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I. Records preliminary to a general Treatment of the <i>Eupato-</i> <i>riaceae</i> ,—III. By B. L. ROBINSON.....	3
II. Studies in the <i>Boraginaceae</i> . By I. M. JOHNSTON.....	43
1. Restoration of the Genus <i>Hackelia</i> .....	43
2. The Genus <i>Antiphytum</i> .....	48
3. Novelties and new Combinations in the Genus <i>Cryp-</i> <i>tantha</i> .....	52
4. A Synopsis and Redefinition of <i>Plagiobothrys</i> .....	57
III. Diagnoses and Notes relating to the Spermatophytes chiefly of North America. By I. M. JOHNSTON.....	80

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✓ **H. arida** (Piper), comb. nov. *Lappula arida* Piper, Bull. Torr. Cl. xxviii. 44 (1901). *L. Cottoni* Piper, l. c. xxix. 549 (1902).

✓ **H. arida**, var. **Cusickii** (Piper), comb. nov. *Lappula Cusickii* Piper, Bull. Torr. Cl. xxix. 542 (1902). *L. arida*, var. *Cusickii* Nels. & Macbr. Bot. Gaz. lxi. 41 (1916). *L. saxatilis* Piper, l. c. 541.

**H. diffusa** (Lehm.), comb. nov. *Echinosperrum diffusum* Lehm. Pug. ii. 23 (1830). *Lappula diffusa* Greene, Pittonia ii. 182 (1891). *L. Hendersoni* Piper, Bull. Torr. Cl. xxix. 539 (1902). (?) *L. trachyphylla* Piper, l. c. 540. *L. subdecumbens* of Nels. Man. Rocky Mt. Bot. 412 (1909), as to description only.—The plant concerned here agrees with Lehmann's description in height of growth, pubescence, size and color of flowers, and in the arming of the nutlets. It fits the description far better than the other plant, here called *H. floribunda*, which has borne Lehmann's specific name in the past. In fact the present plant diverges from Lehmann's description only by having usually acutish rather than obtusish cauline leaves.

✓ **H. diffusa** var. **caerulescens** (Rydb.), comb. nov. *Lappula caerulescens* Rydb. Mem. N. Y. Bot. Gard. i. 328 (1900). *L. subdecumbens caerulescens* Garrett, Fl. Wasatch Reg. 78 (1911).

## 2. THE GENUS ANTIPHYTUM.

IN the literature concerned with the *Boraginaceae* the species of *Antiphytum* have been repeatedly confused with the species now referred to *Plagiobothrys*, *Cryptantha*, and allied genera, despite the fact that the former genus appears to belong not to the *Eritrichieae*, but rather to the *Lithospermeae*. This confusion has resulted from the attention being too closely centered upon similarities in nutlets, similarities which caused Gray, Proc. Am. Acad. xx. 265 (1885), to refer the Mexican species of *Antiphytum* to *Krynitzkia*, and which gave Macbride, Contr. Gray Herb. xlviii. 41 (1916), his reasons for saying that *Amblynotopsis*, here referred to *Antiphytum*, is "intermediate between the genera *Allocarya* and *Plagiobothrys*." The genus *Antiphytum*, however, differs from *Plagiobothrys* in habit, color of flowers, and particularly in the geminate stigmas. The stigmas of *Antiphytum* definitely remove it from the *Eritrichieae* in which *Plagiobothrys* and its other supposed allies are found.

The genus *Antiphytum* was first described in Meisner's Genera, i. 280 (1836-43). The original description, about fifty words in length, applies well to the genus as it has been taken in the past. In the Commentary accompanying his Genera, ii. 188 (1836-43), Meisner gives the bibliography of the genus as follows:—

"ANTIPHYTUM. DC. Mss. in Moç. ic. fl. Mex. ined. (4 sp.)—*Anchusa oppositifolia*, H.B.K., nov. gen. 3. p. 91. t. 200. *A. cruciata* et *stoechadifolia*, Cham. in Linnaea, 4. p. 438. et *A. Mexicana*, DC. ap. Moç. l. c.—Genus jam foliis oppositis (unde nomen) insigne."

Mociño's flora referred to was unpublished until 1874, or over thirty years after the appearance of Meisner's Genera. *Antiphytum mexicana* DC., published in the Prodrômus, x. 121, in 1846, is *Heliotropium calcicola* Fernald, Proc. Am. Acad. xliii. 62 (1907). Although the only *Antiphytum* published in Mociño posthumous work, *A. mexicana* can scarcely be considered as the type of the genus since it remained so long unpublished and particularly since having typical *Heliotropium* fruit, it is not at all described in the original generic diagnosis. *Anchusa oppositifolia* HBK. is an *Allocarya*. This species being the first published species mentioned under *Antiphytum* and the only one with a cited illustration, might be considered the type of *Antiphytum* and that name treated as an older synonym of Greene's genus *Allocarya*, Pittonia i. 12 (1887). Usage, however, has restricted the name *Antiphytum* to the genus including Chamisso's *Anchusa cruciata* and *A. stoechadifolia*. This usage is justifiable by the workings of the logical process of residues, the other species originally placed in *Antiphytum* having been referred to other genera and the name *Antiphytum* left to that group which had a majority representation in the original definition of the genus. It is also to be noted that with the exception that they are never herbs, Chamisso's species agree with every item in Meisner's diagnosis. On the other hand *Anchusa oppositifolia* is never suffrutescent, and does not have scorpioid cymes, nor ciliate-papillose faucal protuberances.

In 1916 Macbride, l. c., erected the genus *Amblynotopsis* for the Mexican species which I refer to *Antiphytum*. Although four of the five recognized and previously published species had been at one time or another referred to *Antiphytum* no contrast was made between the members of the newly proposed genus and the old restricted one. A careful study of this relationship now shows that the Mexican plants, forming the genus *Amblynotopsis*, are distinguished from the Brazilian ones, forming the true *Antiphytum*, only by having non-blue corollas and alternate upper leaves. These are scarcely generic differences. The Mexican *Antiphytum heliotropioides* besides agreeing with the Brazilian *A. cruciatum* in shrubby habit and loose strigose pubescence of similar encrusted hairs, also has opposite leaves. The chief difference between the two plants being that in the Mexican plant the leaves of the inflorescence are alternate, whereas in the Brazilian

species the leaves are opposite throughout the plant. Among the Mexican species *A. floribundum* has all its leaves alternate. Such species as *A. peninsulare* and *A. nudicalces* have several pairs of opposite leaves. Hence within the enlarged *Antiphytum* there are all the stages from an entirely opposite-leaved condition to a completely alternate-leaved one. Since leaf-position has various degrees of development among the Mexican species and since the difference separating the Mexican and Brazilian species is simply a matter of slight degree it seems inadvisable to attempt the use of leaf-position as a generic character. Flower-color is equally unsatisfactory as a generic character. The Brazilian species have bluish flowers. Among the Mexican species *A. peninsulare* has white flowers, whereas the remainder have yellow ones. If the color of corolla is to be exalted to generic importance there will be need of three instead of merely two genera.

The Brazilian species have flat gynobases and nutlets that are basally attached by a short stipe-like prolongation. Although most Mexican specimens have their nutlets directly attached to a more or less pyramidal gynobase by a large oblique submedial ventral scar, certain specimens (*Palmer 443, 207*) here referred to the polymorphous *A. floribundum* have nutlets with basal attachments through a short stipe to a flattened gynobase quite like that exhibited in Brazilian specimens. A synopsis and bibliography of the genus follows:—

ANTIPHYTUM A.DC. in Meisner, Genera i. 280; ii. 188 (1836-43).  
*Thaumatocaryon* Bail. Bull. Mens. Soc. Linn. Paris 839 (1890).  
*Amblynotopsis* Macbr. Contr. Gray Herb. xlviii. 41 (1916).

Leaves all opposite; corolla bluish; South American.

Plant herbaceous; leaves 10-35 mm. broad; nutlets smooth, shiny; corolla tubular-funnelform. . . . . 1. *A. tetraquetrum*.

Plant suffrutescent; leaves 3-8 mm. broad; nutlets rugose, dull; corolla tubular-rotate. . . . . 2. *A. cruciatum*.

Leaves alternate at least above; corolla yellow or white; Mexican.

Pedicels elongating, becoming 5-10 mm. long; leaves alternate only in the inflorescence; corolla with definite tube and faucal appendages. . . . . 3. *A. heliotropioides*.

Pedicels not elongating, at most 5 mm. long; leaves in basal rosettes, alternate, or only lowermost opposite.

Corolla subrotate, throat broad and open, tube practically undeveloped; appendages lacking, stamens exposed.

Stems strictly erect, 3-8 dm. high; basal leaves few, oblanceolate to linear-oblanceolate, canescent, 3-10 mm. broad. . . . . 4. *A. floribundum*.

Stems decumbent, less than 2 dm. tall; basal leaves numerous, crowded, very narrowly linear, silvery, 1-2 mm. broad. . . . . 5. *A. paniculatum*.

Corolla salverform, tube cylindrical and well developed; appendages well developed; stamens included and hidden.

Corolla white; fruiting calyx 8 mm. long, sparsely strigose-hispid; plant bushy, about 5 dm. tall. . . . 6. *A. peninsulare*.

Corolla yellow; fruiting calyx 2-5 mm. long, densely strigose; plant caespitose or with a prostrate shrubby caudex, 1-2 dm. high.

Plant with a loosely branched shrubby caudex; leaves not in basal rosettes, all cauline. . . . . 8. *A. nudicalces*.

Plant densely caespitose; basal leaves in dense rosettes.

Corolla about 5 mm. broad; style surpassing nutlets; fruiting calyx 3-4 mm. long. . . . . 7. *A. caespitosum*.

Corolla about 1 mm. broad; style not surpassing nutlets; fruiting calyx 2-3 mm. long. . . . . 9. *A. Parryi*.

1. ANTIPHYTUM TETRAQUETRUM (Cham.) A.DC. Prodr. x. 122 (1846). *Anchusa tetraquetra* Cham. Linnaea viii. 113 (1833). *Thaumatocaryon Hilarii* Baill. Bull. Mens. Soc. Linn. Paris 839 (1890). *Antiphytum Bornmülleri* Pilger in Fedde, Repert. iii. 24 (1906). *Antiphytum Bornmülleri*, var. *asperior* Pilger l. c. 25.

2. *A. CRUCIATUM* (Cham.) A.DC. Prodr. x. 121 (1846). *Anchusa cruciata* Cham. Linnaea iv. 438 (1829). *Anchusa stoechadifolia* Cham. l. c. 439. *Antiphytum staechadifolium* A.DC. l. c. *Myosotis Berroi* Arech. Anal. Mus. Nac. Montevideo, ser. 2, i. 69, f. 5-6 (1911).—The lengthy descriptions given by Chamisso do not seem to contain any fundamental characters by which his two species can be distinguished, nor has any subsequent writer pointed out diagnostic characters.

3. *A. HELIOTROPIOIDES* A.DC. Prodr. x. 122 (1846). *Eritrichium heliotropioides* Torr. Bot. Mex. Bound. 140 (1859). *Krynitzkia heliotropioides* Gray, Proc. Am. Acad. xx. 265 (1885). *Cryptantha heliotropoides* Loes. in Fedde, Repert. xii. 243 (1913). *Amblynotopsis heliotropioides* Macbr. Contr. Gray Herb. xlviii. 41 (1916).

4. *A. FLORIBUNDUM* (Torr.) Gray, Proc. Am. Acad. x. 55 (1875). *Eritrichium floribundum* Torr. Bot. Mex. Bound. 140 (1859). *Krynitzkia floribunda* Gray, l. c. xx. 265 (1885). *Amblynotopsis floribunda* Macbr. Contr. Gray Herb. xlviii. 41 (1916). *Amblynotopsis durangensis* Macbr. l. c. 42.—As here taken the species is extremely polymorphous and almost certainly capable of division, but at present the material is too meager to attempt satisfactory segregation.

5. *A. paniculatum*, nom. nov. *Lithospermum linifolium* Mart. & Gal. Bull. Acad. Belg. xi. 338 (1844); not *Antiphytum linifolium* A.DC. (1846).

6. *A. peninsulare* (Rose), comb. nov. *Krynitzkia peninsularis* Rose, Contr. U. S. Nat. Herb. i. 85 (1890). *Amblynotopsis peninsularis* Macbr. Contr. Gray Herb. xlviii. 41 (1916).

7. **A. caespitosum**, sp. nov., mexicanum; caulibus erectis vel valde ascendentibus 8–16 cm. altis apicem versus pauce stricteque ramosis; foliis dense strigosis argyro-canescensibus 1–2 mm. latis acutiusculis, inferioribus anguste linearibus 2–5 cm. longis erectis rosulatis, caulinis 8–15 mm. longis; racemis paucis unilateralibus manifeste bracteatis 2–3 cm. longis; calyce 2.5–3 mm. longo 5-partito breve pedicellato; corolla flava, limbo 4–5 mm. lato plano, lobis rotundatis imbricatis extus pubescentibus, tubo 1.5–2 mm. longo ad apicem cum 5 appendiculis gibbosis instructo, staminibus inclusis cum filamentis antheris brevioribus; nuculis rugoso-tuberculatis 1.5–2 mm. longis, areolis amplis distincte sub medio locatis; gynobasi angusta pyramidalis; stylo nuculis longiore; stigmatibus geminatis.—MEXICO: Cerros near San Luis Tultitlanapa, Puebla, *Purpus* 2606 (TYPE, Gray Herb.). Sonnige Kalkhügel bei Comitán, Chiapas, *Seler* 3073. Huauclilla, Nochixtlan, Oaxaca, *Conzatti & González* 1222.

8. **A. nudicalces**, sp. nov., diffusum; *A. caespitosum* similans sed differt ramis numerosis ramosis e caudice suffruticoso laxo ramoso prostrato vel etiam paullo subterraneo orientibus et foliis majoribus 2–3 mm. latis omnibus caulinis.—MEXICO: Sosola, alt. 7000 ft., Oaxaca, *L. C. Smith* 393 (TYPE, Gray Herb.). Although differing from *A. caespitosum* conspicuously in habit this species is identical with it in inflorescence, floral, and fruit characters and may prove to be worthy of no more than varietal recognition.

9. *A. PARRYI* Wats. Proc. Am. Acad. xviii. 122 (1883). *Krynitzkia Parryi* Gray, Proc. Am. Acad. xx. 265 (1885). *Amblynotopsis Parryi* Macbr. Contr. Gray Herb. xlvi. 41 (1916).—MEXICO: En route from San Luis Potosí to San Antonio, Texas, *Parry* (TYPE). Sosola, Oaxaca, *L. C. Smith* 394. Without locality, *Coulter* 1050 in part. The type is in advanced maturity and entirely lacks flowers. It is associated with the small-flowered Oaxacan plant only because of the remarkable similarity in the size and developments of all other parts.

### 3. NOVELTIES AND NEW COMBINATIONS IN THE GENUS CRYPTANTHA.

**Cryptantha Abramsii**, sp. nov., annua basem versus simplex supra sparse ascenderet ramosa 15–30 cm. alta strigosa; foliis linearibus vel lineari-filiformibus 1–3 cm. longis 1–1.5 mm. latis sessilibus acutiusculis basem versus hispidis, infimis oppositis; spicis solitariis vel geminatis 2.5–10 cm. longis conspicue bracteatis, bracteis linearibus vel lanceolatis; corolla evidenti 1.5–2 mm. lata; calycibus maturitate 3–4 mm. longis remotis non biseriatis strictis vel ascendentibus, lobis lanceolatis breviter hispidis calyce  $\frac{1}{3}$ – $\frac{1}{4}$  brevioribus