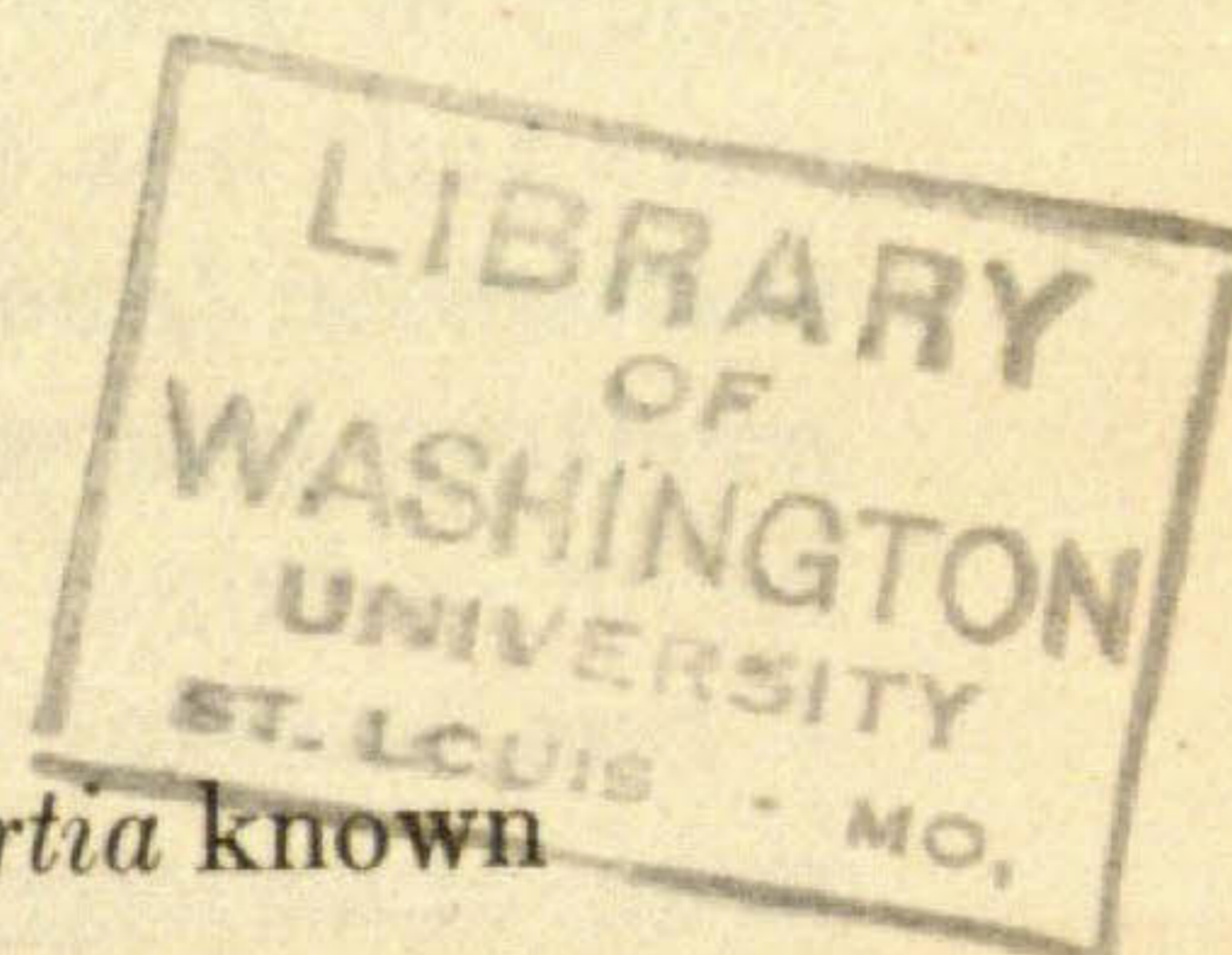


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STUDIES IN THE BORAGINACEAE,—VIII.

I. Observations on the Species of <i>Cordia</i> and <i>Tournefortia</i> known from Brazil, Paraguay, Uruguay and Argentina.	
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By

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This is a reasonably well defined local species, which is known only from the vicinity of the city of Rio Janeiro. It is probably most closely related to *T. membranacea*, which also occurs in the same region, but differs in its lanceolate leaves, more congested inflorescence, slightly larger flowers, more elongate calyx-lobes and spreading pubescence.

UNRECOGNIZED SPECIES.

Heliotropium erectum Vell. Fl. Flum. 69 (1825) & Icones ii. t. 42 (1827).—Perhaps a species of *Tournefortia*, but if so, one not known to me. The type came from the region about Rio Janeiro.

Tournefortia Blanchetii DC. Prodr. ix. 524 (1845).—The type of this species was collected by Blanchet (no. 1914) in Bahia. Besides the type I have seen an authentic specimen (lacking the inflorescences) in the herbarium of the British Museum. I am uncertain as to its correct disposition. The flowers and inflorescence suggests *T. rubicunda* and it may be that the plant is only a very strigose, broad-leaved form of that species. The only other species particularly suggested by *T. Blanchetii* is *T. Gardneri*. That latter, however, has somewhat smaller leaves and a much more condensed inflorescence.

Tournefortia brasiliensis Poir. Encyc. v. 357 (1804); DC. Prodr. ix. 529 (1845).—A plant said to be native of Brazil. It may possibly be *T. paniculata*.

Tournefortia megapotamica Spreng. Syst. iv. pt. 2, 66 (1827); DC. Prodr. ix. 530 (1845).—I know this species only from the short description, which is as follows, "T. foliis oblongis obtusis glabris medio dentatis subtus flavicantibus, spicis axillaribus elongatis, calycibus verticillatis hirsutis. Rio grande. Sello." The identity of the species is a complete mystery to me.

II. TAXONOMIC NOTES CONCERNING VARIOUS BORAGES.

HELIOTROPIUM PROCUMBENS Mill. Dict. ed. 8, no. 10 (1768). *H. americanum* Mill. Dict. ed. 8, no. 11 (1768). *H. brasilianum* Roth, Nov. Pl. Sp. 103 (1821). *H. rigidulum* DC. Prodr. ix. 540 (1845).—While at the British Museum of Natural History last year I made another search for Miller's type of *H. americanum* and eventually found it. It is specifically identical with *H. procumbens* as is also *H. brasilianum*, the type of which I found in Roth's herbarium at the Botanical Museum in Berlin. I have also examined the type-material of *H. rigidulum* at Geneva and can now definitely place this obscure species in the synonymy of *H. procumbens* Mill. also.

HELIOTROPIUM LEIOCARPUM Morong, Ann. N. Y. Acad. Sci. vii.

168 (1892). *H. minarum* Glaz. Bull. Soc. Bot. France lvii. Mem. 3e, 479 (1910).—I have examined the authentic material of *H. minarum* found in the Delessert Herbarium at Geneva. This species, scarcely more than a nomen nudum, falls into the synonymy of *H. leiocarpum*. It is rather slender, loosely branched and has rather thinnish leaves but seems to be clearly referable to *H. leiocarpum*. The plant is most interesting since it represents a conspicuous range-extension. No previous collections of *H. leiocarpum* have been reported from Brazil. The type of Glaziou's species came from southernmost Minas Geraes.

Heliotropium (§ *Orthostachys*) **cornutum**, sp. nov., annum prostratum multicaule foliosum pilis rigidiusculis ca. 0.8 mm. longis adpressis pallidis sparse vestitum; caulibus gracilibus laxe ramosis 5–20 cm. longis ad 1 mm. crassis, internodiis usque ad 2 cm. longis; foliis alternis vel inferioribus rariter suboppositis ad apicem versus caulis paullo reductis; lamina ovata vel oblongo-lanceolata 3–8 mm. longa 1.5–4 mm. lata concolori firmiter herbacea costata sed enervata integerrima apice acuta basi in petiolum gracilem 0.5–1 mm. longum plus minusve abrupte contracta; floribus distantibus inter euphylla secus ramulos extra-axillaribus; pedicello maturitate ascendenti ad apicem versus plus minusve incrassato 2–2.5 mm. longo imam ad basem tarde deciduis; corolla 5–6 mm. longitudine et diametro infundibuliformi extus faucibus et medio parte loborum sparse adpresse villosa; tubo ca. 1.5 mm. longo ad 1 mm. crasso intus supra insertionem staminum puberulento calyce conspicue breviori; faucibus gradatim ampliatis intus glabris tubo duplo longioribus; lobis ovatis ascendentibus 1.5 mm. longis distantibus, dentibus inter lobos late deltoideis plicatis ca. 0.3 mm. longis; staminibus tubo corollae inclusis medium versus tubi insertis; filamentis brevissimis; antheris ca. 1.2 mm. longis ovato-oblongis supra stigma fornicatis, apice truncatis cohaerentibus glanduloso-puberulentis; stylo ad 0.5 mm. longo gracili, disco stigmatoso angustissimo ad 1 mm. diametro, columna stigmatis gracili stylo subaequilonga; ovario villosissimo; fructibus conspicue rostratis et ad basem versus quadri-cornutis quadrangulatis maturitate 2–2.5 mm. crassis 3–4 mm. longis in nucula 4 uniovulatas disruptis lobis calycis paullo brevioribus; nuculis dorso leviter concavis adpresse villosis, ventre cum faciebus duabus planis arcte contiguas.—BRITISH INDIA: in a rice-field near Mangalor, Canara, March, *Pl. Indiae Or.* Ed. Hohenacker, 1851, no. 82 (TYPE, Brit. Mus.).—This is a very interesting and very distinct new member of the Subsection *Axillaria*, Johnston, *Contr. Gray Herb.* lxxxi. 48 (1928), a group heretofore thought to be endemic to America. The species is characterized by its very villous fruit which is not only drawn up into a very well

developed beak but is also provided with evident blunt cornute processes that develop above the base on each of its four angles. These processes are duplex in structure being composed of prolongations of adjacent portions of the margins of the closely contiguous nutlets. I know of no other species in the entire genus that has similar outgrowths on the fruit. The type has been determined as *H. marifolium* Retz, a species which it somewhat simulates in habit but from which it differs widely in inflorescence and fruit. *Heliotropium cornutum* must be very rare or local for otherwise it would be very difficult to understand how such a very striking species could go so long unrecognized.

It should be noted that *H. cornutum* is not the only representative of the Subsection *Axillaria* in the Old World. This very characteristic group also has thoroughly typical members in Africa and Madagascar. As with the Indian species these have also been confounded with *H. marifolium*. I take this opportunity, therefore, to give their synonymy and to cite such specimens of them as I have seen. They are as follows,—

Heliotropium madagascariense (Vatke), comb. nov. *Evolvulus madagascariensis* Vatke, *Linnaea* xliii. 522 (1882); Hallier, *Bot. Jahrb.* xvi. 536 (1893) and *Bull. Herb. Boiss.* vi. 723 (1898).—MADAGASCAR: flowers white, in locis sterilibus, Mojangá, lat. 15° 43', June 1879, *Hildebrandt 3035* (Berlin).—Of the three species of the *Axillaria* in the Old World this one seems to be closest to the American species, especially to *H. antillanum* Urban. From that species, however, it is readily separated by its coarser habit and larger leaves, more conspicuous pubescence and more elongate calyx-lobes. *Heliotropium madagascariense* is very closely related to the typical form of the African *H. Baclei* differing in its looser more evident pubescence, more slender habit and much smaller fruit.

HELIOTROPIUM BACLEI DC. *Prodr.* ix. 546 (1845); Baker in *Thiselton-Dyer, Fl. Trop. Africa* iv. pt. 2, 34 (1905). *H. marifolium* of Baker, l. c. 40, in pt.—AFRICA: Quoja, West Africa, *Bacle* (DC, TYPE); Gambia, 1928, *Hayes 543* (Kew); Sierra Leone, 1915, *Thomas 8836* (Kew); dry sandy places, Makunde, Limba, Sierra Leone, April 1892, *Scott-Elliott 5717* (Kew, Brit. Mus.).

Heliotropium Baclei DC., var. **rostratum**, nom. nov. *H. katan-gense* Gürke in *De Wild. Études Fl. Katanga* iii. 223 (1903); Baker, *Fl. Trop. Africa* iv. pt. 2, 43 (1905). *H. nigerinum* A. Chev. *Explor. Bot. Afr. Occid. Fr.* i. 450 (1920), nomen. *H. marifolium* of Baker, l. c. 40, in pt.—AFRICA: near water, flowers bright yellow, Sesheke Dist., Rhodesia, *Gairdner 186* (Kew); wet sands near river, flowers

yellow, Victoria Falls, Zambesi, Feb. 1906, *Allen 289* (Kew); flowers bright yellow, Elephant Marsh, North Nyasaland, Dec. 1887, *Scott* (Kew); flowers yellow, dry sandbank of the Ugala River, Tanganyika Terr., March 29, 1882, *Böhm 123* (Berlin); Lukafu, Katanga, *Verdick 174* (Berlin); Mokele, Belg. Congo, Sept. 1914, *Vanderyst 4591* (Brit. Mus.); Kasai, Belg. Congo, Sept. 1914, *Vanderyst 4629* (Brit. Mus.); dunes along streams in the marigots of Sudan, 1880, *Lécard 42* (Berlin; Delessert); dunes along the Niger near Sebi, Sudan, July 11, 1899, *Chevalier 1168* (Kew).—The African material of the *Axillaria* seems to represent a single species. In its typical form it is confined to west Africa and is characterized by having its fruit broadly conical and not long-beaked. The forms of the species in central Africa, however, have the fruit drawn up into a very long and conspicuous beak. Because of the geographical correlation of this fruit variation I have thought it worthy of varietal recognition. The forms with beaked fruit have been published upon as *H. katangense* and *H. nigerinum*. In treating them for the first time as a variety, however, I have taken the opportunity of applying to them a really descriptive name. The varietal name may be considered as having the same type as *H. katangense* Gürke.

Sericostoma calcarea (Vatke), comb. nov. *Heliotropium calcareum* Vatke, *Linnaea* xliii. 318 (1882). *S. albidum* Franchet in *Révoil, Fauna et Fl. Pays Comalis* (Sert. Somal.) 46 (1882). *S. verrucosum* Beck. in *Paulits. Harar* 457, fig. 3-6 (1888). *H. albo-hispidum* Baker, *Kew Bull.* 220 (1895). *S. strigosa* Defflers, *Bull. Soc. Bot. France* xliii. 120 (1896). *H. Vatkei* Baker in *Thiselton-Dyer, Fl. Trop. Africa* iv. pt. 2, 39 (1905).—This species is known only from Somaliland and southwestern Arabia. It is very closely related to *S. Kotschyi* (Boiss. & Hohen.) B. & H. ex Jackson, *Index Kew*, iv. 885 (1895), from the head of the Persian Gulf and may be no more than a variety of that species distinguished by its coarsely tuberculate rather than smoothish nutlets. *Sericostoma calcarea* varies in the size of its leaves, and somewhat also in the size of the slightly irregular corollas, though by no means sufficiently to justify the recognition of the species that I have listed above in synonymy. The synonyms that were described as species of *Heliotropium* have been universally accepted in that latter genus, despite the fact that even a most hasty dissection would have revealed their true generic affinities. It perhaps should be mentioned here that although *H. calcareum* Vatke and *S. albidum* Franch. were both published in 1882 the former name has indubitable priority since Franchet, l. c. 8, cites Vatke's paper in his bibliography.

Sericostoma arenaria (Vatke), comb. nov. *Heliotropium arenarium*

Vatke, *Linnaea* xliii. 319 (1882).—This remarkable species is known only from the type collected on the coastal hills near Baraua, Somaliland. It is characterized by its congested inflorescence, shallowly lobed calyx, oblanceolate leaves and its firm oddly shaped corollas. The corolla is coarse and herbaceous in texture and is pustulate outside. The tube is cylindrical but the faux is globular.

MACROMERIA LONGIFLORA Don, *Edinb. New Philos. Jour.* xiii. 239 (1832) *Onosmodium longiflorum* Macbr. *Contr. Gray Herb.* xlix. 21 (1917). *M. discolor* Benth. *Pl. Hartw.* 49 (1840). *O. discolor* Macbr. l. c. 20.—I have examined the type of Don's *M. longiflora*, which is now preserved in the British Museum. It is unquestionably the same species as that which was subsequently described as *M. discolor* Benth. Don's type, which was a part of the Ruiz Herbarium formerly owned by Lambert, bears the manuscript name, *Lithospermum longiflorum*. Another old specimen of this very same species, also bearing the name *L. longiflorum*, is to be found among the Pavon collections in the Boissier Herbarium. Number 905 of Sesse & Mociño's plates in the library of the Delessert Herbarium apparently also represents the species. Although the old specimens from the collections of Ruiz and of Pavon bear the name *Lithospermum longifolium* I rather doubt that they are the same as the plant described under that name in Sesse & Mociño's posthumous work, the *Flora Mexicana* 29 (1894). It seems scarcely likely that *M. discolor*, i. e. *M. longiflora*, which is characterized by its closely appressed, almost strigose, pubescence would be described as having hirsute stems and leaves.

In my treatment of *Macromeria*, *Contr. Gray Herb.* lxx. 14 (1924), I identified *M. viridiflora* DC. with *M. Thurberi* (Gray) Mack. This disposition I am now inclined to doubt. *Macromeria viridiflora* is based entirely upon number 904 of the De Candolle set of copies from Sesse & Mociño's plates. Until last year I had seen only a tracing of this plate. Since then, however, I have seen the original at Geneva. I regret to say that this opportunity did not assist me in definitely placing *M. viridiflora*. I can only suggest that plate no. 904 may represent *M. Thurberi* or an otherwise unknown species or one poorly drawn and hence unrecognizable. With more data at hand regarding the distribution of *M. Thurberi* and with more information as to the itinerary of Sesse and Mociño I am inclined to believe now that they could scarcely have collected the northern species, *M. Thurberi*. Consequently until authentic material of *M. viridiflora* is seen or until collections made in central Mexico are found which agree with plate 904 I believe that the name *M. viridiflora* had best be treated as too obscure and doubtful for recognition.

Cryptantha mendocina, sp. nov., annua ca. 15 cm. alta ascender ramosa hispida; foliis linearibus vel lineari-spathulatis 1.5–3 cm. longis 1–3 mm. latis ad apicem versus latioribus abundanter minuteque pustulatis apice obtusis vel subrotundis superioribus paullo reductis; spicis solitariis vel rariter geminatis breviter pedunculatis 3–4 cm. longis evidenter foliaceo-bracteatis, bracteis calycibus plus minusve duplo longioribus; corolla inconspicua 2–2.5 mm. longa alba, lobis ca. 0.5 mm. longis ascendentibus; calycibus fructiferis laxè dispositis ascendentibus 5–6 mm. longis ad basem versus 2–2.5 mm. crassis paullo asymmetricis tarde vel vix deciduis basi rotundis; pedicellis evidentibus rigidis 1.5–2 mm. longis, lobis subulatis vel subulato-linearibus conniventibus sed ad apicem versus recurvatis imam ad basem connatis marginibus breviter hispidovillosis, costa lobi valde prominenti crassa indurata setis 1–1.5 mm. longis rigidis pallidis horrida; ovulis 4; nuculis 4 evidenter heteromorphis; nucula axillari maxima persistenti pallida 2–2.3 mm. longa ca. 1.1 mm. lata lanceolata ovata vel anguste ovata abundanter minuteque tuberculato-granulata et evidenter tuberculata papillatave, basi obtusa, lateribus rotundis, apice acuta, ventre ca. $\frac{3}{4}$ longitudinis ad gynobasem quadrangularem 1–1.2 mm. longam affixa, sulco paullo asymmetrico ad apicem versus nuculae clauso ad medium versus in areolam latam vix excavatam abrupte expanso; nuculis 3 homomorphis deciduis crassis 1.8–1.9 mm. longis paullo lucentibus ovato-oblongis inconspicue minuteque tuberculato-granulatis et evidenter papillatis, dorso rotundis, marginibus rotundis, lateribus subplanis, ventre ca. $\frac{3}{4}$ longitudinis ad gynobasem affixis, sulcis asymmetricis apice nuculae clausis paullo infra apicem in areolam cuneatam vel lanceolatam evidenter excavatam ampliatis; stylo ca. 0.8 mm. longo nuculis 3 homomorphis superanti nuculae axillari aequanti vel rariter paullo superanti.—

ARGENTINA: dry place, Potrerillos, Prov. Mendoza, 1400 m. alt., Oct. 20, 1907, *Corn. Osten 5129* (TYPE, Herb. Boissier; fragments, Gray Herb.).—This species, while very distinct from any of the known South American members of the genus, is very closely related to and perhaps no more than varietally distinct from the North American, *C. minima* Rydb., a plant which ranges almost exclusively east of the Rocky Mountains and extends from northern Texas northward into Canada. The Argentine plant differs from its northern relative in being a more slender plant, having slightly smaller less conspicuously thickened fruiting calyces and in having evidently tuberculate or papillate odd-nutlets. In *C. minima* the odd nutlet, i. e. the axial one, is minutely and finely tuberculate- or papillate-granulate as in *C. mendocina* but lacks the large coarse tuberculations present in the

southern species. Among the species of South America *C. mendocina* may be quickly distinguished by the very evident heteromorphy of its nutlets, the axial one of each fruit differing from the remaining ones not only in persistence but in size, shape, color and roughenings. It is of particular interest being clearly a member of the *Texanae*, Johnston, Contr. Gray Herb. lxxiv. 54-60 (1925), a group heretofore thought to be confined to North America.