Some West American Asperifoliæ.

III.

Only three years since, the multitude of species discussed in this and two former papers under the above heading, were comprised in the genus *Eritrichium* as set forth by Professor Gray in Volume I., Part II., of the Synoptical Flora of North America. But long before the year 1884, the present writer, from his vantage-ground of familiar knowledge of the plants as they grow, had perceived the accepted *Eritrichium* to be a complex genus, and had thought to divide it into three or more by restoring, first of all, the old genera, *Plagiobothrys* and *Krynitzkia*, the names of which had been preserved as sub-generic under *Eritrichium* in the Synoptical Flora. In the summer of the year named, after much valuable material, of forms both old and new, representing the South as well as North American phases of the genera, had been amassed in the herbarium of the California Academy with a view to this new elaboration, the present writer disclosed his purpose to the celebrated author above named. The result was that Dr. Gray himself took the work in hand, and, at the end of the year, gave us his "Revision of some Borragineous Genera," in the pages of the American Academy Proceedings. The substance of this paper was shortly afterwards reprinted, forming the bulk of a supplement to the proper volume of the Flora.

Eritrichium, of which we had, as I supposed and still think, two species, suffered a complete extinction at the hands of Professor Gray, and the whole nomenclature of this large alliance was changed, saving only the names of the few originals of *Plagiobothrys* and *Krynitzkia*. In the course of the three years last past the number of species has been increased considerably, mainly through diligent field research carried on by my colleagues and correspondents; and now, in the series of papers of which this is the third, all the names

are changed again. My reasons for proposing two or three new genera have been given already. That the name *Krynitzkia*, with which people had barely had time to grow familiar, is to be dropped, is simply a historical necessity of the case, and therefore a thing for which I am not responsible.

The genus *Cryptanthe* of Lehmann, identical with *Krynitzkia* of Fischer & Meyer, antedates it by nine years. Such is the fact which has called forth the present paper. And, since this and the two which have preceded it, are so essentially of the nature of a commentary upon the most recent of Dr. Gray's several pronouncements on this tribe of plants, it may not lie beyond our province to enquire why an author in so good repute for botanical learning should have left *Cryptanthe* quite unmentioned. Conjectures upon this point would be sure to rise in the minds of the readers of these comments, after what has been already stated as a fact.

It might be surmised that even the name *Cryptanthe* had escaped his notice; that he did not know the fact of its existence. Such things occur in the labors of the best of botanists. The genus was published originally in a catalogue of the plants of a botanical garden. It was republished a few years subsequently in Linnæa, a journal whose earlier volumes, replete with valuable matter appertaining to the botany of Western America, are but too often neglected. It was yet again reprinted in Don's Dictionary, another work which has not always been duly respected as a book of botanical reference, although it contained much new matter, and cannot safely be left unreferred to. In this last named work, wherein the two then recognized species of *Cryptanthe* are described, the plant which was destined to figure as the type of *Krynitzkia* was still lurking under the genus *Echinospermum*; but before the appearing of the tenth volume of De Candolle's Prodromus a change had come to pass, and, while in that volume *Cryptanthe* was reduced to *Eritrichium*, the former *Echinospermum leiocarpum* stood forth as typical of a genus, under the name *Krynitzkia leiocarpa*. Any one

taking the Prodromus as a starting point in the history of these things would go astray.

A second conjecture might be this: that there was some uncertainty about the generical identity of the South American plants upon which *Cryptanthe* was founded, and the North American *Krynitzkia leiocarpa*. Fischer and Meyer, who founded the latter, were not ignorant of the former, but thought them generically distinct. The present writer has reason to think that the best herbaria in Eastern North America are but poorly supplied with Chilian plants; and we of the Pacific Coast enjoy peculiar facilities for interchange with Chili and Peru. Good native Chilian specimens of the plants on which *Cryptanthe* was established, authentically named by the venerable Alphonse De Candolle, he who reduced the genus to *Eritrichium* aforetime, we have access to; and these are our warrant for the conclusion that our many North American annuals lately named as species of *Krynitzkia* are, with the exception of those placed under *Allocarya*, *Eremocarya* and *Piptocalyx*, of the same genus with *Cryptanthe*.

It is, thirdly, not impossible that Dr. Gray, who is not unwavering in his adherence to principles of priority, may have recognized both the name *Cryptanthe* and the identity of the genus with *Krynitzkia*, and yet have thought best, for reasons of his own, to retain the nine years later name, and keep silence regarding the earlier but more obscure one. If this last conjecture be the true explanation, he will admit the present paper to have the force of a strong argument for strict priority in generic names at least; for had he, in the first place, as was his privilege, if not his duty, named our long list of species as species of *Cryptanthe*, no room would have been left for that which follows hereupon in augmentation of the Borragineous bibliography.

CRYPTANTHE, Lehmann.

Racemes or spikes naked. Calyx deciduous (except in some of the last group, *Pterygium*), together with its filiform pedicel when present, or the latter (in *C. racemosa*) persistent, 5-parted to the base; segments erect, usually closely embracing the fruit, the attenuate and elongated tips sometimes spreading above it and hispid with straight or hooked bristles. Nutlets 4 (sometimes by abortion 2 only or 1), smooth, tuberculate or muriculate, seldom rugulose, not carinate (though with a dorsal ridge in one or two species), often with acute or even strongly winged margins, attached from the base upwards commonly to near the apex; groove and scar open or closed.—Pilose-hispid slender annuals (except *C. racemosa*, a half-shrubby perennial), with bractless flowers rarely glomerate rather than spicate or racemose. Herbage and root imparting no stain. Leaves alternate, narrow and entire. Flowers in the South American type minute and cleistogamous, whence the generic name, not strictly appropriate to the North American species.—Lehm. Sem. Hort. Hamb. (1832); Fisch. & Mey. Sem. Hort. Petrop. (1836). 35; Linnæa (Litteratur Bericht), xi. (1837) 103; Don. Gen. Syst. iv. 373 (1838): *Krynitzkia*, Fisch. & Mey. Sem. Hort. Petrop. 1841. 52: Species of *Eritrichium*, A. DC. Prod. x, and of Gray, Syn. Fl. ii. part 1: *Krynitzkia* § *Eukrynitzkia*, Gray, Proc. Am. Acad. xx. and Syn. Fl. Suppl.

(A.) South American Species.[1]

1. C. GLOMERATA, Lehm. Erect, branching above, pubescence spreading and both setose and hirsute, the latter kind

[1] Of these I take up only such as exist in the herbarium of the California Academy of Sciences. There are, as Prof. Gray has remarked "many more in the books," and, I would add, doubtless many more genuine species in fact.

predominant; floral leaves ovate-lanceolate, cauline lanceolate; calyces in short naked racemes and leafy glomerules: nutlets usually solitary, dark colored, ovate, granulate, the closed groove opening at base into a transverse, rather crescent-shaped scar.—Sem. Hort. Hamb. l. c.; Don. l. c.: *Eritrichium cryptanthum*, A. DC. l. c. 129.

Native of Chili: nutlets like those of the Californian *C. muriculata*, but they are usually solitary, and the foliage and inflorescence are different.

2. C. MICROCARPA, Fisch. & Mey. Near the preceding but more setose-hispid: nutlets apparently always two, with sharply angled margins and an open groove of which the basal fork is divaricate and closed.—Sem. Hort. Petrop. 1835; Don. l. c.: *Eritrichium clandestinum*, A. DC. l. c.

3. C. CONGESTA. Erect, pubescent with spreading pilose hairs: leaves linear: racemes in pairs or threes on elongated naked peduncles: nutlets one or two, ovate-acuminate, somewhat incurved, carinate dorsally, sharply angled laterally and muriculate throughout. *Eritrichium congestum*, A. DC. l. c. 132.

The nutlets of this very distinct species were unknown to De Candolle. In our specimen they are too young to show the character of the ventral groove, etc.

4. C. LINEARIS. Habit of the last but more rigid and stout, setose-hispid: leaves narrowly linear, greatly elongated (2—3 inches long): nutlets one or two, ovate, with obtuse dorsal ridge and lateral angles, densely and sharply muriculate. *Myosotis linearis*, Colla. fide. A. DC. l. c. 131.

5. C. GLAREOSA. Erect, slender, rather soft-hirsute; leaves linear, an inch long: racemes nearly sessile, somewhat loose: nutlets ovate, neither ridged nor angled, transversely rugulose.—*Eritrichium glareosum*, Philippi in Herb. Cal. Acad.

Cordillera de Santiago, Philippi. A very well marked species.

Issued November 19, 1887.

6. C. DIMORPHA. Root perhaps biennial: stem stout and fructiferous below the short, leafy, racemose branches: pubescence soft and appressed: subradical flowers probably apetalous or cleistogamous, their nutlets ovate, more than 2 lines long, distinctly carinate dorsally, the marginal angles continuous across the back of the nutlet above its base, the whole surface coarsely granulate or tuberculate; ventral groove narrow but not closed, ending below in an exactly basal, rounded and deeply impressed scar: fruit of the terminal inflorescence not seen.—*Eritrichium dimorphum*, Philippi in Herb. Cal. Acad.

Cordillera de Santiago, Philippi. A very singular species, allied to true *Eritrichium* by its nutlets, otherwise most unlike it.

(B.) NORTH AMERICAN SPECIES.

* *Fruiting calyx closed, deciduous, its segments narrow, hispid.*

†—*Nutlets muriculate,*

††*one only, or one larger and less roughened.*

7. C. CRASSISEPALA = *Eritrichium crassisepalum*, T. & G. Pac. R. Rep. ii. 171: *Krynitzkia*, Gray, Proc. Am. Acad. xx. 268, and Syn. Fl. Suppl. 424.

8. C. TEXANA = *Eritrichium Texanum*, A. DC. l. c. 130: *Krynitzkia*, Gray, l. c.

9. C. ANGUSTIFOLIA = *Eritrichium angustifolium*, Torr. Pac. R. Rep. v. 363, and Bot. Mex. Bound. 141; *Krynitzkia*, Gray, l. c.

10. C. DUMETORUM = *Krynitzkia dumetorum*, Greene in Gray, l. c.

11. C. MICROMERES = *Eritrichium micromeres*, Gray, Proc. Am. Acad. xix. 90; *Krynitzkia*, Gray, l. c. xx. 274 & Syn. Fl. Suppl. 427.

Dr. Gray does not seem to have observed that one of the four nutlets in this species is more persistent than the rest and nearly or quite smooth. The plant has now been found on Santa Cruz Island, and also in Amador County, in the interior of the State.

++ ++ *Four nutlets present and all alike.*

12. C. MURICULATA = *Eritrichium? muriculatum*, A. DC. l. c.: *Krynitzkia muriculata*, Gray, l. c.—This species, common in the regions coastward, may be recognized by its light gray nutlets, short calyx and few spikes well developed.

13. C. JONESII = *Krynitzkia Jonesii*, Gray, Proc. Am. Acad. xx. 274 and Syn. Fl. Suppl. 427.—Differs from the last in no character of fruit, but only in habit and inflorescence, being strictly erect with numerous short branches paniculately arranged, as has been well indicated by Professor Gray in the original description. I obtained it in fine condition, as far southward as All Saints' Bay, in 1885.

14. C. AMBIGUA = *Krynitzkia ambigua*, Gray, l. c.—This and the next have elongated calyx-segments, and nutlets exceedingly unlike those of other species in being of a dark brown color, when mature, and having their muriculations few, scattered, and little elevated, scarcely to be called muriculations, not being sharp enough to bear properly that designation.

15. C. FOLIOSA = *Krynitzkia foliosa*, Greene, l. c.; Gray, Syn. Fl. Suppl. 427.—Peculiar to Guadalupe Island: established upon the best of characters as regards habit, pubescence, foliage, etc., the nutlets also grooved somewhat differently from those of the preceding.

16. C. DENTICULATA = *Krynitzkia denticulata*, Greene, Bull. Cal. Acad. i. 205; *K. muriculata*, Gray, ll. cc. in part.—Readily distinguishable from *C. muriculata* by the dark brown color of the nutlets, their sharper outline and manifest dorsal ridge (much like those of some Amsinckias), as well as by a very stout habit. Apparently confined to the region (so strangely abounding in peculiar plants), lying just along the eastern base of the middle California Sierra.

17. C. POLYCARPA. Coarse and stout but low and diffuse, 6—10 inches high, very hispid throughout, but more especially upon the calyx, which has a coat of white appressed setose pubescence beneath the bristles: flowers biserial in innumerable short crowded axillary and terminal spikes: calyx 2 lines long, the segments with somewhat foliaceous-dilated and spreading tips: nutlet ovate-deltoid, acute, little more than ½ line long, gray flecked with brown, the surface nearly as in *C. muriculata*, the elevations rather more numerous; groove closed above, the small triangular areola and nearly divaricate basal furcation open.

Around the Tahoe Ice Company's pond, two miles below Truckee, Cal., C. F. Sonne, June and August, 1887.

Said to be abundant in its locality: the nutlets, much smaller than in *C. muriculata*, have also a broad truncate base and open bifurcation. In habit the plant is most like *C. crassisepala*, though with shorter and far more numerous spikes. The calyx is very promptly deciduous.

18. C. BARBIGERA = *Eritrichium barbigerum*, Gray, Syn. Fl. 194; *Krynitzkia*, Gray, Suppl. 273.—This and the next, while probably confluent, are very distinct from *C. ambigua*; for their nutlets are of the lightest gray, almost white, and are roughened with very prominent though not sharp murications.

19. C. INTERMEDIA = *Eritrichium intermedium*, Gray, l. c. and *Krynitzkia*, l. c.

20. C. ECHINELLA. A span high, with a few ascending and stoutish branches from the base: moderately pilose-hispid: spikes terminating the branches and branchlets, rather short, biserial: calyx 2 lines long, the segments attenuate above, erect: nutlets a line long, broadly ovate, acute, light gray, their whole surface densely covered with minute but well elevated and very sharp-pointed muriculations; groove apparently either open or closed, the basal forks of which, not divaricate but only moderately divergent, are always closed.

Mt. Stanford, above Donner Lake, 1886, Mr. Sonne. Extremely well marked in the murication of the nutlets. In habit like some Oregon plants which I refer to *C. ambigua*, but which are likely to prove the type of another unnamed species.

21. C. PUSILLA = *Eritrichium pusillum*, Torr. & Gray, Pac. R. Rep. ii. 171; *Krynitzkia*, Gray, l. c.

22. C. RAMOSA = *Eritrichium ramosum*, A. DC. l. c.; *Krynitzkia*, Gray, l. c.

23. C. RACEMOSA = *Eritrichium racemosum*, Watson in Gray, Proc. Am. Acad. xvii. 226; *Krynitzkia*, Greene, Bull. Cal. Acad. i. 208.—Apparently of this genus, although suffrutescent while all the rest are annual. The conspicuously pedicellate calyx is deciduous when ripe, by a joint at its very base, the pedicel remaining on the rachis. The species is surely a connecting link between *Cryptanthe* and *Oreocarya*, and many draw the latter genus into this, if in *Oreocarya*, calyces in maturity are in any cases deciduous (as I have now reason to suspect), unless it may stand on habit alone.

\+ \+ *Nutlets smooth and shining, light grey, or mottled with dark brown,*

\+\+ *solitary, or rarely two, the others abortive.*

24. C. FLACCIDA = *Myosotis flaccida*, Lehm. Pugill. ii. 22

(1830); Hook. Fl. ii. 82: *Eritrichium oxycaryum*, Gray, Proc. Am. Acad. x. 58 (1874), and Syn. Fl. 193: *Krynitzkia oxycarya*, Gray, l. c.

25. C. MICROSTACHYS = *Krynitzkia microstachys*, Greene in Gray, Proc. Am. Acad. xx. 269, and Syn. Fl. Suppl. 425.

26. C. ROSTELLATA = *Krynitzkia rostellata*, Greene, Bull. Cal. Acad. i. 203; Gray, Syn. Fl. Suppl., l. c.

27. C. SPARSIFLORA = *Krynitzkia sparsiflora*, Greene, l. c., and Gray l. c.

28. C. RAMOSISSIMA = *Krynitzkia ramosissima*, Greene, Bull. Cal. Acad. i. 203; Gray, Suppl. 428 and, in part, of Proc. Am. Acad. xx. 277.

29 C. GLOMERIFLORA. Annual, 2—4 inches high, diffusely branching and flowering from the base, very hispid throughout; leaves linear-oblong, $\frac{1}{4}$—$\frac{1}{2}$ inch long: flowers in glomerules of 2 or 3 in the axils of the leaves and at the ends of the branchlets: corolla very minute: calyx very bristly, its linear segments only $\frac{1}{2}$ line long, a little surpassed by the ovate-acuminate speckled nutlet whose ventral groove is closed throughout, not even opening into the depressed and wholly separate, obscurely triangular and entirely basal scar.

Borders of a pond two miles below Truckee, Cal., July, 1887, Mr. C. F. Sonne.

The wealth of the Truckee River region in peculiar plants of this alliance is remarkable, and is being well brought out by the zeal and diligence of Truckee's resident botanist. The present species has more points of contact with the very type of *Cryptanthe* than any other known plant of North America, witness the minute corollas and the inflorescence. The nutlet is altogether peculiar, its basal part being somewhat umbilicately gathered around the scar, which latter does not run into the groove at all.

30. C. CEDROSENSIS = *Krynitzkia Cedrosensis*, Greene, l. c. 204.

31. C. MARITIMA — *K. maritima*, Greene, l. c.

32. C. CLEVELANDI. A foot or more in height, with few ascending branches rather rigid, and bearing two or three short racemes at summit; hispid throughout with slender but rigid pungent bristles, and without appressed pubescence: calyx slender, appressed to the rachis (as in *C. flaccida*): nutlets 2 or 1.

Common in shaded places along streamlets in the hills back of San Diego, where it was collected by Mr. Cleveland and the writer in April, 1885, the specimens having been largely distributed by me as "*K. microstachys*, Greene," from which it is very distinct, being as it were intermediate between that and *C. leiocarpa*, but with more slender nutlets than those of that species. It was also obtained, in the same year at All Saint's Bay, Lower California

++ ++ *Nutlets four.*

33. C. LEIOCARPA — *Echinospermum leiocarpum*, Fisch. & Mey. Sem. Hort. Petrop. 1835. 36, also in Linnæa (Lit. Bericht), 1837. 104; Don. Gen. Syst. iv. 373: *Krynitzkia leiocarpa*, Fisch. & Mey. op. cit. 1841. 52: A. DC. Prodr. x. 134; Gray, l. c.—Six inches to a foot high, diffusely branched, canescent with an appressed pubescence, and with more or less of pilose-hispid spreading hairs: inflorescence short-spicate or somewhat glomerate and leafy: calyx a line long, the segments not much elongated or attenuate above the nutlets, the latter with closed groove which is not forked at base.

Common in the sand hills of San Francisco, well out on California street, April, 1886; also obtained at Point Reyes by Mrs. Curran, and near Gilroy by Mr. Hickman. Plant seldom much hispid except upon the calyx, and, in the San Francisco

locality scarcely at all so, but almost silvery canescent with quite soft appressed hairs.

34. C. HISPIDISSIMA. A foot high or more, with ascending branches; strongly pilose-hispid throughout, and without different appressed pubescence under the spreading: inflorescence elongated and loosely spicate, never leafy or glomerate: calyx 1½—2 lines long, the segments long-attenuate, far exceeding the nutlets: corolla large and conspicuous: nutlets of the preceding species.

San Luis Obispo County, Cal., J. G. Lemmon, 1887. Plant with the aspect, and the rather showy corollas of *C. barbigera*, and so not resembling *C. leiocarpa*; like that only when the nutlets alone are considered. Old specimens of what is apparently the same were obtained by Mrs. Curran in 1886, in the Salinas Valley, some distance north of Mr. Lemmon's locality; and my *Krynitzkia leiocarpa* of the Santa Barbara islands, although somewhat less hispid than Mr. Lemmon's type, belongs here.

35. C. NEMACLADA. Slender, very diffusely branching, a foot high, sparsely setose-hispid and green, *i. e.*, lacking canescent appressed hairs: spikes very loose, almost filiform: calyx a line long, appressed to the rachis, the segments hispid below the middle, their filiform upper portion retrorsely setulose: nutlets ovate-acuminate, ½ line long, smooth and shining, the groove bifurcate at base but closed throughout.

Colusa County, Cal., 1884, Mrs. Curran. Only one specimen, and that inadvertently left by me, as a large state of *C. sparsiflora*, at the time when the latter (under *Krynitzkia*) was published; its widely different character now first detected.

36. C. TORREYANA = *Krynitzkia Torreyana*, Gray, l. c.— This species and the next, so precisely similar in aspect, have been well distinguished by Professor Gray by the fine character of a slight but constant difference in the insertion of the

nutlets. There is an additional character, belonging to the vegetative organs, which none but the collector would be likely to take cognizance of, *i. e.*, a peculiar brittleness of texture in the present species. The var. *calycosa* is of singular appearance when compared with the type, but is no doubt best left as Dr. Gray has placed it.

37. C. AFFINIS = *K. affinis*, Gray, l. c.

38. C. GEMINATA. Size, habit, pubescence, etc., of the last: calyx a line or more long, segments without attenuate tips and little exceeding the nutlets, these also like those of *C. affinis* in outline, but closely appressed to each other in pairs, and all four somewhat laterally attached to the gynobase!

I have heretofore spoken of the singular pairing off of the four nutlets in *Oreocarya suffruticosa*, and in *Sonnea hispida*. In the present remarkable plant the groove of the nutlet is as in *C. affinis* except that it runs up and down, not in the middle but very near one edge, so that the nutlets themselves sit in the calyx, very flatly face to face in pairs. The ovary itself is obviously compressed, and thus, in young calyces, when dried under pressure, the circumstance might pass for a result of the mere accident of pressing for the herbarium. But the perfectly ripe fruit exhibits unmistakably all the characteristics above ascribed; and, what is more, the collectors of the species both assure me that it is an obvious mark of the plant as seen growing. Aside from this, the short segments of the calyx (not concealing, but freely exposing the curiously geminate-compressed fruit) are about the only mark by which the species is seen to be distinct from its relative and associate. I say associate because the two species grow together in the neighborhood of Truckee, Cal., where they have been abundantly collected by Mrs. Curran and by Mr. Sonne. *C. geminata* I have not met with from elsewhere.

39. C. WATSONI = *Eritrichium leiocarpum*, Wats. Bot. King. 244 in part, fide Gray: *Krynitzkia Watsoni*, Gray, l. c.

40. C. PATTERSONI = *Krynitzkia Pattersoni*, Gray, Proc. Am. Acad. xx. 268; Syn. Fl. Suppl. 424.

41. C. FENDLERI = *K. Fendleri*, Gray, ll. cc.

* * *Calyx persistent, spreading and discharging the nutlets, the segments broader and less bristly.*—PTERYGIUM.

+– *Nutlets broadly winged.*

42. C. PTEROCARYA = *Eritrichium pterocaryum*, TORT. Bot. Wilkes Exp. 415. t. 13; Gray, Syn. Fl. 195: *Krynitzkia pterocarya*, Gray, Proc. Am. Acad. l. c. 276; Suppl. 429.

43. C. CYCLOPTERA = *K. cycloptera*, Greene, Bull. Cal. Acad. i. 207.

+– +– *Nutlets acutely angled.*

44. C. OXYGONA = *K. oxygona*, Gray, Proc. Am. Acad. l. c. 277; Suppl. 427.

45. C. MOHAVENSIS = *K. Mohavensis*, Greene, l. c.; Gray, Suppl. l. c.

46. C. UTAHENSIS = *K. Utahensis*, Gray, Suppl. l. c.

SOME AMERICAN POLEMONIACEÆ.

I.

One may now say of this family of plants, almost unqualifiedly, that it belongs to the western side of the North American Continent. Africa, Australia and the oceanic island-groups