentibus; foliis 3-5-nerviis, inferioribus oblanceolatis apice obtusis rectis integris 3-6 cm. longis, 1 cm. latis, superioribus oblongis apice obtusis basi angustatis et amplexicaulibus, floribus inferioribus sessilibus in axillis foliorum, superioribus confertis et occultis in spicis ornatis, bracteis obovatis 2-3 cm. longis apice coccineis; calyce 2 cm. longo 4 mm. lato vix corollam superanti, fisso 5 mm., segmentis 4-nerviis apice rotundatis; corollae galea 1 cm. longa dorso glandulari-pilosa, labio inferiore protuberanti trisaccato infra lacinias tuberculati-rugoso, laciniis exterioribus 3 triangularibus obtusis, interioribus 2 brevioribus sinus terminantibus; stylo stigmatateque exsertis; capsula oblique oblonga compressa 1 cm. longa. — CHIHUAHUA: vicinity of Madera, May to June, 1908, altitude 2250 m., *F. Palmer*, no. 274 (type, in hb. Gray). There is also in hb. Gray a fragmentary

specimen from the same region, *C. V. Hartman*, no. 150 (Lumboltz Exped.), which may be this species. *C. nervata* resembles *C. aspera* in the tuberculate-rugose sac-like lower lip of the corolla, but differs in having the segments of the calyx quite entire and in the glandular pubescence. The flowers are smaller and the capsules less ovoid. The strongly nerved leaves suggest *C. lithospermoides*, but otherwise it is quite different.

19. *C. CONZATTII* Fernald, "suffruticosa; caulibus simplicibus erectis glanduloso-puberulis; foliis linearibus vel lineari-lanceolatis, 3-5-nerviis, 2-7 cm. longis dense puberulis, inferioribus integris, superioribus pectinatis, laciniis linearibus patentibus; bracteis oblongis 1.5-2.5 cm. longis, summis coccineis trifidis, lobis lateralibus linearibus vel spatulatis, intermedio majore anguste obovato integro vel obsolete trilobo; pedicellis 1 mm. longis; calyce mediam tantum corollam paululo superante 1.5-1.8 cm. longo viridi et albo, antice et postice aequaliter fisso, lobis oblongis subtruncatis 5-6 mm. longis; corolla viridi et rubella 2.2-2.5 cm. longa, tubo 1.2-1.3 cm. longo, galea elongata, labii lobis obtusis 1 mm. longis." — Proc. Am. Acad. xliii. 67 (1907). — OAXACA: Santa Ines del Monte, Zimatlan, altitude 2700 m. *Conzatti*, no. 1360 (type, in hb. Gray); 25 km. southwest of City of Oaxaca, altitude 2287-2897 m., *E. W. Nelson*, no. 1368.

20. *C. rigida*, n. sp., perennis rigida recte sparseque ramosa 3 dm. alta; caulibus et foliis purpurascensibus albo-pubescentibus; foliis inferioribus oblanceolatis, ceteris lanceolatis apice obtusis basi non dilatatis ca. 3-4 cm. longis 2-5 mm. latis; floribus sessilibus in spicis elongatis; bracteis oblongis apice rotundatis vel acutis coccineis puberulis flores subaequantibus, basi pilosis 2-2.5 cm. longis 5-8 mm. latis; calyce fisso 1 cm., segmentis ca. 5 mm. latis, apice oblique truncatis, 4-nerviis coccineis puberulis; galea exserta 5 mm., dorso puberula viridi, antice membranacea coccinea; labio inferiore obtuso, lobis membranaceis, lateralibus oblique truncatis, medio deltoideo obtuso, 1 mm. longo et lato, sinibus crassis involutis; stylo exserto 3 mm., stigmatibus bilamellato; capsulis caulibus adpressis oblongo-cylindraceis acuminatis 15 mm. longis. — Hills near Chihuahua, 16 April, 1885, *C. G. Pringle*, no. 188, in part (type, in hb. Gray). As in *C. Conzattii*, to which this species is related, the flower after anthesis has a tendency to curve outward above the capsule.

21. *C. falcata*, n. sp., caule simplici recto 3-3.5 dm. alto glandulare puberulenti et tenuiter piloso rubro angulato; foliis oblongo-lanceolatis integris vel sparse et irregulariter laciniatis 2-2.5 cm. longis, basi 3-10 mm. latis dilatate et auriculate amplexicaulibus 3-5-nerviis glandulare pilosis; bracteis foliis latioribus et longioribus, inferioribus viri-

dibus, supremis apice coccineis; floribus sessilibus interruptis in spicis elongatis, falcatis bracteas superantibus; calyce fisso 12 mm., tubo anguste cylindrico piloso, segmentis dilatatis 4-5 mm. latis coccineis puberulentibus; galea et labio inferiore calycem superantibus; galea 1 cm. longa, basi 3-4 mm. lata, dorso viridi glandulare pilosa, antice coccinea membranacea; labio inferiore protuberanti trisaccato, dentibus acutis viridibus, sinibus implicatis cum plicaturis interioribus; stylo apice et stigmatate subclavato exsertis; capsula ovata oblique-acuminata. — PUEBLA: Mount Orizaba, altitude 3660 m., 14 Aug., 1901, *C. G. Pringle*, no. 8560 (type, in hb. Gray). This is related to *C. Conzattii*, differing in having much longer flowers, with segments of the calyx red instead of green. The falcate flowers spreading outwards resemble those of § *Hemichroma*, but the equally cleft calyx is that of § *Euchroma*. It is a showy species.

22. *C. HIRSUTA* Mart. & Gal., "caule fruticuloso humili ramoso dense hirsuto-villoso; foliis obovato-spatulatis 3-nerviis apice rotundatis integerrimis villosis scabris, corolla calycem coccineum longe excedente. — Folia  $\frac{1}{2}$ -pollicaria, flores pollicares. Dans les champs de Zacuapan, à 3000 pieds. Fl. rouge vif. Février-juillet." — Bull. Acad. Brux. xii. pt. 2, 29 (1845); Walp. Rep. vi. 651; Hemsl. l. c. 460; Greenman, Proc. Am. Acad. xli. 460. *C. obovata* Benth. l. c. 528. — HIDALGO: in a barranca below Trinidad Iron Works, altitude 1525 m., *C. G. Pringle*, no. 8935. Through the kindness of Dr. Prain, Director of the Royal Gardens at Kew, specimens under this number were compared with authenticated specimens in hb. Kew and reported as similar. There is a tendency in the specimens in hb. Gray to have incised dentate or lacinate leaves. Bentham placed this in § *Epichroma* on account of the somewhat ampliate calyx-limb. It is entirely unlike the other species in that section in habit, foliage, bracts, and flowers, and has the characteristic equally cleft calyx-divisions of § *Euchroma*, so in this synopsis it is included under the latter section.

23. *C. SCORZONERIFOLIA* HBK., simplex vel basi ramosa perennis; caulibus piloso-hispidis; foliis linearibus vel lanceolatis hispidulis; apice saepe angustatis; floribus spicatis sessilibus; bracteis oblongis acutis integris pilosis coccineis vel purpurascensibus florem subaequantibus; calycis segmentis coloratis emarginato-bidentatis; corolla calycem vix superanti; galea lineari dorso pilosa; labio inferiori quinque-dentato; stylo exserto filiformi; stigmatate capitato emarginato-bilobato; capsula oblonga compressa acuminata vel acuta. — HBK. Nov. Gen. et Spec. ii. 331, t. 165 (1817); Mart. & Gal. l. c. 29. *C. scorzoneraefolia* Benth. l. c. 529; Hemsl. l. c. 462. *C. speciosa* Mart. & Gal. l. c. 30 (1845). The following are in hb. Gray: — PUEBLA: Mt. Orizaba,

altitude 3350 m., *H. E. Seaton*, no. 208. SAN LUIS POTOSI: altitude 1830–2440 m., *Parry & Palmer*, no. 690, coll. of 1878; hillsides, Las Canoas, *C. G. Pringle*, no. 3066. STATE OF MEXICO: Nevada de Toluca, about timber-line, altitude 4000 m., *C. G. Pringle*, no. 4225; Sierra de Ajusco, *J. W. Harshberger*, no. 123 a. COAHUILA: Sierra de Parras, *C. A. Purpus*, no. 1051; Levios, 67 km. east of Saltillo, *E. Palmer*, no. 2026, coll. of 1880. NUEVO LEON: near Monterey, *C. G. Pringle*, no. 2236; north-east side of Volcano Colima, *P. Goldsmith*, no. 80 a. DURANGO: Otinapa, *E. Palmer*, no. 367, coll. of 1906, in part. Mexico without locality: *Dr. J. Gregg*, no. 407. The following have been examined from hb. U. S. Nat. Mus. — Mount Orizaba, *E. W. Nelson*, no. 282, *Rose & Hay*, no. 5741. TAMAULIPAS: mountains near Miquihuana, altitude 2135–2745 m., *E. W. Nelson*, no. 4485. This is a showy plant, distinguished from allied species by the pilose pubescence (somewhat glandular only on the inflorescence) and by the five-toothed lower lip of the corolla. The species may prove to be an aggregate when more fully understood. The forms with strictly acuminate capsules do not seem exactly similar to those with capsules subtruncate to acute, but the material has not been sufficient to warrant a division.

24. *C. GLANDULOSA* Greenman, annua vel perennis basi indurata, pilosa et glandulari-pubescentis; caulibus simplicibus rectis 1–3 dm. altis; foliis viridibus vel purpurascensibus sessilibus, paulo basi dilatatis et amplexicaulibus, lanceolato-attenuatis 1.5–5 cm. longis 1–6 mm. latis, acutis integris et saepe crispe undulatis trinerviis; floribus sessilibus et confertis 2–2.8 cm. longis in spicis ornatis 2–18 cm. longis, floribus inferioribus distantibus; bracteis inferioribus lanceolato-acuminatis foliaceis, superioribus oblongis apice rhomboideis coccineis vel flavis saepe flores superantibus; calyce fisso 8 mm., segmentis obtusis vel vix emarginatis; corolla 2–2.7 cm. longa calycem superanti 3–5 mm., galea recta 7–9 mm. longa dorso viridi glandulari-puberulenti, antice alba membranacea; capsula ovoidea acuminata 10–12 mm. longa. — *Proc. Am. Acad.* xli. 247 (1905). — STATE OF MEXICO: hills near Lecheria Station, altitude 2200 m., *C. G. Pringle*, no. 10,000 (type, in hb. Gray); hills above Santa Fé, altitude 2440 m., *C. G. Pringle*, no. 7979; *Schaffner*, no. 322. DURANGO: Otinapa, *E. Palmer*, no. 367, coll. of 1906, in part; City of Durango, *E. W. Nelson*, no. 4601. OAXACA: Sierra de San Felipe, altitude 3140 m., *C. G. Pringle*, no. 4722, in part; 10 km. above Domingullo, altitude 1980 m., *E. W. Nelson*, no. 1644; summit of Mt. Zempoaltepec, altitude 3470 m., *E. W. Nelson*, no. 626 (hb. U. S. Nat. Mus.); Sierra de Tápalo, altitude 2500 m., *González & Conzatti*, no. 759 (doubtful).



HIDALGO : Ixmiquilpan, mountain slopes, *C. A. Purpus*, no. 1411 a ; Sierra de Pachuca, altitude 2897 m., *C. G. Pringle*, no. 7618, in part ; hills near Julianaciugo, *C. G. Pringle*, no. 13,278. PUEBLA : Mt. Orizaba, *Rose & Hay*, no. 5686. SAN LUIS POTOSI : in montibus San Miguelito, *J. G. Schaffner*, no. 741 ; *Parry & Palmer*, no. 691. COAHUILA : north-east side of Mt. Colima, *P. Goldsmith*, no. 80. Seemann's plant from northwest Mexico is doubtfully included. These specimens probably represent an aggregate of perhaps two or more species which it seems impossible with the present knowledge to segregate. The line between this species and the preceding is not very clear. It is somewhat doubtful in the light of present investigation how much weight is to be placed on the form of the lower lip of the corolla. The above specimens are all characterized by a lower lip with three teeth incurving in age, separated by a broad infolding sinus, so that when it is spread, open the teeth are quite separated. *C. scorzonerifolia* has the teeth of the lower lip rather close and the sinus marked by smaller teeth. The indumentum of *C. glandulosa* is in general pilose, but there is also present a close glandular pubescence or almost puberulence, the glands under a lens appearing shortly and finely stipitate. The leaves are somewhat variable, though the typical specimens in each species have rather long acuminate leaves. Some specimens included among the above have obtuse leaves not at all acuminate.

25. *C. cryptandra*, n. sp., pilosa et hirsuti-scabrida, striata ; foliis superioribus ovatis acuminatis integris 3-5-nerviis, apice obtusis, basi cordato-amplexicaulibus, nerviis hispido-scabridis ; spicis coccineis, floribus confertis breviter pedicellatis, bracteis obovatis coloratis flores superantibus, 3 cm. longis, 1-1.5 cm. latis integris apice rotundatis ; calyce fissio 1 cm., 2.5 cm. longo, laciniis obtuse bilobatis 4 mm. longis, glandulari-pilosis ; galea paulo calycem superanti dorso pilosa et glandulosa ; stylo curvato exserto, stigmatate clavato ; capsula compressa ovato-acuminata. — COLIMA : Cuchilla, northeast side of Volcano Colima, 22 July, 1905, *P. Goldsmith*, no. 76 (type, in hb. Gray). — This is a showy species related to *C. scorzonerifolia*, differing in its more veiny leaves, coarse and rough pubescence, and in having the lower lip of the corolla with three instead of five teeth. It is also related to *C. lithospermoides*, but the bracts are much larger, almost completely concealing the flowers.

26. *C. LITHOSPERMOIDES* HBK., caule recto simplici piloso-hispido ; foliis lanceolato-linearibus, apice angustatis et obtusis, integris valde trinerviis piloso-hispidis ca. 5-7 mm. latis 3-6 cm. longis ; floribus spicatis sessilibus ; bracteis apice dilatatis rubicundis flores excedentibus ; calycis segmentis bilobatis, lobis rotundatis ; corolla albida vix calyce

longiore; galea dorso pubescenti; labio inferiore brevissimo tridentato, dentibus incurvis; stylo exserto, stigmatе capitato-emarginato; capsula ovata vix acuta. — HBK. Nov. Gen. et Spec. ii. 331, t. 164 (1817); Benth. l. c. 530; Mart. & Gal. l. c. 28; Hemsl. l. c. 461. *C. angustifolia* Mart. & Gal. l. c. 29 (1845) is considered a synonym of this, but the name is preoccupied. The range of this species, if all that seem to agree with the description and authenticated specimens are correctly identified, is from South America to N. W. Mexico. The type was collected probably in the State of Hidalgo near Real del Monte. Specimens in hb. Gray. — JALISCO: Guadalajara, *C. G. Pringle*, nos. 2565, 9348, 9461. OAXACA: Santa Domingo, *E. W. Nelson*, no. 2679. ORIZABA: San Cristobal, *Bourgeau*, no. 2904; N. W. Mexico, *Schumann*. There is also included no. 4168, collected by *C. G. Pringle* in Michoacan, distributed as *C. angustifolia* Mart. & Gal.

27. *C. Nelsonii*, n. sp., suffrutescens; caulibus simplicibus 3–4 dm. altis striatis glabrescentibus; foliis ovato-acuminatis 3–5-nerviis auriculati-amplexicaulibus apice obtusis integris 5–7 cm. longis 1.5–2 cm. latis desuper glabris, nerviis inferioribus puberulentibus; spicis coccineis investis pilis longis, albis, floribus confertis, bracteis apice dilatatis integris et undulatis vel obtuse et breviter lobatis calyces superantibus; calyce 18 mm. longo, 7 mm. lato ad 1 cm. fisso, laciniis inaequale et obtuse bilobatis; galea recta tubum aequanti, calycem superanti, dorso glandulari-puberulenti; labio inferiore triplicato, laciniis 3 rectis acuminatis; stylo curvato exserto; stigmatе capitato obscure emarginato; capsula ovata acuminata compressa. — SOUTHWEST CHIHUAHUA: Mount Mohinora, 1 September, 1898, *E. W. Nelson*, no. 4895 (type, in hb. U. S. Nat. Mus. and hb. Gray). This species is related to *C. scorzonnerifolia*, but differs in having much larger almost smooth leaves. The corolla is dissimilar, with three rather long acuminate divisions instead of five short teeth. *C. Nelsonii* is a showy plant with a large subcapitate spike of scarlet bracts and flowers terminating the tall stems.

28. *C. LANATA* Gray, tomentosa floccosa simplici denso undique incana; foliis linearibus integerrimis, floralibus nunc trifidis apice coloratis; spicis demum interruptis; calycis lobis obovato-oblongis integerrimis retusisve. — Gray in Torr. Bot. Mex. Bound. Surv. 118 (1859); Gray, Synop. Fl. N. Am. ii. pt. 1, 298; Hemsl. l. c. 461. — The type (in hb. Gray) was collected along and near the Rio Grande river from Eagle Pass to El Paso. COAHUILA: Saltillo, *E. Palmer*, no. 76, coll. of 1898, and no. 990, coll. of 1880; *C. C. Parry*, no. 20; near Diaz, *C. G. Pringle*, no. 9032, and Carneros Pass, no. 3192. NORTHERN ZACATECAS: Cedros, *F. E. Lloyd*, no. 102. San Luis Potosi to San Antonio, Texas, *C. C. Parry*, no. 689.

29. *C. GUADALUPENSIS* Brandegee, frutescens intricate ramosa, 2-3 dm. alta; caulibus senioribus glabris atris, junioribus tomentosis; foliis anguste spatulatis 15-18 mm. longis, 2-4 mm. latis dense tomentosus; calycis segmentis tubum aequantibus; galea calycem paulo superanti tubum aequanti; labio inferiore brevissimo tridentato. — Zoe, v. 166 (1903). — Guadalupe Island off the coast of Lower California, A. W. Anthony, 1896 (type, in hb. Univ. Calif.), Harry Drent, 1898, Dr. E. Palmer, no. 59 (coll. of 1875). This species is related to *C. foliolosa*, but is more intricately and divaricately branched. The stems are harder and more woody, while the leaves are longer and narrower at base. In Dr. Palmer's specimen the longest leaves are 6 cm. long and the broadest almost 1 cm. wide. It is a younger and more vigorous shoot than the type, which has been examined through the kindness of T. S. Brandegee and H. M. Hall.

30. *C. INTEGRATA* Gray, perennis; caulibus tomentosus, basi, ramosis 3-7 dm. altis; foliis lineari-lanceolatis tomentulosus integris 3-8 cm. longis 4-8 mm. latis; floribus sessilibus in spicis brevibus demum elongatis; bracteis oblongis obovatis coccineis subpetaloideis floribus paulo brevioribus; calyce 2-3 cm. longo colorato, lobis bifidis lanceolatis obtusiusculis; corolla viridi-coccinea ca. 1.6 cm. longa; labio inferiore brevissimo. — Torr. Bot. Mex. Bound. Surv. 119 (1859); Gray, Synop. Fl. N. Am. ii. pt. 1, 298; Hemsl. l. c. 461. *C. tomentosa* Gray in Torr. Bot. Mex. Bound. Surv. 118 (1859). — CHIHUAHUA: near Colonia Garcia, Sierra Madre, altitude 2287 m., Townsend & Barber, no. 448; Santa Eulalia Mts., C. G. Pringle, no. 226; hills near Chihuahua, Palmer, no. 87, coll. of 1908; Puerto de San Diego, altitude 1982 m., C. V. Hartman, no. 598 (Lumholtz Exped.). SONORA: Mabibi, Geo. Thurber, no. 438 (type of *C. tomentosa*). In hb. U. S. Nat. Mus. are specimens from Chihuahua, Sierra Madre, E. W. Nelson, no. 6495.

31. *C. aspera*, n. sp., suffruticosa; caulibus simplicibus sparse pilosis et scabrido-puberulentibus angulatis rectis 3 dm. altis vel majoribus; foliis oblongis trinerviis scabrido-hispidis 4 cm. longis 5-10 mm. latis, apice obtusis vel acutis; bracteis inferioribus foliis similibus, flores superantibus, superioribus brevioribus apice margineque coloratis quam flores brevioribus; calyce 2.2 cm. longo subaequaliter in altitudinem 8 mm. fisso, segmentis bilobatis, lobulis subulatis 5 mm. longis, tubo nervato; corollae galea calycem superanti 1-2 mm. obtusa, dorso glandulare puberulenti; labio inferiore trisaccato rugoso-tuberculato, laciniis viridibus, media incurva bicarinata acuta, lateralibus latioribus dentatis; stylo exserto curvato, stigmatate capitato; ovario oblique acuminato. — CHIHUAHUA: near Colonia Garcia, Sierra Madre, altitude

2287 m., 3 June, 1899, *Townsend & Barber*, no. 449 (type, in hb. Gray), also no. 250; same locality, *E. W. Nelson*, nos. 6227, 6101 (hb. U. S. Nat. Mus.). DURANGO: Otinapa, *E. Palmer*, no. 367 in part, July–August, 1906. The two equal segments of the calyx place this in *Euchroma*, but these parts are sharply cleft as in *Hemichroma*. The lower lip of the corolla resembles that of *C. nervata*.

32. *C. ctenodonta*, n. sp., perennis glandulari-pilosa; rhizoma gracili; caule simplici recto gracili 2–3.5 dm. alto; foliis infimis non rosulatis sed imbricatis lanceolatis integris trinerviis 3 cm. longis 5 mm. latis, apice acuminatis; foliis ceteris imbricatis vel distantibus lanceolato-acuminatis pectinatis cum lobulis filiformibus 1–5 mm. longis distantibus 2–8 mm., saepe pectinato-dentatis, basi cordato-amplexicaulibus et paulo decurrentibus; spicis capitatis non-numquam pedunculatis et demum elongatis; bracteis supremis pectinatis vel anguste laciniatis quam flores brevioribus, apice coccineis; floribus sessilibus paucis subdivaricatis; calyce coccineo nunc paulo longiore nunc corolla brevior, segmentis acuti 1–2 mm. in altitudinem bifidis; corollae galea obtusa, exserta 4–7 mm. dorso barbata; labio inferiore non viso; stylo exserto 1–2 mm. gracili; stigmatibus clavatis integro; capsula elliptica acuta. — OAXACA: wet meadows, Sierra de Clavellinas, altitude 2745 m., 16 October, 1894, *C. G. Pringle*, no. 4986 (type, in hb. Gray). — This number was distributed as *C. pectinata*, but cannot be that shrubby plant, nor is it to be classed in the same alliance. It more nearly approaches *C. patriotica*, but differs from that well-marked species in leaves, pubescence, and flowers. It is a more slender plant with simple stems. There are features which ally it to *C. minor*, such as, the narrow segments of the calyx-divisions, the slender red-tipped divisions of the uppermost bracts, and the conspicuously colored lower lip of the corolla. The leaves are typically pectinate with the rachis lanceolate. It is doubtfully placed in *Euchroma*.

33. *C. BRYANTI* Brandegee, annua 1.5–3 dm. alta divaricate pilosa ramosa, ramulis gracilibus rectis; foliis inferioribus linearibus integris, ceteris pinnatisectis, laciniis 3–7 linearibus acutis; floribus spicatis apice confertis infra elongatis et interruptis; bracteis similibus foliis superioribus, apice coccineis vel ochroleucis; calycis segmentis 7–9 mm. longis 2–3 mm. in altitudinem bisectis, laciniis lanceolatis; corolla calycem aequanti 15–18 mm. longa, galea brevi, labii inferioris lobis brevibus incurvatis; capsula oblongo-cylindracea vel subellipsoidea 1 cm. longa. — Proc. Cal. Acad. ser. 2, ii. 192 (1889), iii. 157. — In habit of growth and foliage this species resembles *Orthocarpus*, but the flowers are those of *Castilleja*, approaching *C. affinis*, though much smaller and less exserted. The pods are different from those of any

other species, being much narrower, approaching those of *C. minor*. The lower part of the stem is very leafy, the leaves becoming 1 dm. long, the rachis and divisions 0.5–2 mm. broad. The type and all specimens are in hb. Univ. Calif. except a small part of a flowering branch in hb. Gray and perhaps also in hb. U. S. Nat. Mus., collected by Lyman Belding no. 4, at Laguna, Lower California, altitude 915 m. The specimens from hb. Univ. Calif. were kindly loaned by T. S. Brandegee and H. M. Hall. The species has been found only in Lower California and at the following localities: San Jorge, San Estaban, Sierra de Laguna, Sierra de San Francisquito, San Jose del Cabo.

34. *C. AFFINIS* H. & A., perennis herbacea; caule simplici piloso-hispido 3–6 dm. alto; foliis lineari-lanceolatis trinerviis integris raro pinnatisectis; floribus subracemosis, inferioribus pedunculatis, superioribus confertis; bracteis similibus foliis brevioribus; calycis segmentis acute bilobis; corolla calycem superanti et valde divaricate exserta; labio inferiore exserto protuberanti. — Bot. Beech. 154 (1833); Benth. in DC. Prodr. x. 532; Gray in Bot. Cal. i. 573, and Synop. Fl. N. Am. ii. pt. 1, 296; Hemsl. l. c. 460. — This species is distinctively Californian and peculiar to the coast region. It varies extremely in foliage and flowers but can scarcely be divided into varieties. The Mexican specimens in hb. Gray are all from the coast of Lower California, — Todos Santos Island, *A. W. Anthony*, no. 198; San Quentin, *E. Palmer*, no. 642, coll. of 1889.

35. *C. MINOR* Gray, annua vel perennis glandulosa et sparse pilosa; caulibus simplicibus vel ramosis 1–plurimis 3–6 dm. altis gracilibus foliosis; foliis anguste linearibus apice attenuatis 2–5 cm. longis; floribus racemosis, pedicellis brevibus filiformibus rectis; bracteis terminalibus fasciculatis apice coloratis anguste linearibus et attenuatis; calyce subfalcato in altitudinem 1.5 cm. fisso, laciniis 2 filiformibus 1–5 mm. longis; galea et labio e fissura exsertis, galeae dentibus triangularibus coccineis exsertis; capsula anguste ovoideo-cylindracea acuta. — Gray in Bot. Cal. i. 573 (1876), and Synop. Fl. N. Am. ii. pt. 2, 295. *C. affinis*, var. *minor* Gray in Torr. Bot. Mex. Bound. Surv. 119. *C. affinis* Seemann, Bot. Voy. Herald, 323, not H. & A. — NEW MEXICO: beds of exsiccated streams near the copper mines, *Wright*, no. 1494 (type, in hb. Gray). CHIHUAHUA: *C. V. Hartman*, no. 583 (Lumboltz Exped.); *Bigelow*; *Wright*, no. 1493; Presidio del Norte, *Schott*. SONORA: Los Animas, *Thurber*, no. 330; Tubac, *Parry*; Santa Cruz Mountains, *Captain E. K. Smith*. N. W. Mexico, *Seemann*, distributed as *C. affinis*. This species has more slender flowers than its allies. At the summit of the stem the bracts and flowers are

closely clustered, the ribbon-like bracts surpassing the flowers; later the flowers become rather distant on the flowering axis.

36. *C. MEXICANA* (Hemsl.) Gray, annua vel biennis nana 7-15 cm. alta hirsuta; caulibus dense foliosis; foliis pinnatifidis sessilibus, lobis linearibus utrinque saepius 2; floribus sessilibus 5-6 cm. longis rectis, post anthesim divaricatis; bracteis calyce brevioribus basi latis trinerviis, alte trilobatis, lobis linearibus obtusiusculis, lateralibus paulo brevioribus; calycis lobis viridibus, laciniis anguste linearibus non-numquam idem bifidis; corolla calycem triplo superanti gracili puberula; labiis subaequalibus inferiore tripartito basi obscure saccato. — Gray in Proc. Am. Acad. xxi. 404 (1886). *Orthocarpus mexicanus* Hemsl. Biol. Cent.-Am. Bot. ii. 463, t. 63 A. f. 1-6 (1882). — The type is in hb. Kew and was collected in Zacatecas, North Mexico, by Coulter. COAHUILA: Sierra Pata Galana, *C. A. Purpus*, no. 1050; Saltillo, *E. Palmer*, no. 530, coll. of 1905; 992 and 993, coll. of 1880, also no. 13, coll. of 1898; same locality, *C. C. Parry*, no. 20½. NUEVO LEON: near Monterey, altitude 610 m., *C. G. Pringle*, no. 10,156. SAN LUIS POTOSI: San Miguelito Mountains, *Dr. J. G. Schaffner*, no. 82. CHIHUAHUA: on rocky hills near town, *C. G. Pringle*, no. 209; Pueblo de Galleana, no. 657, and Puerto de St. Diego, *C. V. Hartman*, no. 631 (Lumholtz Exped.). *C. sessiliflora* Pursh is excluded as all specimens seen appear to be *C. mexicana*. The two are very closely related.

37. *C. auriculata*, n. sp., suffruticosa canescens pilosa et glandulosa; caulibus ramosis; ramis ascenduntibus; foliis imbricatis anguste deltoideis acutis vel apice obtusis, basi auriculate amplexicaulibus, integris 1-3 cm. longis 5-15 mm. latis, palmate trinerviis, nervio medio distinctissimo, cinereis scabridis cum glandulis et pilis glandulosis; floribus imbricate spicatis; bracteis foliis similibus, supremis coloratis; spicis confertis, floribus subsessilibus; calyce 2.5 cm. longo antice in altitudinem 2.5 cm., postice 7 mm. fisso, laciniis integris vel bidentatis, 2-3-nerviis; corolla 3.7 cm. longa, galea paulo tubo longiore, antice membranacea, dorso glandulosa, exserta 5-10 mm.; labii inferioris lobis 3, exterioribus linearibus acutis 3 mm. longis paulo medium excedentibus sinus intus plicatis; stylo exserto; stigmate clavato apice capitato et obscure emarginato; capsula rhomboideo-orbiculata acuminata compressa 1 cm. longa. — Between Huajuapán, OAXACA, and Retlatzingo, PUEBLA, November 19, 1894, *E. W. Nelson*, no. 1992 (type, in hb. Gray and duplicate in hb. U. S. Nat. Mus.). This species is nearest to *C. longiflora*, differing most noticeably in its broader, conspicuously auriculate, closely imbricated leaves. The flowers are more erect and the corolla in anthesis more in a line with the calyx.

38. *C. LONGIFLORA* Kunze, "caule suffruticoso, tenui, erecto, imprimis

basi ramoso, foliis, inferioribus suboppositis, horizontalibus deflexisve, e basi amplectente dilatato-auriculata linearibus acuminatis, superioribus latioribus, omnibus trinerviis; bracteis ovato-acuminatis, trinerviis, pallidis, summo apice lateritiis, divergenti-divaricatis; floribus brevissime pedunculatis terminalibus, subracemosis, paucis, calycis tubulosi compressi lobis elongatis, bidentatis (aurantiis), corolla longe exserta, labio superiori attenuato, obtuso, recto (apice rubello), inferiore minuto, bi-, rarius trifido, lobis porrectis, obtusis, stylo parum exserto." — *Linnaea*, xvi. 312 (1842); *Mart. & Gal.* l. c. 28; *Benth.* l. c. 533; *Hemsl.* l. c. 461. — PUEBLA: near Tehuacan, altitude 1700 m., *C. G. Pringle*, no. 9517, *C. A. Purpus*, no. 1287, *Rose & Hay*, no. 5844 (hb. U. S. Nat. Mus.); also in calcareous soil, altitude 1677 m., *C. G. Pringle*, no. 6250. MICHOACAN: Las Reyes, *E. W. Nelson*, no. 6859; Volcano Jorullo, *E. W. Nelson*, no. 6949. OAXACA: valley of Oaxaca, alt. 1675-2290 m., *E. W. Nelson*, no. 1459 in part (hb. U. S. Nat. Mus.).

39. *C. subalpina*, n. sp., perennis herbacea; rhizomatibus ligneis gracilibus; caulibus 3 dm. altis simplicibus angulatis albo-pilosis; foliis lanceolatis apice acutis basi auriculati-amplexicaulibus 2.5-3.5 cm. longis ca. 5 mm. latis trinerviis sparse pilosis et dense scabrido-puberulis et obscure glandulosis; foliis floralibus quam caulina paulo latioribus apice nunc coloratis nunc viridibus; floribus rectis subsessilibus in spicis demum elongatis; calyce 3 cm. longo piloso antice 2 cm. postice 16 mm. in altitudinem fissio; segmentis pilosis coccineis acute bidentatis; corolla recta 4 mm. longa, galea obtusa 2 mm. longa, dorso barbata, antice rubra membranacea, labio inferiore brevi protuberanti, laciniis incurvis ovato-subulatis brevibus, sinibus similibus glandulis, stylo filiformi exserto 5 mm.; stigmatibus clavatis; capsula ovato-acuminata cauli adpressa, 12 mm. longa. — OAXACA: Sierra de San Felipe, altitude 3140 m., 26 June, 1894, *C. G. Pringle*, no. 4722 in part, distributed under *C. scorzonifolia* HBK. (type, in hb. Gray). It belongs near *C. longiflora* but has different pubescence, and generally longer and narrower leaves. The flowers are more slender and less crowded than in the other species and generally more erect.

40. *C. tenuiflora* Benth., fruticosa scabrido-pubescentia ramosa vel simplex; foliis linearibus vel lanceolatis basi amplexicauli-dilatatis integris; floribus spicatis; bracteis lanceolatis acutis, supremis apice coloratis quam folia latioribus; calyce elongato acute 2-4-dentato; corollae galea elongata; labio inferiore protuberanti, lobis brevibus subulato-acuminatis, primum inflexis demum reflexis. — *Pl. Hartweg*, 22 (1839); *DC. Prodr.* x. 533; *Hemsl.* l. c. 463; *Loesen.* l. c. 285. — The following Mexican specimens are in hb. Gray unless otherwise

indicated: *Hartweg*, no. 191, type; *Coulter*, no. 1354. STATE OF MEXICO: Tacubaya (Tokabaya), *Bilimek*, no. 288; Sierra de Ajusco, 2592 m. alt., *C. G. Pringle*, nos. 9476 and 11,063; Chapultepec, *C. G. Pringle*, no. 1472; valley of Mexico, *Bourgeau*, no. 125. OAXACA: Cerro San Felipe, *E. W. Nelson*, no. 1146; also in hb. U. S. Nat. Mus. nos. 1166 and 1076; west slope of Mount Zempoaltepec, 2300–2440 m. alt., *E. W. Nelson*, no. 559, hb. U. S. Nat. Mus.; near Reyes, *E. W. Nelson*, no. 1735, hb. U. S. Nat. Mus. COAHUILA: 9.6 km. east of Saltillo, *E. Palmer*, no. 991, April, 1880; San Lorenzo Cañon, *E. Palmer*, no. 415, coll. of 1904. HIDALGO: Ixmiquilpan, *C. A. Purpus*, no. 1411; Sierra de Pachuca, *Rose & Hay*, no. 5582. PUEBLA: San Martin, *E. W. Nelson*, no. 8, and on same sheet without separate numbers is a specimen from Mexico and another from Vera Cruz, hb. U. S. Nat. Mus.; in plaza near Calchicomula, *Rose & Hay*, no. 5807; near town of Puebla, *Lucius C. Smith*, no. 905. JALISCO: Guadalajara, *E. Palmer*, no. 265, July, 1886; *C. G. Pringle*, no. 8763. MICHOACAN: north slopes of Mount Patamban, 2897–3355 m. alt., *E. W. Nelson*, no. 6587; *C. & E. Seler*, no. 1281, SAN LUIS POTOSI: *E. Palmer*, no. 724, coll. of 1898; no. 88, coll. of 1902; *Parry & Palmer*, no. 692, coll. of 1878. MORELOS: Tres Marias Mountains, *C. G. Pringle*, no. 11, 647. SONORA: Huchuerachi, 1220 m. alt., *C. V. Hartman*, no. 299, and *F. E. Lloyd*, no. 436 (Lumholtz Exped.). VERA CRUZ: Mount Orizaba, 2745 m. alt., *H. E. Seaton*, no. 160; Boca del Monte, *E. W. Nelson*, no. 194, hb. U. S. Nat. Mus. STATE OF MEXICO: Mount Popocatepetl, *Rose & Hay*, no. 6063; foot-hills of Mount Ixtaccihuatl, *Chas. C. Deam*, no. 19; Cholula, *Chas. C. Deam*, no. 85.

41. *C. CANESCENS* Benth., suffruticosa ramosa canescenti-hispida; foliis linearibus lanceolatisve basi dilatato-amplexicaulibus, floralibus latioribus acutis, summis rarius apice coloratis; spicis confertis; calyce elongato hinc fisso, postice obtuso vel acute 2–4-dentato, corollae galea elongata, labii lobis brevibus obtusis vel acutiusculis. — Benth. in DC. Prodr. x. 533 (1846); Seem. Bot. Voy. Herald, 323; Hemsl. l. c. 460. — It is doubtful if this species can be maintained as distinct from the preceding, though certainly *Hartweg*, no. 191 (*C. tenuiflora*), and *Andrieux*, no. 156 (*C. canescens*), specimens cited by Bentham and represented in hb. Gray, are dissimilar, as is indicated in the above key. The flowers seem alike in the dried specimens, though perhaps those of *C. canescens* spread more widely from the flowering axis. The following are in hb. Gray, — SAN LUIS POTOSI: *Parry & Palmer*, no. 688, coll. of 1878; in the mountains of San Miguelito, *Schaffner*, no. 740, also near town of San Luis Potosi, no. 739. OAXACA: Cerro San Felipe, *C. Conzatti*, no. 689½, April, 1898; Huaquilla, Nochixtlan, alt. 2000 m.,



*Conzatti & González*, no. 1225; San Juan del Estado, 1920 m. alt., *Lucius C. Smith*, no. 407. CHIHUAHUA: near Batopilas, *E. A. Goldman*, no. 195. DURANGO: vicinity of city, *E. Palmer*, nos. 114 and 648, coll. of 1896. VERA CRUZ: Orizaba, *Botteri*, nos. 590 and 431. STATE OF MEXICO: Tacubaya, *W. Schumann*, no. 1013; near Toluca, *G. Andrieux*, no. 156; Vallée de Mexico, *E. Bourgeau*, no. 104. GUANAJUATO: Guanajuato, *A. Dugès*, no. 388. N. W. Mexico, *Seemann*: Mexico without locality, *Dr. J. Gregg*, nos. 434 and 610.

42. *C. xylorrhiza*, n. sp., perennis, investa pilis albis crispis simplicibus vel basi furcatis; radice lignea crassa; caulibus pluribus basi ramosis, supra simplicibus rectis 1.5-2 dm. altis (gracilibus in specimine viso sed anni praecedentis caulibus ligneis grandis); foliis lanceolatis trinerviis 2-3 cm. longis, 2-3 mm. latis, apice acutis, basi obscure auriculatis; floribus breve pedicellatis divaricatis in spicis brevibus confertis, bracteis floribus brevioribus similibus foliis; calyce 2.5 cm. longo, basi ventricoso, laciniis bidentatis; corolla 3.5 cm. longa, galea exserta 5-15 mm., dorso glandulari-pubescenti; labio inferiore protuberanti acuminato-tridentato, sinubus inter dentes angustis crassis, similibus glandibus; stylo filiformi exserto, stigmatate integro clavato; capsula oblonga, basi et apice acuminata, compressa, 1.5 cm. longa. — COAHUILA: Sierra Encarnación, 28 July, 1896, *E. W. Nelson*, no. 3895 (type, in hb. Gray). This species is related to *C. tenuiflora*, differing in the peculiar pubescence, the habit of growth, and fewer-flowered more capitate spikes.

43. *C. scabridula*, n. sp., suffruticosa scabriduli-puberulens ramosa alta; foliis lineari-lanceolatis apice acutis vel obtusis basi rotundatis vel rarissime auriculatis, trinerviis 2-3 cm. longis, 2-5 mm. latis; foliis floralibus latioribus et brevioribus; floribus breve pedicellatis, junioribus in spicis capitatis, senioribus in racemis; pedicellis filiformibus 3-5 mm. longis; bracteis supremis attenuatis apice coccineis; calyce basi obliquo tubuloso 3 cm. longo, in altitudinem postice 6 mm., antice 2 cm. fisso, segmentis acuminato-laciniatis glandulari-puberulentis, superiore parte coccinea, inferiore psittacina; corollae galea exserta 15 mm., obtusa sed lateraliter emarginata, 2 cm. longa, apice 2 mm. lata, basi 5 mm.; labio inferiore atro-rubro exserto et protuberanti 1 mm., laciniis lineari-acuminatis 1 mm. longis, exterioribus divaricatis, media incurvata, sinubus crassis; stigmata fere exserto clavato; ovario ovato-acuminato. — DURANGO: Tejaman, August, 1906, *E. Palmer*, no. 468 (type, in hb. Gray). Dr. Palmer notes this as one of the showiest of plants, with flowers bright yellow and scarlet. It grows in compact masses on stony hills among other plants, but is not common. The stems are brittle and the plant is not eaten by

animals. It is related to *C. linariaefolia*, but differs in its shorter tri-nerved leaves, its pubescence, its pedicellate flowers, and the peculiar lower lip of the corolla, which stands out like a small shelf and must be very conspicuous in the living flower, its dark red contrasting strongly with the light red and yellowish green of the other parts of the flower and bracts.

44. *C. LAXA* Gray, herbacea cinereo-pubescentis; caulibus e radice perennis subdivisis ramosis gracilibus; foliis tenuibus scabridis linearilanceolatis integerrimis basi haud dilatatis, floralibus calyce brevioribus rubro-coloratis; floribus paucis confertis breviter pedicellatis; calyce rubello antice profundius postice breviter fisso, dentibus brevibus obtusis; corollae galea magna, lobis labii inferioris brevissimis obtusis. — Gray in Torr. Bot. Mex. Botand. Surv. 119 (1859); Gray, Synop. Fl. N. Am. ii. pt. 1, 296; Hemsl. l. c. 461. — SONORA: mountain sides near Santa Cruz, Wright, no. 1490; Los Pinitos, altitude 1830 m., *C. V. Hartman*, no. 142 (Lumboltz Exped.). DURANGO: San Ramon, *E. Palmer*, no. 59, coll. of 1906. ARIZONA: Santa Catalina Mts., *J. G. Lemmon*, no. 264. There is an abnormal specimen collected at Alamos in 1890, by *E. Palmer*, no. 366.

45. *C. STENOPHYLLA* Jones, suffruticosa 6 dm. alta ramosissima, ramulis rectis subcinereis; foliis subfiliformibus obtusis 2-5 cm. longis; floribus rectis in spicis capitatis demum elongatis; bracteis oblongis acutis nervatis integris vel laciniatis, laciniis lateralibus paucis linearibus brevibus, media lata; calyce 2 cm. longo, postice in altitudinem 5 mm. fisso, segmentis irregulariter acuminatis vel laciniatis; corolla calycem superanti 3 mm., galea basi 3 mm. lata, apice 1 mm., dorso glandulosa; labio inferiore triplicato, lobis subulatis incurvatis 1 mm. longis; capsula oblongo-ovata 1.5 cm. longa. — Contributions to Western Botany, xii. 67 (1908). The type was collected at Garcia and in San Diego cañon, Sierra Madre, CHIHUAHUA, September, 1903 (hb. Marcus E. Jones). The specimens in hb. Gray are from Colonia Garcia, altitude 2287 m., *Townsend & Barber*, no. 209, also *E. W. Nelson*, no. 6210 a, in part. According to Marcus E. Jones, the flowers have a green back and red face. At almost all the leaf-axils there are small sterile branchlets slender and very leafy.

46. *C. LONGIBRACTEATA* Mart. & Gal., "caule fruticoso erecto glabriusculo, foliis linearibus acuminatis elongatis 3-nerviis subglabris, floralibus lanceolato-linearibus flore sublongioribus, superioribus vel bracteis obovato-lanceolatis apice fimbriatis, floribus longepedunculatis racemoso-spicatis; calyce tubuloso-inflato glabriusculo, corolla calycem longe excedente apice pilosa. — Flores 1.5 pollicares, pedunculi semipollicares. — A *Castilleja integrifolia* L., cui affinis praesertim

bracteis majoribus pedunculisque longioribus differt. Dans les bois de Juquila del Sur (côte pacifique d'Oaxaca) à 5000 pieds, à Talea et dans le Rincon (Cordill. orientale d'Oaxaca), de 3000 à 4000 pieds. Fl. rouges. Septembre." — Bull. Acad. Brux. xii. pt. 2, 28 (1845); Walp. Rep. vi. 651; Hemsl. l. c. 461. The following specimens are in hb. Gray, — Mexico, *Dr. Coulter*, no. 1353. OAXACA: Sierra de San Felipe, altitude 1830 m., *C. G. Pringle*, no. 4817; hills, San Felipe del Agua, altitude 1750 m., *Conzatti*, no. 570. In hb. U. S. Nat. Mus., Valley of Oaxaca, altitude 1830–2287 m., *E. W. Nelson*, no. 1194; 29 km. southwest of City of Oaxaca, altitude 2287–2897 m., *E. W. Nelson*, no. 1459, as to material in hb. Gray.

47. *C. INTEGRIFOLIA* Linn. f., suffruticosa ramosa glabriuscula vel tenuiter canescenti-hispidula; foliis linearibus integris basi vix dilatatis, floralibus paulo latioribus apice raro coloratis; racemo secundo; calyce elongato hinc fisso postice brevissime 2–4-dentato; corollae galea elongata glabriuscula, labii lobis brevissimis acutis. — Linn. f. Suppl. 293 (1781); Smith, Icon. Ined. 39; Benth. in DC. Prodr. x. 533; Mart. & Gal. l. c. 27; Hemsl. l. c. 461. The species was founded upon specimens collected by *Mutis* in Nova Granata and is also a native of Central America and Mexico. The flowers are conspicuous, falcately spreading, and turning black in drying. The calyx is nearly 2 cm. long and the corolla exerted about 5 cm. — CHIAPAS: *Giesbrecht*, nos. 152, 654, and 655. GUATEMALA: *Hyde & Lur*, no. 3099 (distrib. of J. Donnell Smith); *Sutton Hayes*; between Jacaltenango and San Martin, altitude 1670–2135 m., *E. W. Nelson*, no. 3609. OAXACA: between Juquila and Nopala, altitude 1372–2135 m., *E. W. Nelson*, no. 2426. NUEVO LEON: near Monterey, *C. G. Pringle*, no. 1051.

48. *C. PATRIOTICA* Fernald, simplex vel ramosa, 3–5.5 dm. alta; caulibus piloso-hirsutis vel glabrescentibus; foliis tenuibus hispidulis 3–5 cm. longis lineari-lanceolatis vel pinnatisectis, laciniis 2–6 lineari-lanceolatis; floribus racemosis; pedicellis ca. 1 cm. longis; bracteis foliis similibus minoribus et minus laciniatis; calyce tubuloso 3–4 cm. longo piloso-puberulo rubro viridi et albescenti; corolla 4.5–5.25 cm. longa viridi et albescenti dorso; galea 2.75–3 cm. longa exserta; labio inferiore viridi protuberanti ca. 3 mm., lobis lanceolatis; capsula oblongo-acuminata 1.5 cm. longa. — Fernald in Proc. Am. Acad. xl. 56 (1904). — CHIHUAHUA: near Colonia Garcia, altitude 2310 m., *Townsend & Barber*, no. 156; Cumbre, *E. Palmer*, no. 363, coll. of 1885; Mapula Mts., altitude 2200 m., and cool slopes of the Sierra Madre *C. G. Pringle*, nos. 1154, 1350 (type, in hb. Gray); Colonia Juarez, *E. W. Nelson*, no. 6062. DURANGO: barranca below Sandia Station,

*C. G. Pringle*, no. 13,659; in hb. U. S. Nat. Mus., near La Providencia, altitude 1982-2440 m., *E. W. Nelson*, no. 4989; Sierra Madre, 45 km. north of Guanacevi, *E. W. Nelson*, no. 4766.

49. *C. PURPUS* Brandegee, perennis, suffruticosa hirsuta; caulibus multis 1 dm. altis simplicibus ex rhizomatibus longis ramosis; foliis inferioribus lineari-lanceolatis obtusis vel acutis, basi subattenuatis 1.5-2 cm. longis 3-4 mm. latis; foliis superioribus bracteisque trifidis, segmento medio longissimo; calyce antice profunde fisso, postice paulo, segmento integris vel emarginatis; corolla 3.5 cm. longa exserta; galea tomentosa dorso viridi; labio inferiore brevissimo, dentibus 3 acuminatis, medio brevioré. — *Zoe*, v. 181 (1905). — Mt. Ixtaccihuatl, rocky slopes above timber-line, *C. A. Purpus*, nos. 320 (type), 1711 (both in hb. Univ. Calif., duplicates in hb. Gray). The bracts and calyx are more or less tinged with red, but the entire plant becomes black in drying. The leaves are rather thickly covered with loose spreading long white hairs, and some of the upper leaves are trifid.

50. *C. PECTINATA* Mart. & Gal., "fruticulosa pilosa; foliis pectinato-subpinnatis, laciniis linearibus distantibus elongatis 2-3-jugis, bracteis laciniato-pectinatis, floribus racemoso-spicatis, pedunculis et calycibus pilosis. — Folia pollicaria pectinato-laciniata, flores rubri similes floribus *Castillejæ integrifoliae* L.; sed pedunculati. — Affinis *Castillejæ laciniatae* Hook. Dans les forêts de pins de la Cueva del Temascal, au pic d'Orizaba, de 9500 à 12,500 pieds (limites de la végétation phanérogame). Fl. rouge-vermillon. Août." — *Bull. Acad. Brux.* xii. pt. 2, 27 (1845); *Walp. Rep.* vi. 651; *Hemsl. l. c.* 462. — *C. Orizabae* Benth. in *DC. Prodr.* x. 533, is founded partly on the same number (1074) in Galeotti's collection, also on *Linden*, no. 223. Bentham gives these additional characteristics under *C. Orizabae*, — "canescenti-hispidula, foliis inferioribus integris linearibus sublanceolatisve, superioribus dilatatis incisis, floralibus vix apice coloratis, racemo laxo, calyce elongato amplo hinc fisso postice obtuse 2-4-dentato, corollae galea tubo suo multo longiore, labii lobis brevibus acuminatis. Habitus fere *C. integrifoliae* sed folia pleraque incisa lobis elongatis et flores multo majores. Calyx 15 lin. longus. Corollae galea dorso villosa, calycem lineis 5-6 superans." In hb. Gray the species is represented by a doubtfully identified specimen collected in GUATEMALA: Volcan de Agua, Depart. Zacatepequez, altitude 3670 m., April, 1890, *John Donnell Smith*, no. 2146.

51. *C. FISSIFOLIA* Linn. f., herbacea quandoque suffruticosa; caulibus erectis parum ramosis foliosis pubescentibus; foliis sessilibus patentissimis, basi ovatis integris, apice pinnatifidis, laciniis patentibus obtusis fere alternis utrinque pubescentibus subtrinerviis; floribus versus apices

ramorum majorum axillaribus solitariis pedunculatis speciosis coccineis; bracteis propriis nullis; calyce tubuloso antice ultra medietatem longitudinaliter fisso, nervoso pubescenti colorato, basi subventricoso, superne compresso; labio superiore longissimo incurvo, apice emarginato dorso pubescenti; inferiore brevissimo trifido, laciniis acutis; sinubus similibus glandulis; stigmatibus obtusis; capsula ovato-acuminata compressa. — Linn. f. Suppl. 293 (1781); Benth. l. c. 533; Smith, Icon. Ined. t. 40; Hemsl. l. c. 460. — This species can scarcely be considered Mexican, as it has so far been collected only in South and Central America. There are no specimens in hb. Gray from Mexico or Central America.

52. *C. IRASUENSIS* Oerst., "suffruticosa glabra, foliis linearibus apice trifidis, lacinia intermedia subtrifida, racemo elongato laxo, calyce elongato hinc fisso postice bilobo, lobis retusis, corollae galea tubo subduplo longiore labii lobis brevissimis acuminatis. — Suffrutex erectus, ramosus, 1-2 pedalis. Caulis ramique teretes, glabri, nitiduli. Folia alterna, sessilia, amplexicaulia, linearia, supra medium trifida, glabra, 8-14 lin. longa, lobis linearibus obtusiusculis, intermedio majore sub 3-4-fido. Folia floralia indivisa, cuneata, apice obtusa, 8 lin. longa, trinervia, rubicunda, glabra. Flores pedicellati, 15 lin. longi. Pedicelli 2 lin. longi, villiusculi demum glabriusculi. Calyx elongatus, tubulosus, compressus, tomentosus, fuscus margine flavescens, hinc fissus inde bilobus, 6-7 lin. longus, lobis rotundatis vel retusis. Corolla bilabiata subrecta, calyce tres lineas longior, antice virescens postice rubicunda, labio superiore (galea) apice retuso, inferiore 3-fido, laciniis acuminatis incurvis. Stamina exserta, anticis corolla lineam longioribus, posticis ei aequilongis. Stylus exsertus. Stigma capitatum. Capsula ovato-oblonga, breviter acuminata, fusca, glabra calyce demum tecta, 6 lin. longa. Semina oblonga, numerosa, minutissima, testa laxa, diaphana, reticulata." — Oerst. in Vidensk. Meddel. 1853, p. 27; Hemsl. l. c. 461. — COSTA RICA: alpine region, Volcano Irasu, altitude 2745-3050 m., Oersted, part of type material in hb. Gray; same locality, John Donnell Smith, no. 4901; Volcan de Turrialba, Pittier, no. 13,079 (hb. Nat. Costa Rica, distr. by John Donnell Smith). COLUMBIA: Santa Marta, H.H. Smith, no. 1387.

53. *C. TEPEINOCLADA* Loesen., "humilis atque procumbens, tota planta tantum circ. 6-9 cm. alta; ramulis subglabris vel hirtis; foliis parvis sessilibus linearibus vel lineari-lanceolatis integris, acutis vel subacutis, glabris vel pulvereo-puberulis, uninerviis vel obsolete trinerviis, 6-13 mm. longis, circ. 1-2 mm. latis; bracteis longioribus usque 17 mm. longis et latioribus usque 3 mm. latis, summis ipsis plerumque utrinque uni- vel bifimbriatis, fimbriis lateralibus usque 6 mm. longis; pedicellis

circ. 3 mm. longis vel brevioribus; calyce mediam tantum corollam paullulo superante circ. 2.2 cm. longo, flavo et rubello, antice profunde fisso, ad circ. 1/3 altitud. connato, postice minute exciso, rotundato; corolla flava et rubella e calycis fissura longe exserta, 3.5-3.7 cm. longo, tubo circ. 1.5 cm. longo, galea elongata, labii lobis acutis, naviculari-subcorniformibus vix 1 mm. longis.

"Var. *a.* SUBGLABRA Loesen.; ramulis subglabris, foliis glabris. Hab. in GUATEMALA, in dept. Quezaltenango in pratis alpinis supra Totonicapam in 3000 m. altitud.: Sel. n. 2357. — Flor.: Sept.

"Var. *β.* HIRTA Loesen.; ramulis hirtis, foliis pulvereo-puberulis. Hab. in GUATEMALA, in dept. eodem in pratis alpinis ad Zihâ in 2840 m. altitud.: Sel. n. 2933. — Flor.: Jun." Loesen. in Bull. Herb. Boiss. ser. 2, iii. 285 (1903).

54. *C. KATAKYPTUSA* Loesen., "humilis atque procumbens, tantum circ. 9 cm. alta; ramulis dense hirtis; foliis parvulis, sessilibus, linearibus vel superioribus lineari-lanceolatis, integris, acutiusculis, pulvereo-puberulis, obsolete uni-trinerviis, 8-20 mm. longis, vix 1-4 mm. latis, inferioribus angustioribus brevioribus, superioribus longioribus praecipueque basi latioribus sensim in bracteas transformatis, bracteis summis etiam maioribus, usque 23 mm. longis, et 4 mm. latis, margine utrinque 1-2-fimbriatis, fimbriis ipsis tantum usque 4 mm. longis, linearibus, lamina igitur fimbriis additis tota circ. 10 mm. lata; pedicellis tantum vix 2 mm. longis; calyce circ. 2.5 cm. longo, postice minute atque etiam minus excisulo quam in praecedente, rotundato, corolla circ. 4 cm. longa, tubo circ. 1.7 cm. longo, labii lobis obtusis vel subobtusis, extrinsecus pilosis; cetera ut in praecedente. — Habitat in GUATEMALA: in dept. Huehuetenango in pratis et silvestribus in jugo montium inter Todos los Santos et Chiantla, in 3000 m. altitud.: Sel. n. 2750. — Flor.: Sept." Loesen. in Bull. Herb. Boiss. ser. 2, iii. 286.