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A Series of Papers Relating to Botany and Botanists.

BY

## EDWARD L. GREENE.

VOLUME IV. PLATES 9-12.

WASHINGTON, D. C.,

1899-1901.

PRESS OF THE LAW REPORTER COMPANY, WASHINGTON, D. C.

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Vol. IV.

# PITTONIA.

Part 20.

# A SERIES OF BOTANICAL PAPERS

## EDWARD L. GREENE,

Professor of Botany in the Catholic University of America,

WASHINGTON, D. C.

JANUARY-APRIL, 1899.

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# Price, Fifty Cents

PATOT, UPRAM & Co., San Francisco: WILLIAM WESLEY & Sow, London.

## NEW SPECIES OF CASTILLEIA.

C. HATDEN. C. patida, var. Haydeni, Gray, Syn. Fi, ii 297. The characters for this, as indicated by Gray, are also gether of specific value; but to those are others to be noted, over and above those of the low stature, eleft foliage and lefiniate bracks. The spike, as compared with that of C. patidia, is long and lax. The color of them is also not bright crimson." but a soft reserved, or else patier and with an admixture of like. It is a common alpine species of southern Colorado.

C. CONTON. Perennial, the tufted stems about 11 feet high, prese and glabrous below, more or less "litons abore, the inflorescence strongly villous with long slightly dofexed somewhat visicl but not glabuldiar bairs: hower lawses all lancolate, acuminate, entire, 2 or 3 inches long; these under the inflorescence broader and with a pair of narrow falceted viergent lobes; heated of the spike still borter and broader, mainly scarlet, and with two pairs of lobes; ealyy with four makequal lancolate acute lobes; concolls well exserted, the gales notably villous along the back, twice the length of the link, the prominent tesh of which are incurred.

À somewhat subalpine rather large species of the more southerly or southerstopy Colorado Rocky Mountains, and those of adjacent New Marico. It has been confused with  $C_{\rm s}$  minitade, to which it is, indeed, related; but it lacks the tall stick halit of that species and its pobsences is of quite another character, that of  $C_{\rm minitad}$  being parase, short, and mostly gland-tipped, that of the back of the galac notably so. And the ealyz-lobes in that species are oblong and obtave. Bentham so describes them; and Gray's account of these

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Pages 1-8. 5 Jan., 1899.

appears to have been drawn from the plant here defined as new, rather than from the northwestern and true C. miniata-

C. mnora. Perennial, the stems erect, it o 2 feet high, rather sparsely leafy and the flowers very loosely spicate; the margins of leaves and bracks sparingly hirstec-fliate and the other short pubecence examply: leaves mather broad, of oblog outline, somewhat digitately cleft at and near the summit, the body of the leaf quite entire: flowers an inch apart in the spike, or more, their bracks almost like the leaves in cut, either the tips of their lobes or the whole upper portion of the brack searlet: calyr only slightly cleft into 4 subequal oborate-oblog obtase lobe, these scarlettipped: comparatively short corolla exserted from the calyr by about half the length of the gales.

Goldstream, Vancouver Island, 20 May, 1887, collected by John Macoun. A very distinct species, of the group to which C. angustifolia belongs.

C. SUBNICESA. Perennial, the tuffed evest rather slender very rigid and brittle stems about a yard bigh, these and the long narrowly linear entire leaves cincreons with a fine short very rough pubsecence: splite all length 6 or 5 inches long and somewhat lax i bracls very marrow, far surpassing the flowers, narrowed in the middle, the acute scarlet th slightly dilated : calyx nearly 2 inches long, spathaecous by a very deep anterior fissure, the long upper lip fully as long as the gales of the corolls and deeply cut into four very narrow and slenderly accurnitue lobes.

Foothills of the Sierra Nevada in Annador and Calaveras counties, California, Geo. Hansen, July, 1806 (numbers 1730 and 1800). A very distinct and remarkable species allied to *C. lineriofolia* and *C. cendeus*; the flowers greatly elongated, and corolla almost enclosed by the mainly searlet calys.

## A FASCICLE OF NEW VIOLETS,

V. FALCATA. Flants solitary, the rootstock about 2 inches long, perpendicular, rather compiscoulty nodose, the roots not numerous: leaves mostly 2 only, their poticies very pubsecent, the long peticies retransly hirstaulous; blade of broad-deloid outline, primarily deeply cleft or even divided into 3 segments of which the middle one is usually simple. Inclusions of the number of the second state of the harmonitor or roombic innecesite, remotely toothed above the middle, or even throughout, the lateral divisions mostly outer are more or lease nodely function of the leaf as a whole from 4 to 9 inches broad and much broader than long; petalforms flowers not known, the settian ad apatalous ones subterrances, their delicate blanched petonlets 3

In eak woods, near Cobden, Illinois, 15 June, 1898. Remarkable among the acaulescent violets for its large size, and the distinctly lunate or findated divisions of its apparently compound leaves. In one of the specimeus there are three withered aerial capsules, evidently the product of the ordinary early petallerous flowers.

V. coxrucess. Plants tarhed, often densely so, the long petioles and peduncles erect, the latter commonly S or 10 inches high and well exceeding the latves; herbage slightly secular, deepgreen, appearing glabrous, but he upper face of the laaves sparsely short-pubsecut along the vision and veinides: black of lat comparatively small, the lowest less than an inch long and broadly cordate-ovato, plane, the later ones 1 ji nches long and from cordate to cordate-subsagittate and somewhat decurrent on the petiole: corollas large, blue, more than an inch in diameter, the lamins of the petals broadly and obtusely obovate, the claw and the base of the blade white and densely white-hairy, the hairs flattened: sepals lanceolate, acutish, wholly glabrous: apetalous flowers not seen, but doubtless acrial.

This is one of the most distinct violets of Maryland. though doubtless uncommon, and I am confident it has never been described. It inhabits grassy uplands along the borders of forests looking northward, and holds a place almost exactly intermediate between such widely different species as V. cucullata and V. emarginata, exhibiting almost the foliage of the latter, and flowers as much resembling those of the former, though the petals are broader, of a deeper blue, and the plant decidedly more showy when in petaliferous flower. Though the mature plant is multicipitous, the younger ones, at first flowering from seed, are solitary; and in this condition the species would be very apt to pass for V. emarginata with the inexpert. My specimens are from Anne Arundel Co., Maryland ; but I have seen it in one other station, and that along the railway towards Harper's Ferry. Where it occurs it is rather plentiful; and, as it is associated with no other violet whatsoever, it can not be of hybrid origin.

V. SUSSUEATA. F. emerginata, var. aubimuta, Greene, Pitt III, 313. A forther study of this basulful violet of the mountains of eastern Tennesses reveals characteristics which declare it quite distitut from V. emerginata. Its leaves are of a firmer texture, less succulent, and on notably and constantly shorter petioles; and they are pubseesu. After the manner of what is supposed to be F. pefnuta; to which, in-dec, the plant is nore nearly related than to V. emerginata. Its decident of this post operating is any of the group to which V. emerginate belongs. The pediundes of the petitificous flowers are valued as actioning in any of the group to which V. emerginates belongs. The pediundes and obtes, never emerginate.

V. Marsasuraca. Allied to Y. Iolanda, but the rootstock elongated, stort, short-jointed, clothed with the persistent bases of the petioles of former years; plant at flowering time 2 to 4 inches high, the pedincels and petioles erect, of somewhat equal length; herbage of deliast texture, light-green and glabrous: leaves round-resultion to orbicaler, obtase but with a short saliest caup at the apex, the margin rather routby denutes or creanst-coholt-i sepaid solitoger orbiolog lanceolato, obtase: corolla § inch in diameter, the petala all broad and obtase and glabrous; the lowest (or texel) not only purple-wriend but the purple color diffused over the whole petal, the others pure white.

This rather strongly marked white violet is known to me only in herbarium specimens from northeastern British America. The type sheets are three, all belonging to the herbarium of the Canadian Geological Survey, and numbered as follows : 2.353, from damp mossy woods about Lake Mistassini, collected in July, 1885, by J. M. Macoun, the specimens only in full flower at that date : also n. 4.342 from West Branch, Hamilton River, Labrador, A. P. Low, 20 June, 1894, these in early flower, the leaves small; and n. 16,286, from along Richmond Gulf, east shore of Hudson's Bay, Mr. Spreadborough, 30 June, 1896; these specimens large and rank, barely in good flowering condition. From all its allies V. blanda, renifolia and amona, this is readily distinguished by its stout scaly-looking and elongated rootstock, and by its notably toothed foliage, the leaves in all the others being crenate, the proper teeth never salient but on the contrary almost obsolete. The cuspidately apiculate character of the leaf is also quite constant; and so is the deep color of the lower petal. The species is probably not stoloniferous

V. WATSONII. Allied to V. blanda but much larger, similarly light-green as to herbage, and somewhat succulent; leaves relatively smaller, on elongated and stoutish

petioles of cordate-orate outline, distinctly and somewhat closely creater, the upper surfaces with seattered and somewhat appressed short hairs, the plant otherwise glabrous: peduncies long, surpassing the lawers, brateolaton near the middle: sepals lance-linear, 4 lines long, with narrow scartos margins and an acutab hot aclosat-liped aparts; petals apparently part while, spatulate-oblong, more than § inchlong (the expanded corolla more than an inch in diameter), three of them bearded below with strongly clavate white hairs.

A very noteworthy new white violet, found in a bog meadow some unlies from Charlotteown, Privoc Edward Jaland by Mr. Laurence W. Watton, in June, 1898. Though doubtless of the V-blands group, it is remarkable for great dimensions of the corolia, and the robustness of the general habit, the lawes, however, being much smaller in proportion to the whole plant. The rhizone, as far as the specimens show it, is much shorter and stouter than in any of the other relatives of V-blands. We are not informed as to whether the flowers are, as in our other while violets, fragmant.

V. ERTVA. Acadescent, low, stout and subsucculent, glabroan throughout except the petals: lowest leaves subcraiform and small, abruptly acutish, the others successively boadly cordate-orate and deloid-ovate, with an abrupt short acumination, all with broad open sinus and more or loss distinctly tapering to the short petiola, the margin ernante-serrate: pedurales stoat, about equalling the leaves, bibractoatte about the middle, the bractoebs broad, triangular-subulate: sepals hanceolate, nerveles, scarious-margined: petals anorwly spatiation or oblom-spatialate, truncate or retuse at apex, apparently blue, three of them somewate barefield at base.

Plains of northern Colorado, toward the foothills; the best specimens from Carl F. Baker, collected at Fort Collins, 2 May, 1866, and named by me V. cognate at the time; but that species, besides being alender and with slender rootstock, has foliage of rounded outline. In the new one the leaves are trigonous rather than rounded, the rootstock stout and erect, and the whole plant of a very different aspect.

V. CUCLOTILL. Root unknown, the tuffed leaves and flowers terminating a horizontal sady cander; the whole plant glahrons: leaves orbicular, about an inch in diameter, ou petioles of an inch in length or a little more: stout peduncies twice the length of the leaves, bibracteolate far bolow the middle sepais lancoetale, thin, nervelses, saarious-margined; corolla blue, nearly § inch broad, somewhat orbicular, all the petales extremely broad and rounded (round-obovate), marked by dark violet veins toward the base and all wholly glabroas.

Collected at Yellow Head Pass in the Rocky Mountains of British Columbia, 13 July, 1898, by Mr. W. Spreadborough, and communicated by Mr. Macoun; being n. 19,298 of the Geol. Survey Herbarium.

The following violets have hitherto been recognized by us under names that are untenable :

V. AUGOPHILA. V. amona, Le Conta, Lyc. N. Y. iii 14, the name precluded by the V. amona of Symons, Syn. PL. Brit, 198 (1708). The species is seen to be one of the best when one has given due attention to the floral characters. Not only it V. Japohidra woodland plant, whereas V. 5 dands is of boggy meadows, but its petals are twice as large, and remarkably marrow, the two uppermose being quite lightlake, strongly deflected, and twisted almost like the sepals of some orbids. On my first beholding, three years since, the living

flowering plants of what we were calling *V. amena*, this remarkably contorted corolla impressed me at once as exceedingly characteristic; and, now that I possess Le Conté's unpublished plate, I perceive just this floral character to have been fully appreciated, and well brought out by him.

It has been supposed by some, particularly by Asa Gray, that Parsh's *Conduction* was the same as Le Conté *V*. amena; but Le Conte, who knew Parsh and his violets very well, knew better. I ani possession of evidence quite conclaisve that Parsh's *V*. *chandetarian* is *V*. *Viondetaria* is *Viondetaria* is *V*. *Viondetaria* is *V*. *Viondetaria* is *V*. *Viondetaria* is *V*. *Viondetaria* is *Viondetaria* is *V*. *Viondetaria* is *V*. *Viondetaria* is *Viondetaria* i

Although the V. blanda var. palustriformia of Gray is by that author made to include our V. alsophila, nevertheless the type of that variety is a rather high northern plant with very broad and obtuse leaves, quite resembling those of the European V. palustris, to which latter V. alsophila makes no manner of approach.

V. SEMPRETERS. V. Learnandore, Dougl. in Hook. Fl. i 80; the name proceedupid in the V. sarrandorad of Bieberstein, Fl. Tauro-Cances. i. 172 (1808). The plant of Douglas is not only one of the most beautiful of American yellow flowered violets; it appears to be our only species whose leaves are corinecous and evergreen. This character has never before been clearly indicated; but it has been familiarly known to me for twenty years. I stated the fact, but perhaps indisturely, in the Baye-Royion Manuel. V. RAFINESQUII. V. bicolor, Pursh, FL. i 175 (1814), and Nutt. Gen. 151 (1818), not of Gilibert (1781). V. arcenus, Muhl. Cat. 25 (1818), also Ell. Sk. 302, not of Murray (1770). V. tenella, Raf. Am. M. Mag. iv. 191 (1819), probably also of Muhl. 1. e. 26 (1818), but not of Poiret (1810).

This is our only American representative of the Old World paney group of violets; and it in no strange that the earlier generations of American botanists referred it is one or another of the segregates, in their day recently made, of the  $V_i tricolor of Linnews.$  Rafuesque was probably the first to name our plant as a species distinct from all European violets. But of this we cannot be positive; for his  $V_i$  finds of 1800 is a name only, and cannot now be brought into use for any species.

It is quite likely that Muhlenberg—who seems to have had for his V. arceanis a well-matured plant of the present species, and to have founded his V. tenells on the early vernal state of it—adopted the latter name from Rafinseque. Yet this quitor's V. tenells is also a nome nuclum.

The first presentation of the plant to the public under a new name and with a cited means of identification, was made by Rafnesque, as above indicated; but insamuch as the name *tenella* had then been in use for nine or ten years to designate a Syrian violet, I here dedicate the American species to him who was first to really publish it as new.

V. VIEWAILS. F. insignis, Pollard in Bot. Gaz. xxvi. 334. An Autrian V. insignis, published by Richter in 1688, precludes the acceptance of Mr. Pollard's appellation for the plant of the Southern U. S. The figure on page 335 of the *Gazetic* represents the type of the species; but a considerable part of the hortarium material which Mr. Pollard refers to it, I have long taken to be very fair V. supemiloba; and the name vicinatic is doubly appropriate to a violet which is not only manifestly related to V. suptemiloba, but is of the same general habita.

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## NEW WESTERN SPECIES OF ROSA.

R. MELINA. Stout and much branched, 3 or 4 feet high. the stem and branches red, glabrous, glaucescent, sparingly armed with short prickles, some stout and longer, others slender and smaller, but all strongly recurved : stipules finely glandular-serrulate, with also some subsessile glands extending to the rachis of the leaf, but leaflets glabrous and glandless, these about 7, ovate or oval, acute or obtuse simply and sharply serrate : peduncles of the solitary flowers short and stout, woody and not in the least curved or bent in age by the weight of the very large fruit; this broadly somewhat inverse-pyriform, smooth and glabrous, nearly 11 inches in diameter : sepals smooth and glabrous except on the margin, this closely beset with short-stipitate glands, the foliaceous terminal part commonly nearly as large as the basal portion and perfectly glabrous, either simple or with a few large teeth or lobes.

Apparently common at middle elevations in the mountains of Southern Colorado; the bast specimes (in fruits only) collected by myself at Cerro Stammit above Cimaron, 30 Aug. 1896; but the apocies has a northwesterly extension apparently to Moniana, and has passed for *R. Nutlema* with some : though it is extremely different from that by its small allobrous folloge, short and hooked pirkless, short woody pedunoles never shirikhing and eurying in fruit; and the back as in those Northwest Coast roses which form the *R. Nuthema* egyregate.

R. Macouvir. Low shrub of compact growth, the growing branches and short flowering branchlets densely leafy. the older armed with numerous prickles of various sizes, all stoutish and rather deflexed than recurved : leaves wholly glandless, glandus a supprove a slight soft pubsecence on the

#### NEW WESTERN SPECIES OF ROSA.

stipules, rachia and lower face of leaflets; stipules short, ample for the size of the leaves, and plane, obtained or shortpointed; leaflets mostly 9 or II, somewhat cannets-obovato, obtase, sharply scratte from the middle, othersize eather: flowers solitary and short-peltancied, small, rather pale; sepals bread, would)-cillate, bearing very short and inconspicators foliaceous tips; fruits large for the plant, depressedflobes, of a light red (between scarlet and orange).

This rather common rose of the middle and northern Rocky Mountins has often been taken for a standad and subalpine R. Manda, though it is more commonly labelled in the herbaria as R. Woodsif; but to this latter it bears no initiante relationship at all; for that is a shrind with perfectly straight prickles, glandular-edged very narrow and acute stipules, ovate fruit and shining foliage.

My best herbarium specimens are those collected by Mr. John Macoun in Assiniboia (Causd. Surv. numbers 10532 and 10533), and by myself near Cheyenne, Wyoming. It belongs to the region of dry elevated plains, and is subalpine as to devation.

R. MANCA. Dwarf subalpine shrub, sometimes a foot high or more, rather freely branching, the glabrous and smooth red stem and branches armed with few and stoutish compressed and very strongly recurved prickles : leaves small. the leaflets about 7, from somewhat obovate to elliptic, thin, sharply but not deeply serrate, the serratures callous-tipped and the larger with one secondary tooth, all smooth and glabrous on both faces : stipules extremely narrow, glandular, the long and narrow though prominent auricles more herbaceous: flowers solitary at the ends of short leafy branchlets: receptacle and back of sepals glabrous and glaucescent; sepals finely woolly-margined and with notable scattered sessile black glands among the wool, usually also appendaged on one side by a pair of long spreading linear lobes, the foliaceous tips narrowly oblong, entire, glabrous and glandless: corollas small: fruit not seen.

Collected by Messrs, Baker, Earle and Tracy, on dry hillsides at about 10,000 feet altitude in West Mancos Gafion, southern Colorado, July, 1898, and distributed for *R. Arkaw*sona. The name assigned this excellent new rose is taken from the geographical name Mancos, which is Spanish and also Latin for "the cripples."

R. SUPULTA. Stems low, simple, corynthesely floriferous at the summit, the bark green and glacescent, ruther deasely armed with comparatively short straight spreading or ascending prickles: leaftes about 0, obouts, a cent, serrate, finely pubsesent on both faces but most so beneath, the racits short-prickly and with a few short-stakked glands: stipules well developed, sparsely glandular on the margin, their auricles with entire inner margin, the outer strongly and evenly glandular-serrate: receptate smooth and glabrous; spalsh with woolly-cilicate margins, the back barring scattered subsessie glands, their folicecons tips small and entire: fruit to seen.

Of this southern Rocky Mountain rose I have seen but one specimen, and that was communicated to me some years since by the late Dr. Geo. Vasey, from the meadows of the Rio Grande at Las Vegas, New Mexico. It was labelled "R. blanda var. ædigera, Crepin," which is now taken by Grephin for R. Arkansana.

The name R. sufful is suggested by a circumstance which have not mentioned in my diagnosis, because I farst imay be accidental or occasional; though it may possibly prove to be a real character. Between the two auricles of the stipules there arises a leafle, or a pair of them, well developed and complexons, though of only on-fifth or on-fourth the size of the proper leafters; and these are not like theordinary leaflets, in that they hold an upright rather than a pinnatespreading posture. They are parallel to the lobes or uaricles of the stipule, not at right angles with them as the true leaflets are.

R. PRATINCOLA. Almost herbaceous, and never more than suffrutescent, 1 or 2 feet high, usually flowering terminally and corymbosely from upright shoots of the season; bark of the stem green and glaucescent, the prickles dark purplish, all rather slender and weak, but some larger and less slender than others, all straight, spreading or slightly deflexed : leaves very ample for the plant; leaflets 7 to 11, obovate and oblong-obovate, sharply serrate, somewhat cuspidately acute, pubescent on both faces when young, the upper face glabrate in age; stipules very narrow and entire, softpubescent, but neither glandular nor prickly, the rachis often setose-prickly; receptacle smooth and glabrous, the sepals very woolly within and also marginally, the tips villous on both sides, the back of the basal part glandularhispid : achenes nearly smooth, but more or less hirsute on certain of the angles and about the base or summit.

I thus designate unbestatingly as a new species one of the commones of North American roses, and one most abundantly inhabiling a very extensive range in the United States and Chanda; a denize of the pruite regions of the West and Northwest, from Illinois and Missouri to the Da-Kotas and Manitoha. It has passed for  $R_*$  Arkomson, and to that extent that probably almost all the so-called  $R_*$  Arkomson of the hortzaria of the country is of this species. It is found in eastern Kanass and Nebraska, but does not occur in Colorado, or anywhere very near its horders, in so far as we can ascertain. It is the peculiar rose of the rich grassy printies of the upper Missispiry Valley ; and, though passing usually for  $R_*$  Arkanson, has been distributed by Sandberg, from Minnesch, as  $R_*$  havin: It is of course, a part of  $R_*$  blands of the earlier American authors, and of local botanists residing in the parite regions.

Probably no botanist knowing, as I know, both the Illinois and Wisconsin prairies, and the valley of the Arkansas in Colorado, could be brought to entertain the notion that any species of rose could be common to the two. The latter

is an arid and subsaline half-desert country, a region of cactacous and salicorniaccous plants, probably about as different from the region of *Rosa* particular as a ranking the same land; a consideration which does not seem to have entered the minds of our American rhodologists—if we have any much less those of the European students of the genus.

Ross Arkenson has not, İ think, been collectid a second time; and as I spent many a werk in ardnous collecting about Gahon Gity, in different years between 1873 and 1880, without having seen original *R. Arkansana*, I entertain a suspicion that it may have been founded on some corymboseflowering precodous shoot from the root of the so-called *V. blanda* of that region, or perhaps of *R. Fandleri*. But, apart from the antecedent improbability of this our eastern pairie species being also an inhabitant of a cattat desert, the western and xerophilous rose, the real *R. Arkansana*, is alphroux, while ours is pubsecent; it has stipples fredex in the argonic precision of the so-called ular and prickly, while ours has them softly pubsecent only; it has sepalse reflexed in firstit, while in ours these are cred.

## NEW CHORIPETALOUS EXOGENS.

AQUINGIA REMONSTRA. Erect, slender, mostly less than a dot tigh, gladnous except as to the inforcement, the pedundes and exterior of the flowers birtellons-pubsenci; the long-petioled and almost exclusively radical baves glacous beneath: flowers mostly solitary, terminating the merely bureted scapiorm atoms: flowers small, about 1 inch long, the light-green segals and light-yellow limb of the petial erect; spurs straight, longer than the sepals, rather widely inflated above and this part of the flower light-sender: flaments short; styles elongated and exserted. Southern Colorado, in Sidte Reck Cafon. and on the flamks of Mt. Hesperus in spruce woods; collected by Messrs. Baker, Earle and Tracy, 30 June, 1898 (n. 237).

RARVENTLES OFERATES. Stems only 3 or 4 inches high, stoutish and succellent, solitary, from rather elongated and slender ascending rootstock: having few and elongated fibroas roots; the horbage quite glabrous: earliest folings erpresented by one or more ample scarious slipplar sheaths; the lowest proper leaves only lor 2, with short scarious stippled petiols, and blade of absorblead routilos 3-5-parted, their division 3-lobed; availing leaves similar but subsessife. flower solitary, short-peduncied; sequals large and spready dilate stipules photoge externally; the incomprisous petiels, barely equaling the sepais: filaments short; head of pistils elongated: acheene unknown.

Collected by Baker, Barle and Tracy on Mt. Hesperny, Colorado, 2 July, 1896 (n. 912). Manifestly related to *R.* Escheholatii, yet of very different habit; remarkable for the great development of scattious singular. The underground growth very characteristic. Possibly some specimens of this species in the herbarium of Dr. Gray may have given rise to the statement made in the Symplect Flore about a " commonly oblique caudes or short horizontal rootstock" in *R. Eschecholisti*: But the grouine *R. Eschecholisti*: Iventure to say—and I speak from large experience of the plant in many and widely smolered field—han a laway clustered same arising from a compact thif of fibres, showing no trace of rootstock or caudex.

RARNOULS EARLE. Related to R. Bongard, similarly peramial and with slender fibrous roots, the stoutish and nearly glabrous stars 1 to 2 feet high and strictly creet; petioles villous, and lower face of the larves sparingly so, or when young somewhat silk; y blaced the leares do-5-parted, the segments of obovate general outline and cut into about 3 oblong or incochete lobes; peducutiform branches few

and very erect: sepais villons, reflexed: corolla 4 to 6 lines bread, the 5 petials obleng-bowte, obtams, commonly persistent until the maturing of the achenes, these forming a subplobes rather large head; body of the achene compressed, but not thin, margines, the sides strongly punctate under a lens, but smooth and glabrons, the back stout and rather lone. but with a more selender closely recurred tin.

Along the Mancos River and other streams, June 22 and 28, Baker, Earle and Tracy (38, 39, 187). Distributed as *R. acriformis*, to which it bears nothing like a near faility: It is, as I have said, most related to *R. Bongardi*, Greene, but differs essentially by its large and more or less persistent petals.

CLEONE INSURATA. Annual, a foot high or more, erest, rather widely branching above the middle; lower face of leaflets, and also the inflorescence; sparsely hairy; the whole plant otherwise glabrons: leaflets 3, rather broadly lanceolate, acute, earlier, less than an incl long; moscess short and dense: early x-test broadly triangular and cuspidately acuminato: paths white or faintly purplish: stamens very short, not exserted, the filaments not longer than the linear anthers; stips of ovary longer than the rather short exet somewhat incurred ovary; the latter tipped with a very distinct shonder and incurred style.

Near Grand Junction, Colorado, 26 Aug, 1896. Related to C. servided chlerwise known as C. indepriciols somewhat closely, this notwithstanding its small size, and almost incomplications white flowers. The showiness of the flowers in most members of this genus is owing to the gravity elongated and distinctly colored filaments which always surpass the corollars; but here the stammes are short and almost included within the corolla. The prominent inflexed style is another notable character.

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### NEW CHORIPETALOUS EXOGENS.

DRAWA PETROPETLA. Slema several, rigidly evert from a slightly decumbent hase, about it inclush light, these and the long basal leaves arising from a stont and simple perpadicular crown or rootstock densely clobels with the perisisceolate, obtunish, entire 1] inches long, stellatepubescene and hirsub-clinks: the callies similar as to pubescence, though less clinate, but rather numerous, ovate-oblong, spurthough less clinate, but rather numerous, ovate-oblong, spuringly tootled, sessile by a branch hase and erect: racenees short and subcorymbose; corollas large, yellow; calyx sparingly hirstie; pods cliptic or elliptic-lancoolate, glabrons, strongly twisted, beaked by a slender style <u>1</u> line long or more.

Ledges of the Santa Rita Mountains, southern Arizona; collected by C. G. Pringle, 1854, and distributed as *D. stepbearpa*; but greatly at variance with that in its stout scally caudex, upright basal leaves, and obtuse erect cauline ones, not to speak of that stellate pubescence which completely debars its admission as a form of that species.

DRAMA HELLERIANA. D. selfost, Heller in herb, not of Dales (1837), nor Tarcz (1854), nor D. arows, ratsijosa, Gray. Soutish freely branching and leafy biomial (or perbaps sometimes perennial) 1½ feet high; herbage rather the stem with some longer and hirsele ones forked above the middle: couline laws conte-oblong, entire of few toothed, somewhat narrowed to the senale base: racemes unercous and soft, subsettie: sepals yallow, hintutloous with forked hairs; petals golden-yellow: pois much longer than the peticeles, narrow and twisted, acute, tipped with a long stoutish style, marginally hispid-cillolate, the hairs either simple or forked.

In cañons among the foothills of New Mexican mountains at elevations of 7,000 to 8,000 feet, Heller (n. 3669), and Wooton (275). Mr. Heller's statement, printed on his labels

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'Authentic specimen, from type locality," is mere bombast. Fendler collected no such plant as this; and Mr. Heller did not find the subalpine Fendlerian type on which Gray founded his *D. aurea* var. *stylosa*.

DRAM Neo-MEXICASA. Droke aurosy var. stylos, Gray, but not D. styloso of Heller. Perannial, the few skuder sparsely leaff flowering stems 4 to 6 incluss high : lowest leaves spreading and loosely rominite, oblanceolate, entire, destitute of simple hairs; exuiline leaves similar as to pubesence, but of rather broadily lanceolate outline; ealyx stellate-pubsecent; pods alliptical, searcely twisted, glabrous, acate, tipped with a long stylo.

A subliphic species, of the mountains back of Sant Eq. New Moxico, this description daraw from Fendler's n. 43 as found in the U. S. Herbarium. I know no other specimens agreeiog with then ; though I doubt not that more or less of the so-called D avera of the Recky Mountains may ablong here. I have seen no North American specimeus which could rationally be referred to D avera after being compared with the Greenland typo of the species.

DIARM FINETORIZA. A tall and rank very leavy from uial, commonly almost 1] feat lawses from spatialize abovate to oblanceolats, deniteriats, seldom an inch long, the calline larger, ofken 1] incites long, lanceolate or oblong-lanceolate, evenly deniterate or somewhat seriadely toothed, all stallateseabrous on both faces, the stem with some short simple hairs: racenes 1 to 3, elongated but subsessile; equals using the larger of the larger of the stem with some short simple hairs: racenes 1 to 3, elongated but subsessile; equals using the larger of the larger of the stem with some short simple hairs.

In pine woods along the summit of the Pinos Altos Mountains, southern New Mexico, 16 Sept., 1880; collected by the present writer, and distributed as a variety of D. streptocarpa, according to what was then Dr. Gray's opinion regarding it.

DRABA SPECTABILIS. Perennial, the stems numerous, erect, 6 to 12 inches high, equably and rather conjously leafy to the middle, the upper one-half occupied by the long and showy short-peduncled raceme: basal leaves few, narrowly obovate, short-petiolate, an inch long or more; the cauline oblong-obovate, sharply and even sometimes deeply and incisely serrate-toothed; all the foliage thinnish as to texture and green, the lower face sparsely clothed with bifid and closely appressed hairs, or some of the hairs showing a third and short branch, upper face more sparingly roughened with binate or ternate shorter and merely ascending (not appressed) hairs: sepals from almost glabrous to sparsely hirsute with mostly simple hairs: petals very large, goldenvellow ; pods & to & inch long, oblong, obtuse or acutish. glabrate or hirtellous, tipped with a prominent style, their ascending or spreading pedicels 1 to 1 inch long, hirsute in a line beneath, otherwise glabrous.

Plentiful at from about 10,000 to 11,000 feet altitude in the La Plata Myuntain of southern Golorado; collected in 1898, by Baker, Earle and Tracy, and distributed by them partly for *D* aures and partly for *D* styless. Heller; but the plant has exceedient specific characters of it own, and is doubtles the most showy known *Drabs*; in this respect easily rivalling the scapes *D*. *Mogellowins*, Greene.

DRAM LTEROL. Personial, do 10 inches high pale and cincreosity statistic pubsecut throughout, with only a sensity and dimity perceptible villous pubsecure of simple hairs mixed with the stallate on the starm l arows all ovark-hanceolate, actish, entire or servate-toothed, those of the tall flowering stems equably distributed and ascending: recemes usually several from midway of the stem, narrow and rather strict: sepals thin, yallowisheyren, hirstate with mostly

double hairs; petals large, cream-color, obtase, antire: pedicels much shorter than the pods and distinctly villous throughout; pods linear, acute,  $\frac{1}{2}$  to  $\frac{2}{2}$  inch long, slightly contorted, rough-puberalent, tipped with a short and slender style.

From the same region as the last, and by the same ociletors; and increasibly mistaken for *D* arroporegrap, a plant whose best character is that of being villous and not at all stellate-pubsecut. The most robust specimens are those flowering and f-utiling luxrainally as biomials, or at least, the second year from the seed; but others show a perennial duration of the root.

DRAM DRIVILLA Seen stork erect, 3 or 4 inches high, recences almost from the basis: laves mostly in a dense resultate basal tuft, obloug-lanceolate, cutire or sparingly boshel, nardy glabrous superficially, but the margin hirsubscientize: a superficially but the margin hirsubscientize: a superficient superficient superficient superstate-linite: a superficient superficient superficient superstate superficient superficient superficient superficient superstate sessile.

Camp Stambaugh, Wyoming, collected in 1878, by Dr. Maghee; specimen preserved in the U.S. Herbarium, without a name.

TREATPORTER CREATER. Presential, the stort stems sereral form a brunching cander and 3 fest high: herbage green, wholy david of bloom: lowest leaves oblong-oblancolate, obtus, tapering to a rather long petiod, estrongly creante or erenate-serate; cauline leaves reduced and sattered, lanceolate, sessile, subscriptic: racemes short, corymbose-particled: corollas white, the petals small and obtase: ped not seen.

Mancos sage plains, southern Colorado, Baker, Earle and Tracy (n. 394); distributed as *T. integrifolium*, but certainly distinct by its perennial roots, thin crenate leaves, and herbage not in the least glaucous. ANGLANCHER PRUFFORLA. Sheme clustered and backy, for 5 feet high, the branches shout and rigid, with an asky bark: leaves small (the largest only an inch long), outin so, mostly oblong or elliptic and entire, some obevateoblong and with a few teech across the obluss appex, all on shedre reioloss of j inch: fruits few; in a pendulous corymbose raceme, the policels an inch long or more and very leador: sequences of the cary narrowly triangular-lanceolate and elongated, in the reflexed fruiting condition reaching almost to the base of the fruit: flowers not seen.

Ou sage plains and low foothills about Mances, Colorado, July, 1898, Baker, Earle and Tracy (n. 665). Related to the far northwestern A. pallida, and equally xerophilous; but quite distinct by its narrow foliage of different outline, and by its long narrow calyx-iceth.

ANTLANGTER VESTORS. Habit of the preceding, and with similar pair bark, but leave constantly frond-oborato, entire below the middle, sharply serate at the obtuse apex, pale beneath, generes above, compisionally facther-wined, the veins close, in about 8 pairs; pedicels and very short peticles white with a fine tomerum, this responsing on the triangular-lanceolate segments of the calys, but the fullgrown fruit meany (plabrous; coryme bart, fee-flowered.

This is known to me only as collected long ago by Mr. S. B. Parish, at Clasheberry Springs, is southere California. I had referred it to *A*, pullids at first, notwithstanding that is folings is very different, no their gale access the band and being of different outline. But the obvious fine and lose venation of the leaves is in marked contrast with the approximate venlassmes of other coriaceous-leaved desert species of this genus.

## NOTES ON MACHÆRANTHERA.

At page 00 of the preceding volume I named, and gave an outline of the characters of M. mostmor, recording at the same time my suspicion that it would be found an aggregate of several good species. Since the time of that writing I have again visited the habitats of several of these plants: have also examined, in the herbrarium of Columbia Colleço, several of Nutall's specimean not seen by me before; and lastly, Professor Nelson of the Wyoning University has sent me copions material from those high plains where Nutall himself collected as long ago. I am thus much better equipped than I was three years ago, for the work of biuntfying, and more fully describing certain of Nutall's Disterior, most of which fail, according to my view, into the gourn Micharenthers.

M. vizcosa. Dieteria viscosa, Nutt. Trans. Am. Phil. Sco. wil: 301. M. montans, Greene, Phit. Hi. 60, in part. Biennial; the stems solitary or several, erect, 1 to 2 feet highunally spicate or macmose in the middle, but more coryunbase at summit, or not rarely wholly corymbose: herbage green and semingly glabous, but under a leus puberalent, the inforesence and especially the involverse glandular and visicil : lower cultule lawars anrowly oblancobler, ruther remotely but sharply serrate: bracts of the large and nearly turbinda involver in 5 or 6 series and closely individed and very visicil : may rich partle, 13 or 20: aclonesment, compressed, the faces rather obsearely striate under the thin cost of appressence.

Plentiful on plains of the Platte in northern Colorado; the above description based on specimens collected by myself at La Salle, in 1896. The herbage is, as Nuttall said, fragrant; the odor balsamic and very pleasant. M. PERVENCIENTA. Dieteria pulserulanto, Nutl. L. 6.300. M. montma, Greene, L. ci, in part. Biennial, erste, about a foot high, somewhat fastigiately panieled, more or less canesseni with a fine pubsecance, this on the pedamcular bunchleta and luvolacres mixed with sessile or subsessile very minute residierous glands: rather small and scattered levers oblanceotate, entire or scartisetodulch i hands small, subturbinate; involucral bracts in about 3 zeries, rigid, their short green tips subsered; rars (et §6 16 12).

Common on elevated plains in Wyoming, northern Colorado, etc.; a much smaller and more slender plant than *M. viscosa*, and occupying a totally distinct and higher altitudinal belt.

M. DYARICATA. Disteria dissericata, Nutl. L. e. 301, in part. M. montana, Greene, L. e. in part. Rather larger than the last, the branching divariate and diffuse rather than fastiginate: involuces much larger, hemispherical, their bracts in about four series and with abruptly recurved green tips : rays 12 to 16.

Of the same range as the last, and with similar folinge and pubseence; perhaps confluent or hybridizing with it, yet generally distinguishable even in the herbarium by the involucers and mode of branching. In duration it appears to be biennial.

M straterize. Stems several, erect, only 5 to 10 incluse high form a perminiar not, the heads for and autorecomous herbage cinercous-puberalent, but the involucres and their pedicels viscid-granular: leaves narrowly oblaucedute, excito, entire: heads arthese small, the involucres subtributions, their rather broad erect granular bracts in about 3 series, acute, not spreading: rays 15 to 12, horad, purple.

I have this plantonly from Mr. Nelson of Wyoming. His tickets do not indicate the elevation; but I am confident that it must belong to a higher altitude than the foregoing. The locality given is Bacon Creek. It is next of kin to my *M. letterirena*, but is of different habit, with narrow foliage, and is pale with an asky publicate. M. STATUTORA. Percential, the several stoutish erest virgetley reconcess stems two feet high: foling green and stems purplish, but the whole minutaly pubercleut, the inflorescence somewhat glandlart. radical leave with oblong strongly sphone-dentate hind's tarpering to a rather shouter period, the catiline linear-lancochte, aslisntly service there should the stout teeth spinalose-tipped: involuces rather small, turbinane, their rather narrow bracks in about 4 of 5 series, with subsquarrose green tips: rays To 10, rather short and Incompletion. paparently blue.

Dry hillsides of eastern Oregon, W. C. Cusick, 1897 (n. 1811). Somewhat allied to *M. inornata* of northeastern California; but a very well marked species.

M. MONTANA, Greene, Pitt. iii. 60, excl. syn. Disterior pulserulent, discritent and rissen. This name may now stand for the plant of the Californian Sierra which formed a part of the original bat aggregate *M. montana*. It is a parennial, pale throughout with a classroom puberconce, the involuent bracts being glandular. The leaves are all nodaing innarkly lobel corasely tookhed, the radical of narrowly oblanceolate outline, the cauline broadly satulate. These The large backs are corruboes rulter than racemone; the campanulate involuence well imbricated, the bracks with squarrow green tipe.

The species seems to be of only southerly distribution in the Sierra; *M. Shastensis* being its northern homologue.

M. TERTHODUS. After consecut, viz. tophroles, Gray, Syn. P. 106. Sufficiences, the leafy and flowering branches glabrous below, scabrous above; the long linear-lancoalte leaves earbrous beneath and scabrous-ciloitate and with scattered whort spinsecent testh: basis few, large, hearispherical, the involuent bracks hoary-tomentulous and not at all visid or glandular, their tips long and subulatatiennale, spreading or sacroly recreted.

Mountains of New Mexico and Arizona.

M.OXYLEPS. Personial, a foot high or more, the long left stems erect, terminating in mostly a single large head, both stem and narrow certic ascending leaves canescently tomentations, devoid of glands and with no seabronumes: brates of the hemispherical involucre in about 5 series, merely tomestulones, closely invirtuelated and rigidly erect, the short green tips scatte and those of the inner pungent: rays 15 or 20, large and showy.

Southern Arizona, at Apache Pass, J. G. Lemmon, Sept., 1881.

M. RUDIA. Root and basal leaves not known, the stout rigid somewhat fastignistly panelical stem probabily 20-3 feet high; the whole herbage pale with a minute scabrous pubescence intermixed with small resin glands: leaves linear-laneosate and with a few pairs of short stout divaricate spinseem teelh: involucers very numerous and small campanalita, their acute creet horaccous-tipped brasenan, row and in about 5 series: rays small, narrow, rather numerous, but plai and inconspicous.

Collected at Kearn's Cañon, Arizona, by Miss Zuck, and communicated by Prof. Tourney. A coarse unattractive member of the genus, with heads as small as those of *M. parrifora*, though with twice as many bracts to the involucre, and these less herbaceous.

## EARLY SPECIFIC TYPES IN CHAMÆCRISTA.

My paper on GRAAMCRESTA published somewhat more than a year since' was mainly the result of field study, and was designed to exhibit, and to emphasize the taxonomic importance of those very notable peculiarities of floral streeture of which I seemed to have been the discoverer.

<sup>1</sup> PITTONIA iii. 238.

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Pages 25-40. 17 March, 1899.

I have, in the interval, given such attention as I was able to give, to history of the genus in times subsequent to Linmaus; and this line of research has proven no less interesting than was that of the field study of the plants in question. Some results of this bibliographic work I desire here to place upon record, for the use of any who may in the future take up and earry forward to completion a classification of the CRAIMENTER species.

The genus, proposed as such, and duly published under this name, is ante-Linnsean, as I said formerly; but its real founder is not Commelin (1697) but Brevne (1678). And since 1753, when Linnæus suppressed it, I find four different authors reinstating it anteriorly to my own paper of 1897. And it so far seems to hold perfectly true, as I intimated in the earlier paper, that none of these earlier supporters of the genus studied the corolla to the extent of understanding it and making out its peculiarities. Besides Moench (1794 [misprinted 1694 in Pitt. iii, p. 241]), the other and later botanists maintaining the distinctness of these plants from Cassia are, Schrank (1805), who gives it a new name, Grimaldia : Ernest Meyer (1825), who maintains the prior and rightful name, and Rafinesque (1838); this author also retaining the rightful name, but following his own whim of making the English X stand for a Greek Chi, the name with him reading Xamacrista, which he nevertheless must have pronounced Kamacrista

Again: all authors from Linnacu down to our time who have monographed the Cassias—Linnacus (1753 & 1762), Colladon (1816), De Candolle (1825), Vogel (1887) and Bentham (1871)—have admitted *Chamacrista* as a subgenus, and have placed it last in the series, as made up of plants the uost remote of all from the true type of *Cassia*.

In so far as my examination of these authors has proceeded, I observe that while with all of them the members of the *Chamacrista* section are veritable *Chamacristas*, yet other excellent species of the same group are found to be isolated completely from their nearest kindred, and lurk in the most improbable places here and there among the other sections of *Cassia*. In the first edition of Linneus there occurs a fine illustration of this. On pages 379 and 380, under the heading.

## " \* Chamæcristæ, foliolis numerosis,"

we have an unbroken succession of true CLAMAGUSTA species; but then, the very first *Cassia* which he enumerates, (on page 376) *C. diphylda*, is as perfect a *Chamacerida* as any, and should have been rauged with its congeners at the end of the series.

In the following partial enumeration of CHAMCRUSTA species, I shall follow the chronological order of things, begiuning with Linneus and the year 1733. Certain of these species of 1753 were sufficiently indicated in my former paper. The following have now been determined by me as being genuine Chamseriste.

C. MINOSOTDES. Gassie minasolder, Linn. Sp. 379. To this widoly dispersed East Indian type (the original from Coylon) Mr. Bentham reduces—though not without evident migriving—more than twenty species that had been published by various authors; among blass *Chamersila* strict and *C. plumosa* of E. Meyer. I do not find that any figure has hitherto been published of tyricai *C. minosoida*.

C: PLEXTON. Cases former, Linn. 1. c. Tropical America is the habits of this; and it was published as a *Chromosciata*, not as a *Casia*, in pre-Jannan times, by Breyne with a beautiful folio plate, this plate being Linnues' type for the species as a *Casia*. It is the historic type of what should be made a suction of *Chameroida* marked by a strong development of the stipule. It some of the more recent species of this group the stipule is still more strongly developed, and that at the expenses of the leafter, which in some of them are very few, in others almost or altogether wanting.

C. PROCUMBENS. Cassia procumbens, Linn. 1. c., not of Thunberg, nor of Loureiro. An American and subtropical species, with which Linnaeus, in the second edition of his Species, confused a somewhat similar Old World type.

C. DIPUTLA. Cassis diplofile, Linn. 1. c. Cav. Ic. t. 600. Species activity 4 American, thoogh Linnauss made the mistake of attributing it to "India." That the species is a good member of the *Chamerical group* appears to have been discovered by Colladon; and since then all authors have so placed it. In the figure by Cavanille the Chamaerista habit, inflorescence, and corolla are very clearly brought out.

Coming now to the second edition of the Species Plandarum, it is to be observed that in this work four new species are added to the genus Cassie, and three of them are Chameeristas, though but one is there placed in its proper group, the others being ranged with the Sennas. In Chameerista they will receive names as follows:

C. PITOA. Cassis pilose, Linn. Sp. 2 el. 540; Collad. Hist. Cass. 122, 1:20; A. C. energinada. Mill. and C. Milleri, Collad., according to Bentham. Finat originally from the Island of Jaranica, and first published by Patrick Browne in 1756. Not recognized as being a Chemaerizet by Linmons, or Willdenow, but apparently first assigned its place in this series by Colladon.

C. GLANDUCAS. Cassis glandwiden, Linn. 1. c. 542; Colladon, l. c. 129 in part. Also West Indian, and first publiabel by Breyne, in 1675, with an excellent plate (Cent. 24). In his first edition Linneas referred it to his Cassia Channerita; but here in the second edition he segregates it. Colladon has again confused things by clining under C. glandwiden Commellin's Hortus Amstedostmensis, s. 37, which not only prepresents a totally distinct appeace, but is, if I mistake not, the type of *Chamacrista pavonis*, the real *Cassia Chamacrista*, Linn. Of this very old type-species Mr. Bentham appears to have made another of his favorite jumbles, by reducing to it seven species of other authors.

C. SERPENS. Cassia serpens, Linn. Sp. 2 ed. 541; Colladon, l. c. 128. Native of Jamaica, and also of the small-flowered group to which C. nictitans belongs.

After the second edition of Linnear's Species, the next work of importance to general botany is the eighth edition of Miller's Gardneyr' Dictonary. In this are published a very considerable number of new Cassis that hud been unknown to Linnearis, genus. However, it is easily discoverable by his excellent description of what he calls C. chamaerista, that it is not the plant which Linnear had so named, but a really new Cammerista. Colladon in 1816 discovered this fact, and assigned the species a name. Then again, as late as 1896, by an American botanist it was described and named andwr. Jiss name and synonymy mat here be given.

C. C. MARGENFORDES. Cassia clearesripticity, Collad. Hit., Cass. 134. C. Chamacrita, Mill. Dict., not of Linn. C. depress, Follard, Boll. Torr. Club. xxii, 151. Cleansevide depress, Greene, Pitt. iii. 322. Millife seems to bave doubted as to the identity of his plant with the true Cassie Cleansevides for leages that it differs in having a "trailing stalk"; the leaves are much aborter, having but Laff the number of pinne, which are also narrower and shorter. "And these are precisely the clearaters upon which Mr. Pollard established his C. depress. The description in Miller (1768) and that in the paper of 1805, are so completely harmonious that, were the two plants tokination from opposite beners of the same subtropiese, the types came from opposite hores of the same subtropiese, the

Gulf of Mexico, all cause of doubt as to their specific identity is banished.

Seven years subsequently to the appearing of Miller's eighth edition Forskaal issued his *Flora Argupta-Arabica*, and there is eatalogued in this book an Arabian "*Cassia procumbens P* caule erecto." Vahl afterwards, presumably after having critically examined the specimens, published this as new, under the following specific name:

C. SINGLANS. Cassia ingrirons, Vahl, Symb. J. 20 (1790); Colladon, L. 13. Cassia proceedings, Pork. F. J. Egyp-Arab. CXI (1776), not of Linn. Colladon seems to have felt soom doubt as to whether this paperies should be reckoned a *Chamacrida* or a *Chamacenna*; but Forskanl's having taken it for specifically identical with to typical a *Chamacrida* as *C. procembens* would of itself almost warrant the conclusion that it must be of this group; and Vahl's description leaves no room for doubt. I do not ascertain that the species has were been figured.

Among the new Cassias published by Lamarck in 1783, and by Thunberg in 1784, the following are certainly of the present genus:

C. ANGUSTISSIMA. Cassia angustissima, Lam. Encycl. i. 650. An East Indian kind, known well enough long before Linneus, and neatly figured by Plukenet, Almagestum, t. 5, f. 2. and also by Rumphius.

C. BREVIFOLIA. Cassia brevifolia, Lam. l. c. 651; Colladon, Hist. Cass. 123, t. 19. Native of Madagascar.

C. CAPENSIS, E. Mey., in Linnaes, vii. 172. Cassia Capensis, Thunb., Prod. 79. Indigenous to the Cape of Good Hope; figured in Colladon, t. 19.

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At least two of the Cassias published as new by Swartz in 1788 are *Chamæcriste*, namely,

C. VIRGATA. Cassia virgata, Swartz, Prodr. 66, and Fl. Ind. Occid. 728. Belongs to the West Indian archipelago.

C. LINEATA. Cassia lineata, Swartz, Prodr. 66, and Fl-Ind. Occid. 726. Island of Jamaica.

Persoon among his new Cassias of 1805 had two which are of this genus; one of them having been assigned by him an untenable specific name, as will be seen below.

C. ROTUNDIFOLIA. Cassia rolundifolia, Pers. Syn. i. 456; Colladon. Hist. Cass. 119. Native of South America.

C. PERSOONII. Cassia Personii, Collad. l. c. 119 (1816); C. lanceolata, Pers. l. c. (1805), not of Forsk. (1775). Also South American.

Colladou, whose fine monograph, published in 1816, is now a classic, may naturally stand last in the line of early post-Linnaen authors who contributed the knowledge of several new species belonging to this genus; and with these we conclude the present paper.

C. REWYIPES. Cassis brevipes, DC., in Collad. l. c. 119, t. 9, fig. A. . The species is Central American, and is one of many Chammeristes in which the leaflets cousis of only a single pair, but of which the whole habit, and every character of inflorescence and flower and fruit, are at agreement with this generic type.

C. BIFOLIOLATA. Cassia bifoliolata, DC. in Collad. l. c. 120, t. 9, fig. B. Of Mexico and Central America.

C. CUNEATA. Cassia cuneata, DC. in Collad. l. c. 121. Indigenous to South America.

C. HECATOPHYLLA. Cassia hecatophylla, DC. in Collad. l. c. 124, c. 18. Native of islands of the Caribbean Sea.

C. PATELLARIA. Cassia patellaria, DC. in Collad. l. c. 125, t. 16. Isthmus of Panama and regions adjacent.

C. CALYCIOIDES. Cassia calycioides, DC. in Collad. l. c. 125, t. 20, fig. B. Northern South America.

C. ISCHINOMENE. Cassia exchinomene, DC. in Collad. I. e. 127, t. 17. Native of the West Indies; perhaps represented in Breyne's of plate 24, of the Conturie; if so, then forming a part of the very complicated Cassia Chamserista of Linneus. But the present species is evidently much nearer C. miditans.

## NEW SPECIES OF SISYRINCHIUM.

4.S. LANGIDEN. Densely taffed and very elender stem 3 to 5 inches high, from a cluster of long siender rather wiry fibrous roots: leaves very unrrowly linear, 2 to 4 inches issues sacres) unrolling and the subtret with a pair of strong keel-like angles, all parted in the middle into from 2 to 4 sheader peduncles each with a single small fewflowered spathe, its bracts equal or nearly so, accumiants: pelcies short, liftorn, periant large for so small a plant, blue (widently pale), the brack segments alternately merely obtase and abrupty apiculate-suminate, and returns with a triangular-subulate cusp: stances and pisil short, sacredy half the length of the perianti: frain to sees.

In meadows about St. Martinville, Louisiana, 11 April, 1892, Rev. A. B Langlois; said to be very common.

J.S. XEROPHYLLUM. Plant with a distinct though short erect or ascending rootstock bearing rather coarse densely
#### NEW SPECIES OF SISYRINCHIUM.

tomentose fibrous roots; issuit portion of the plant alover ground siteshed with a rather hevey fibrous could of deal remains of the foliage of other sessons: leaves and scapes of about qual length and more than a foot high, all of rather hard and dry texture; leaves pale and glaucescont, about 9 string and very minutely crystalling-granular batween the lines; aleader scape ancepital, with about 3 lines on either side of the middh, and minutely deuticalitate on the almost hyaline edges, the summit bearing two or more peducole agathese, the cluster substanded 'by a long bract; spathes many-flowered, their bracts about qual, acuto, strongly straite; flowers and frains not seen.

Collected by Mr. Nash, on high pine lands mear Eastis Lake, Florida, 1804, and distributed for *S. Bermudiana*; but ropresenting a new species most strongly characterized by its distinct underground stem, tomentose roots, and the fibrous-heathed tuft of leaves and scapes.

(S. LITURALE. Plant of rather thin and flactid depgreen berdage darknning in driving: leaves few and short, though broad, seldom more than two or three, of only about half the height of the seense somewhat unsiform, 7-string and the lives rather remote: scape solitary, a foo high or less, ancipital, bearing a single spathe, the bracks very unequal, the lower for sarpassing the flowers: perioratin rather large, i inch long, violet, the segments alternately obtaue and reture, all solidate-exploite: fruit not seen.

A maritime species, growing among mosses, grasses and rushes, along the shores of Yes Bay, Alaska; collected by Mr. Gorman in July, 1895, and by Mr. Howell at about the same time; all the specimens in flower only.

/ S. MONTANUM. Plant stout, erect, more than a foot high, herbage light-green, glabrous, not glaucescent: foliage rather copious but short, of less than half the length of the scapes, the broad leaves about 9-striate, the alternate lines com-

monly rather obscure; scapes ancipital, each of the broad, sharp-edged subenitive wings strongly Satriake: spathes mostly solitary, their bracts very unequal, the outer of more than twice the length of the inner and 1½ to 2 inches long: perianths apparently dark-purple; capsules large (nearly ‡ inch in diameter), almost globose, very sparsely hairy.

Meadows along the Mances River, southern Colorado, Baker, Earle and Tracy (n. 113), 25 June, 1898; also by the same on Chicken Creek in the La Plata Mountains, at 9,000 feet, 7 July (n. 377). A large and doubtless showy species, occeeding even the Californian & *bellum* in size.

<sup>4</sup>S. BALOPHICKE. Low and sheader, tarket, wiry and gloucoan, the fibrour roots coarse but rather with: rarrow lawes about half the length of the scape, and very strongly 5-7 striate: scapes 50.6 inclusing, larve and very strongly winged rather than ancipital, one of the wings, even, occessionally almost obsolete: spaties small, solitary, their bracts nearly almost obsolete: spaties small, solitary, their bracts nearly applescent, containing few and large seeds, these duil-black, nearly smoth.

Collected at the Homboldt Wells, near Wells, Nevada, 25 July, 1896, in fui coluy. The species bars more superficial likeness to another halophilous species belonging to Arizona, i.e., *S. danisman*, discovered by use in 1889, near Flagstaff. But that has very numerous and almost minute seeds with a very rough texts, i takino has a branching stem barring two or more spathes. Here the stem or scape is perfectly simple and unispathaccoust, the seeb being free, large, and with an almost smooth testa. It is more than possible that this humbolt Valley plant may prove to have a wider distribution, and be found to include certain flowering specimens which are rather numerous in un berbarrium, free various points in western. Newada, and from Californian stations east of the Sierra.

# NEW OR NOTEWORTHY SPECIES,-XXIV,

<sup>1</sup> Russ ARDUN. Near R. amidam, the stems much stanter, right and decrouos with poberolauch bark, the nodes bearing abort very stout recurred triple spins: leaves small, canescently hirtellous on both faces: palaucles 26 dowered calystube finumellorm, the lober oblong, the whole ealyx houry-tomentalose, dark-red within: fruits small, armed with short and stou (slender-conical) spinse, in maturity barsting on one side and ejecting the pulpy mass of the seeds, the pericora perisiting during the succeeding winter.

A remarkable species, discovered among the arid Joshihl of the Californian Sierra are Caliente, Kern County, in 1883, by Mr. N. C. Wilson. The specimens are searcely yet in flower, having been collected in January, but show buds much the ime of expansion, the branches being will loaded with the dry pericarps of the preceding year. The chancters of the branches, spines and folging alone, would abundantly distinguish the species from R, anietant to which I at the time too headily referred the specimense.

#Rines caugarux. Shrab of the size and labit of R. amictum, but wholy glabrons, leares with their lobes less crenter; flowers larger, the whole calyx with its almost cylindric tube and long spreading segments deep crimson : petals while or pink, not strongly involute, laciniate-dentate across the oblues apex : oursy and berry strongly aculated.

Species common in the Californian Coast Range, from Sonoun Co. northward into southern Oregon. Some specimens of it were present when R. amiztum wars first described, and from these the term "glabrate" found place in the diagnosis, the specimens cited from floopic Valley being of the present species, not the true R. amiztum. This last,

though occurring at the north as far westward as the interior of Humbold Co., is properly a shrub of the Sierra Nevada; is always tomentlose even to the cuiside of the calyx, and has a shorter broader flower, with quite different petals, these being only erose-dentate, and much thicker and more waxy in appearance than those of *R.crusatum*.

<sup>4</sup> ARNICA MERIAM. Stems from ascending rootstocks, siender, simple, monocephalous, about a foot high: lowest leaves upright, oblog: hanceolate, slenderly petiolate, cuttre obserred's B-nered'; the cuttion in two pairs, hanceolate, sessile, entire or denitealete, all sparingly pubescent and somewhat glandular; the peduced of the large bead glandular-hirstate: braces of the campanulate involucer lanceolateneumiante, purplib: rays and disk saffore-olocier: pappara pale-faceous and subplumose; acheses sparsely hirstite, not glandular.

This species is known to me only as an alpine plant of the Culifornian Sterra; and it has passed bereforce as  $\lambda$ . alpina, which is European. It is here described from specimes obtained on Mt. Shata, 18 July, 1988, by Dr. C. Hart Merriam, who observes that it is an associate of *Bryanitau*. From *A. informa*, Pursh, which is its lowland houndogue, occurring from along the eastern foothills of the 'Sierra northward and eastward to and beyond the Rocky Mountain plains, both its leaves, flowers and pappus abundantly distinguish it: for *A. Inform* has a prominently 5 neurel foliage of another outline, oblong and merely acutish bracks, yellow flowers, and a whitish merely berellulate pappus.

ARNICL RYDERROIL About a foot high, from an ascending rootstock, simple and rather leafy up to the 2 or 3 slender-peducaled and subcorymbosh ends, apparently all the leaves opposite, and the lowest subradical pair very small, these spatialate-oblong, denticulate, those next above much larger, similar in outline, indistingly 9-mered, re-

#### NEW OR NOTEWORTHY SPECIES.

motely but saliently dentate, the uppermost pair reduced, broadly ovate, abruptly acuminate: involucres narrow and rays few, all the flowers light-yellow: achenes silky-villous, not glandular; pappus fine and white, barbellate.

This is Mr. J. C. Flodman's n. 891 (of my set) from the Little Belt Moontains, Montana, 1889, distributed for A, fulgens, to which it bears no particular resemblance. It is even nearer what we call A, latifolis Bongard, though the leaves are narrow. These are in about five pairs, and are not notably pubsesent or glandular.

\*Accentus toONTECOLA. Root stoat, elongated and elepsented, simple in young plants, in the older multicipitous and bearing several tufus of depressed leaves and short seapes: herbage very pale and glaucoux, glabrous or more or less tomentulous: leaver from oborate and entire to narrowly hanceolate and toothed or pinantifid: scapes stoatish, mody 2 or 3 timeles high, its upper part glandalaciairy; otter involuceral bracts ovate or ownet-lanceolate, the inner norwly hancelate: schemes flances/fusion, diskingly narrowed at sammit and this portion vacant (not filled by the scal); appun dellwhite, ver firm, scarcely varbroas.

A common and well marked species inhubiting the summits of the higher mountains of the middle and northern Californian Sierra, formerly referred to A, glama. The description is drawn mainly from specimene collected on Mr. Shuata, in 1885, by Dr. C. Hart Merrian. I gathered it wyself, ear Donner Lake, as early as 1874, and Mr. Pringle once distributed excellent specimens from, I think, the vicinity of Mr. Shusta.

r LACTUCA CAMPERTARS. Stort, low and very leady, seldom 2] feet high, with a broad but short paniele: leaves ample, pinnshifd and toothed, the testh sharp and salient, all the foliage sessile by a broad and somewhat sagittate clasping base, the midvein beneath prickly, the whole plant otherwise glabrous: involuces  $\frac{3}{4}$  inch long, the outer bracts elongated deltoid, the inner oblong-lanceolate : flowers blue: acheas nearly black; compressed, sharply angled and with one sharp carinate nerve traversing the flattened face: fill form back about equalling the acheaue; pappus very fine, bright-white.

Common on open prairies in southwestern Minnesota ; collected by the writer at Prairie Junction, 7 July, 1898. With much the general likeness of a low and very leafy L. leucophea, this plant drew my attention as something wholly distinct from that woodland species by its clear white pappus. I gathered specimens, not doubting that it was a new species, yet left them lying without examination or comparison, until, in January, in the first issue of Rhodora, there appeared an account of a new Lactuca Morsaii, blueflowered but with white pappus, from New England. Then I conceived that Dr. Robinson's species must probably be the same as my unpublished one from Minnesota. But now, upon actually investigating my plant in the light of the description and figure of L. Morssii, I perceive that they can not be the same; the prairie species exhibiting an extremely different foliage, much larger heads, and a onenerved achene

<sup>2</sup> CASPANTLA WIRKISSIAN, Glabrous perennial, the upright leafy for-downed atoms. 3 to 6 inshes high, from very sender rootstocks: leaves from obsvate-cunciform and toolhed across the summit only, to oblong-lanceoide with serratetoolhed margins: Howers 1 to 3, on slader ever top-durales: ealyx obyramidal, the evert lanceoide entire teeth more than equality the tubular portion: corolid acep blue-purple, franceitorne, erect, efen nearly to the middle, the segments moderately sproming: style about equality fue toe corolia.

Head of Squaw Creek, Mt. Shasta, California, at an altitude of about 8,000 feet, August and September, 1898, Miss Lewanna Wilkins. A beautifully distinct *Campanula*, with no very near relative south of Alaska and the Olympic Mountains; and perhaps nearest *C. aurila*, Greene, of those regions. The calyx in *C. Wilkinsiana* is destitute of auricles or appendages.

 PYBOLA PALLIDA. Near P. pids, but smaller, the foliage altogether of a pale glaucous green and not motifiel: leaves from obvyate and obtuse to almost elliptical, subcoriaceous and with a narrow entire callous margin: racene rather douse; petals greenish, distinctly 3-nerved.

Common on dry moutain sides, in the pine belt of the inner ranges of nordirar California and Orgon; the species well represented by Mr. Qusiek's n. 1714 of his East Oregon Collection of 1897, and hab by my own 933 distributed from near Yreka, in 1376, bubls seut out under the name of  $P_i$  pidza. Dr. C. Hart Merriam has lately shown it to me as collected by himself on Red Cone, near Mt. Shaata, July, 1898, and his insistence on point is a splant wholly distinct from  $P_i$ pidza has led me to examine into its characters, with the neult of ny coming to a full agreement with him in his opinion.  $P_i$  pidz is a plant of the moist woods that its opinion.  $P_i$  pidz has a plant or vivid contrast with those of this denine of the days are in vivid contrast with those of this denine of the day interior.

- PhaceLA FROM. Dearf tafkel but erect peronial, the short cover or caudac clouds with perisistant dand leaves of preceding seasons; leaves crowded around the base of the short pedandes and on storile lateral shoots, all simple and entire, with elliptic picture-voiced and silverystrigulose blade of less than an inch in length, and a stort birster petide as long; calyx-equents linear, highl with scattered white bristles and destitute of other pubesence: crollas subejindric, little surpressing the calyx, apparently whitish, stamens and styles exerted : capsule by abortion 1-seeded.

Alpine on Mt. Shasta, California; cellected by Dr. Merriam, 3 Aug., 1898. Species of the typical group of the genus; but all its immediate relatives are large plants, and of lower altitudes.

ANTENNATIA CONFINIS. Stems tufed; suffrutescent, ascending, very leading, to to line-inkip including the sparingly bracted scapiform peduncles: leaves spartalate-oblong, obtainsin, nuccronulate, about j inch long, 1-nervel, densely aliky-tomentose on both faces: heads 5 to 9, subsessile and glomerate at summit of the bracted peduncle: involucre small and rather short, the bracts with lorownish-yellowish very obtuse scarious tips from oborate in the outer series to oblong in the inner: britles of the pappus short and rather rigid: and plant unknows.

Process based on specimens obtained in the Santa Gatalian Mountains, Arizona, in June, 1880, by Mr. J. G. Lemmon. It is of the group to which belong A media of the Sirra Nevada, and A. umbrinella of the northern Rocky Mountains; but is distinctly suffratement, the stolo-alike branches of the early part of the season remaining proper branches, not rooting. The involvers differ from these of A umbrinella in that the scarious tips of the bratch are firmer in texture, and of only a brownink-remany color. AVERNARIA NEMORALIA. Blide of radical leave roundobvate to cunate-obvate, yery obuses and notably mucronate, 1 to 1j inches long, lightly 3-mered, glabrate abver, elongated, sacredy leafy except at apex, the growing leaves thinly tomentose above, densely so benath: flowering stems (only the male known) 3 to 6 inches high, with linearacominate bracts: heads 60 r5, the central sessile, the others short-stakled, white tips of the involuent bracts oblong, obtase or truncate: tips of the pappus bristles lanceolate, servilate or subsurise.

Said to be common in groves and open woods about Knoxville, Tennesse; collected by A. Ruth, but the male plants only have been sent me; and these resemble those of A. decipiens (Put, iii.221); but their stolows are longer and move depressed; their mature foliage is of another outline, and its upper surface is glabrate in maturity, while the tipe of the approachristies are much broader and less servat. It is unfortunate not to know the female plant of a species so well marked.

CHINGORIANTS FORMORIS. Low, branched from the bass, forming dame a danost apherical masses about a foot high: both the branches and very narrowly linear spreading folinge white with tomentum; all the branchlest terminating in a large and dense grue of rather clongated heads; branchlets of the grue and their smaller bract-like leaves white tomentoes, but the involverse sholly glubrous, their bracts numerous, 6 or 7 in each of the very distinct vortical ranks, the very short outer ones ovate; the inner successively longer, the immost oblong-linear, all obtuse or acutish : corollas and acheses not known.

A very elegant species, most distinct in habit and characters of the involucre, found only by the writer, in the neighborhood of a mineral spring among the hills a few miles southwest from Grand Junction, Colorado, 27 Aug., 1896;

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at which time the shrub, though very showy with its fine white foliage and dense clusters of bright straw-colored involucres, was not yet quite in flower.

All the following Chrysothamni, which were placed as doubtful varieties of *C. speciouss* in the third column of Erythea, I am now more fully convinced deserve the rank of species.

C. GNAPHALODES. C. speciosus, var. gnaphalodes, Greene, Eryth. iii. 110.

C. LATISQUAMEUS. C. speciosus, var. latisquameus, Greene, l. c.

C. ARIZONICUS. C. speciosus, var. Arizonicus, Greene, l. c.

C. PLATTENSIS. C. speciosus, var. Plattensis, Greene, l. c. 111.

The essential characters of all the above are given in the place cited, and need not be here repeated.

GRINOMIA OXTREPS. Apparently annual (possibly biennik), erect, ruther sender, about a foot high, simple and leafy up to the corymbose summit, or with a few divergent branches; stem glabroux, while and shiring: Lawes small and marrow, spatulate-oblong or oblanceolate, remotely serrulate, one-our-qui, asselle by a bord a unrichulte-classing base, or the auricles aduate to the stem: involuces low-hemispherical, in the bord or more, its bracts subulate-laneoulation and the stem is and specifical, the inner very lation and the stem is and specifical, the inner very lation and the stem is and specifical and specifical with two angles, to somewhat triangular and quadrangular, brained as to bid, reds, formedia, paper, and the specifical with two angles, to somewhat triangular and quadrangular, braines 2 to 4, twice the length of the achem, very slander for the geness bard perfectly smooth.

Moist plains near Chihuahua, Mexico, C. G. Pringle, 1886,

#### NEW OR NOTEWORTHY SPECIES.

n. 748 in my herbarium, distributed for G. squarrosa, to which it is as much related as to any other Grindelia, yet remarkably distinct by characters of involucre, achene and pappus.

HTMINFORPRETS LOURS. Next II. Index, and with similar multicipious curdex and leading sedencefultorm stems about a foot high, but more slender, the monocephalous brouches of the inflorescence longer and more divergent; herbage less tomentess, often green and almost glabrous: mither broad darle, comparaultar, their bracks divintely biserial, the outer shorter, owal or broadly oblong, showing a mither broad darle, purple matrix, he inner consider-abovate, now subjects, the bills green shorter, our graphest, et namachiners sliky-villous, scalas of the pappure about-abovate, as long as the proper tube of the corolla and axceeding the villous hairs of the achenon.

Inyo and San Bernardino counties, California, collected and distributed apparently only by Mr. S. B. Parish, whose earliest specimens were sent out as representing a variety of *H. luteus*, the later ones being labelled *H. filiolius*.

STUTUTEX INSLANTIONS. SLEM 3 to 5 feet high, obtainely quadrangular, triatic between the angles, glaboras, leafy ; leaves all opposite, elongated-wate, 4 to 6 inches long including the patielos of an inche, more oles, kinimis, lightly and irregularly serrate-dentate, or the uppermost subscrift, all subrous above, scarcely so beneath: heads in a rather plations: large inner bracts of the involuces broadly oborate, very obtas, the outer scenesively shorter, relatively less broad and less obtase, all hispid-ciliolate: acheese narrowly and sementia tennaeley oboxies, narrowly winged.

The plant thus named and described is probably included by recent authors in S. trifoliatum, and may form a part of Gray's variety latitodiums of that species. It is also the S. lawigatum of Elliott, by the description, but can not be that of Pursh. The species is well represented in Mr. Ruth's n. 777, from near Knoxville, Tennessee, of the collection of 1898.

SILTING COLLING. Shem terele, stoutish, strinde, 3 to 6 for high, glabrosa, glanescend, aparsky lasky, all the lavers alternate, pariolate, the petioles about as long as the binder; these of broadly ovate outline, commonly cordate or subcordate, angulate-lobed, the lobes entire or toolbed: heads in an ample panicle, small; outer bracts of involuere ovate, the inner obloap-ovate, all obtress, glabrous, only the margins schrous-ciliolate: rays about 5, little more than 3 inch long; achoese puberoute, strongly obsordate, the winges ending as to form a narrow and deep notch; awas not manifest, aponerally wanting.

Mountains of eastern Tennessee to those of western Georgia; not rare in collections, but mistaken for a form of *S. com*positum, which is a plant of the lowlands of the southern seaboard, of half the size of the present species, with leafless and scapiform stem, the foliage appearing as if ternately compound (whence the name compositum).

SILUTION SUGPONT. Shem a yard high more or less, southis, terets and strinks, very leafy, the leaves in torso or threes or alternate, mostly oblong-lancoolate, from repard to coarely creaned or cremate-dentiate, sparsely sechous on both faces, the margins strongly so, the uppermost ovate, sessifiby a broat and Indi-Casnying base: heads large, long-peinncled; breats of involucre ovate, obtase or acuts, puberulent and sechous-elinities : achenes large, nearly 1 inch long inclusive of the wings, these broadest at the summit, ending to form an acutofy triangular deep noteh.

Collected at Palma Sola, Florida, by Simpson, July, 1890; the specimens preserved in the U.S. Herbarium. SILTENTED INCESSES. Shem 2 foot high, rather should, with a few pairs of reduced opposite lowers, the principal foliage radical and large, with clongated-ovate biale 6 or 3 inches long (the hirst petioles nearly a long), coarsely and incisely though not deeply toothed, sparsely strigos-hispidulous on both faces; cauline leaves lanceolate, inclusionthum, the lower pairs petiolate, the upper sessile: heads in a nakedpaduncied cyme; involvent brate ovai to ovate, glahoros, eliiolate: achenes ovai, narrowly winged marginally, but the wings abrophy produced a target munition to pairs of breadly subulate teeth half as long as the body of the achene and forming a deep obtesly triangular notch.

Peculiar species, known to me in a single, but very good specimen, preserved in the U.S. Herbarium; collected near Rome, Georgia, July, 1888, by Gerald McCarthy.

# NEGLECTED GENERIC TYPES .- I.

#### PHYLA.

Loureiro, Fl. Cochin. 66 (1790). Zapania, Lam. i. 58, t. 17 (1791). Platomia, Rafinesque, N.Y. Med. Repos. v. 352 (1806), and Piarimuko of the same, Fl. Telluri. ii. 102 (1836). Species of Verbena, with Linneus and pre-Linnean authors; of Blairia, Gaertner; of Lippia, Michx., and many more recent works.

The type of this genus, known for a century or more before Linneuses a Verban noidforw, was retained in the Sporia Plandruow under that name. In general aspect the plant is more like certain species of Verban than anything else; but this superficial likeness is decouplive. The simplest examination of its inflorescence and fruit discloses characters indicative of a much nearer affinity to Londons and Leppis, these two representing a verbeanceous type very far removel from Verban itself; for the group of which the last-named is

typical has a fruit consisting of four distinct nutlets, while the Lantana-Lippia assemblage all have their carpels consolidated. Lantana itself is characterized essentially by a drupaceous fruit, and Lippia, as to its type-species, is so much like Lantana in habit, inflorescence, and general aspect, that only the absence of fleshiness to the pericarp separates it from that genus. Both Lantana and Lippia are coarse rough-leaved shrubs. Phyla on the other hand is a small genus of more or less creeping perennial herbs of altogether peculiar habit and aspect; and they have a pubescence most characteristic, consisting of sessile forked hairs. This kind of pubescence occurs in several genera of the Cruciferæ : but in the Verbenaceæ it does not occur except in Phyla. In those extremely Lantana-like shrubs constituting typical Lippia the calvx is oblong-campanulate simply, with being compressed or flattened. In Phyla this organ is flat by compression, its two lobes being conduplicate. Hardly even Verbena itself is more definitely limited than is Phyla, both by habit and character.

The earliest botanist to propose the separation of this type from Verkena appears to have been Gartner in 1785; but he merely appends the type-species to his genus Blairia; us o that it can not be received as the type of that genus. But Lamarck three years later seems to receive Verkena wolfdow an the type-species of his genus Zeparkar, and it has been under this name that the various supporters of the genus have ranged the species; but Louriviro's Playla in also based on V. neidfora, and enjoys a year's priority over Zepania.

I can not attempt a full enumeration of the species; but all the following are known to me either by field acquaintauce or in herbarium specimens, or both.

P. NODIFLORA. Verbena nodiflora, C. Bauh. Prodr. 125. Icon. (1620); J. Bauh. Hist. iii. 444. Icon. (1651); Moris. Hist. iii. sect. 11, t. 25, fig. 8 (1699); Barrelier, Icon. Rar. t. 855 (1714); Linn. Sp. Pl. 20 (1753). Blairie notificea, Garta, Fr. et Sem. i. 206, t. 56 (1788). Zapania notificea, Lau. Iltustr. i. 59, t. 17, fig. 3 (1791); Phyla Chineusis, Loursiro, Fl. Cochin. 66 (1790). Lippia endilora, Michz. Phil. 15 (1903). Plainien unificar (mispirit for oxifiera 7), Raf. N. Y. Med. Repos. v. 352 (1908). Farinnula Chineusis, Raf. Fl. Tollur, ii. 102 (1886).

If all that passes under this name is one species, it certainly has a more remarkable geographic range, being found in the tropical and subtropical parts of all the continents and of every archipelago that lises within those lines. It is curious that Linnaus names only "Virginia" as the habitat of the species, while it had been known as thoroughly indigenous to the Mediterranean regions of the Old World for at least a hundred years before his day.

P. LANGROLATA. Lippia? lanceolata, Michx. Fl. ii. 15(1803). Zapania lanceolata, Jusa. Ann. Mus. Par. vii. 72 (1806). Indigenous to the Middle and Southern United States, probably also extending to Mexico, and even to Central America if the Lippia Queetanensis of Kunth be, as some suppose, the same species.

P. CUNRTOLL. Zapanie canaiolain, Torr. Ann. N. I. Jey. ii. 224 (1826). Lippia canaiolain, Stead. Nom. ii. 54 (1841). Torr. Marcy's Report 201, L 17. A very strongly marked halophilous species, common on moist subsaline or alkaline phains of the Rocky Mountain region, ranging wetward to California, southward to Arizona and perhaps Maxico, and with a user relative or two in South America.

P. RHYLANS. Lippin replans, HBK. Nov. Gen. et Sp. ii. 263 (1817). Common in tropical America; allied to the preeding, but its oborate-encate leaves are strongly pinnatenerved and distinctly plicate, thus differing greatly in appearance from these of any United States *Phylo*.

P. CANESCENS. Lippia cancecens, HBK. l. c. Widely dispersed in tropical and subtropical South America, inhabiting grassy plains; the leaves much larger than in the preceding, not in the least plicate, but quite plane.

P. BETULÆFOLIA. Lippia betulsfolia, HBK. 1.e. 264. Indigenous to northern South America; marked by larger leaves of rhombic-vate outline, whit impressed pinnate veins, and coarse sharp serrate teeth. Though strictly of this genus, Mr. Bentham is said to have made it the type of a new one. Crypticalize negledicalia, see DC, Prodr. xi. 654.

#### SIEVERSIA.

Willdenow, Berl. Mag. v. 397 (1811); R. Br. in Parry's First Voyage, App. 276 (1824); G. Don, Gen. Syst. ii. 527 (1832). Species of Geum with most earlier and later authors.

The essential characters of Sieversia as distinguished from Geum are those of its style; this organ here being slender, straight, continuous without articulation or bend, and in fruit wholly persistent and plumose : whereas in Geum it is short, stiff, jointed and bent at or near the middle, the upper portion eventually falling away. It is therefore a more strongly fortified genus than is Pulsatilla as compared with Anemone ; for in this instance the style in neither genus is either bent or jointed or in any part deciduous ; and Pulsatilla rests on no other character of fruit than its elongated and slender plumose styles. It is habitally somewhat unlike Anemone, yet not more so than Sieversia is unlike Geum : so that, on the whole, Sieversia is a better genus than Pulsatilla : and there have not been wanting eminent hotanists who maintained the former while declining to give recognition to Pulsatilla, as for example Sir William Hooker in the Flora Boreali-Americana ; George Don in the General System. and Endlicher, Genera Plantarum ; and there are others ; while the extreme of inconsistency is chargeable to some recent authors who maintain Pulsatilla yet suppress Sieversia. I here enumerate only such species as have been attributed to North America.

S. PENTAPETALA. Dryas pentapetala, Linn. Amon. ii. 353 (1750), and Sp. Pl. i. 501 (1753). Dryas anemonoides, Pallas, Reise, iii. App. n. 92. t. xxviii. fig. 2(1776). Anemone pusilla, Gærtn. Com. Petrop. xiv. 543, t. xix. fig. 2, 3, vide Pallas. l. c. Caryophyllata Camtschatica, Lam. Encyl. i. 395 (1783). Geum anemonoides, Willd. Sp. Pl. ii. 1117 (1799). Sieversia anemonoides, Willd, Berl, Mag. v. 397 (1811). Originally from Kamtschatka, the species was credited by Pursh to our "Northwest Coast and the Kurile Islands," apparently on the authority of specimens in Lambert's herbarium obtained from Pallas. But Gray, in the Flora of North America, after having seen the specimens cited by Pursh, quotes Pallas' labels thus : " Islands towards the coast of America," and " Unalaska"; but the actual occurrence of this plant either on or near the American Continent seems to need verification

I quite sympathies with those authors who have dropped the earliest specific name perkapted in favor of the second one, anenmodels; for the earlier, given under Dryas, when it was very fitting, is absurd in a geoux where all the species are pentapetatos. But these are days in which it seems useless to attempt to resist the tide of feeling for strict priority.

S. GLACIALIS, R. Br. l. e. (1824). Geum glaciale, Fisch. in Mem. Soc. Mose. ii, 187, t. xi, fig. 20 (1809). Also an Asiatic species, but one whose occurrence in arctic or subarctic America is well authenticated.

S. Rossir, R. Br. I. c. (1824). Geum Rossii, Seringe, in DC. Prodr. ii, 553 (1825). Species exclusively North American and subarctic; but the two following have been confused with it.

S. TUBBINATA. Geum turbinatum, Rydb. Bull. Torr. Club. xxiv. 91 (1897). Inhabiting the Rocky Mountains from Arizona and New Mexico northward.

S. SERICEA. Geum sericeum, Greene, Pitt. iii. 172 (1897). From the Ruby Mountains, Nevada, to Montana.

These three species, S. Rossi, turbinate and sericea, while a greement with the generic type in point of habit, and in the continuity and persistency of the styles, fail to show the plumose characters in this organ. They may be comparing to such apecies of Clematis as C. Tékheri and crigon, ja which the fathery hairiness of the styles also fails; but no out oubst their title to membership in the genus Clematis.

S. ROTUNDFOLLA, Ch. & Schl. in Linnna, ii. 4 (1827). Germ rotundi/olium, Langad. in DC. Prodr. ii. 15 (1825). Here we have a northwestern and insular Sieveria with foliage more like that of Geum; but the styles are continuous, and also distinctly though rather lightly feathery.

S. CHARA, G. Don, Gen. Hist, ii. 255 (1852), also & trijfore of the same. Genwe dilatare, Parch, Fi. i. 322 (1814), also G. trijforum of the same, ii. 726. Our most common species, extending across the continent northward along the boundary between the United States and British America, in the western mountain districts and high partier agious occurring as far south as Missouri and Arizons, it Parsh's G. elidatam and trijforum, be one and the same species; which there may be reason for doubling.

#### VANCLEVEA.

Low tufted desert shrub, with the habit of certain species of Chrysothamnus, nearly; but bracts of the turbinate involucre wholly herbaceous, and very gummy as in *Grin*delia. Rays none. Disk-corollas elaviform, with 5 short erect teeth. Styles elongated, their tips long, subterete, papillose-puberalent as in Eupatoriaceous plants. Achenes apparently prismatic, villous-hirsute, surmounted by a persistent-pappus of about 12 chartaceous narrowly linear very acuto pales, their margins delicately eliolate.

The genus is dedicated to the memory of Mr. J. W. Van Cleve, resident of Dayton, Ohio, in the days of Short, Peter, Riddell and Houghton, and a co-laborer with them in the field of western Botany.

V. STVLOSA. Grindelia styless, Eastwood, in Proc. Calif. Acad. 2 ser. vi. 293 (1896). Inhabitant of sandy desert wastes in southeastern Utah; and perhaps the sole specific representative of its genus.

# Two New Gerardias.

#### WITH PLATES IX AND X.

G. DECRATORA. Very sheader stem about a foot high, simple to the middle, these bearing a few pairs of short simple racemose branches: leaves sarcedy a half-inch long, scatescast-fillions, nearbing, norberghouts according or public the lower part of the stem, those subtending the few branches more spreading: pedicids about *j* inch long, seconding, stoutish and firm for a plant so dender: ealyx with wenulose tube and short sout testic: accordia bright pick, less than *j* inch long, more than *j* inch broad, the lobes all spreading and obsordate.

Plant not uncommon about Brookland, D. C. inhabiting grassy knolls and hillsides bordering on pine woods; flowering in October. The striking peculiarity of the species is the obcordate character of the primary divisions of the corolls, giving this organ the appearance of being ten-lobed.

G. HOMMANA. Commonly 14 feet high and loosely paniculate from near the base: leaves about an inch long and spreading, very marrowly linear, acute, only very minutely roughened: pedicels filtform, about an inch long: culyztesth very short: orolla deep roos-purple, i inch broad and nearly as long, the lobes all spreading, broader than long, runneato or returns, villous-cillate: the longer filtements very villous, as also the throat of the corolla behind them ; anthers with promisent incurved memory.

Pleutiful in open pine and oak groves along Michigan Avenne south of the Soldier's Home ground near Brockland, D. C., collected by Mr. Holm and the writer, 20 Oct. 1898. Possibly heretofore confused with *G. tessifolia*, from which it differs very strikingly in that all its corolla-lobes are spreading and subequal. In *G. tessifolia* (which is a much smaller pland) in all its forms, the two upper lobes of the corolla are erect, and galeately arched over the stances, while the others are larger and spreading. This excellent species I dedicate to my friend Mr. Theodor Holm of Brockland, D. C., not merely out of complianet; for the detection of the characters of both these species as distinct and probaby new, was the result of his own study of them in the field i and the excellent plates accompanying this paper are from his dravings.



GERARDIA DECEMLOBA, Greene.



GERARDIA HOLMIANA, Greene.

Vol. IV.

Part 21.

# PITTONIA.

# A SERIES OF BOTANICAL PAPERS

# EDWARD L. GREENE,

Professor of Botany in the Catholic University of America,

WASHINGTON, D. C.

JULY-DECEMBER, 1899.

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Price, Fifty Cents

PATOT, UPHAN & Co., Sun Francisco: WILLIAM WESLEY & Sos, London.

# A DECADE OF NEW GUTIERREZIAS.

Representatives of the genus *Chileresia* are abundant on all elvated phisms and arid mountain slopes from Texas to the Datotas, and westward to the Pacific; but the critical study of them has never been taken up at all environly since the time of Nattall and the alder De Candolle. It is easy to say that treaty or thirty seeming species, gathered out of as many different and often widely separated climatic regions, are all but so many molifications of *California Studensis*," much easier than it is to carefully work out their specific characters. But the more difficult alternatives is the only one that gives promise of results astisfactory to the travelled and observant tadjent.

The following are some of the species which I am able to make out from material existing in my own herbarium, collected largely by myself during many years of field work in the West.

G. DTURNETOLLA. Stems 4 to 5 inches high, loosely rather than densely turbed on a short toot ligncose rown of the Toot, angled and seabrous but hardly glutinose; lowes leaves snowthat to blancolate, the short blade stapering to a long winder and high-failulate petion, this again gradbally lines and the base; only the uppermost truly lines and these not narrowly no; infloressence of large and rather less distances and not flattchopped crune; brands of the involutes in a only about 3 series, with thick obtase group lips; rays 5 or 4, disk-dowres 5 or 10; pappenpalse in the disk-dowers 5 to 12, very narrow and a cate, those of the disk (as is usual in the group).

PITTONIA, VOL. IV.

Pages 53-72. 7 July, 1899.

Prequent from Middle and North Parks in the mountains of Colondo, to Montana and weatward into Unia. The description is drawn from my own apscimates obtained at various times near Laramie, Wyoming. Mr. Watsowis n. 561, from Parky's Park, Utah, July, 1809, is of this species, encording to the sheet retained in the U.S. Herbartum, where also is a sheet collected by Marcus Jones, at Cottrell's Ranch, Utah, 2J July, 1804.

G. LONGTOCLA. Shrubby at base, the leafy and floriforous branches of the reason nearly two feet high: older stems terete, the newer striate and somewhat angled, devoid of inches long or more. Lonered: heads assells and glomerate at the ends of fastigiste branchiets and forming a broad nearly flat-topped inflorescence; involucers elongated, obovate-turbinate, 2] lines high, their brack long, with thick short green tips: flowers of ray and disk each 4 of 5; papurapales of about the same number, mostly lanceolate, those of the ray shorter.

Collected in the White Mountains of New Macio, Aug. 1867, by Mr. E. O. Wooton, and distributed as *G. micro-ophila* (a. 377 of my set). The heads are notably long, narrow and few-dlowered ; but the plant is very large, perhaps he largest of its geous, and very unlike all others in aspect, its long foliage giving it much the appearance of *Gymnosymma Grymbosum*.

G. GLONKERLLA. Tuffed stors 2 feet high, not elender, latigately corrollose, the branches of the asson strated, glabrour; narrowly linear leaves ascending, scaberdloss, punctate, the ultimate twigs of the inforsence and the involucers very glutinous, the latter mostly essile in glomerales of 3 to 5, nearly epindic, with only 1 may and 1 disk-flower, the bracks few, obtass, scarcely green-tipped; the ray-dower hall-enfolded by its involucent brack.

## A DECADE OF NEW GUTIERREZIAS.

This is Mr. Woodon's n. 449, from the Organ Monntains, New Mexico, distributed, with my approval, as G. lucido; but this was too hastily done. The plant has, indeed, the absorplindric 2-Movered involuces of the California species; but is has not the yellow-green somewhat shiring herbage which suggested the specific name lauidd; nor is it glabrous; and its foliage is ascending on the stems, while that of G. lucids is dediced.

G. TILTOLIA. Size and habit of the last, but herbage dark-green and hirzholou-schorous, hie lawse seending, linear-filiform, nearly 2 inches loog; heads in a rather loose panicle, a few sessile, but most of them on short filform policies: involucers narrowly obvoid, the long inner bracks obtass and merely green-apiculate, the outer and horter with hirds green tips: Howers of ray and disk 3 or 4 each, or these of the disk sometimes 2 only, the rays loog for the group.

White Mountains of New Mexico, 24 August, 1897, at an altitude of about 5000 feet, on what is called Gomod Mountain, collected by E. O. Wooton; apparently not distributed, my sheet of specimens having no number attached. By the number of forvers to the hised this would be at agreement whit G. microophala, which, however, is a Mexican precise quite different from this in important points.

G. rENTERS. Shrubby below the middle, the whole that of sender stems nearly two feet high, the lawse and twigg sparsely scaberalous; branchlets of the fastigiate-corymbuse infloressence very scheder: lawses all narrowly linear and plane, scarcely more than  $\frac{1}{2}$  line wide: heads mostly pedicellate, or the terminal ones schessifie in paris or threes rinevolucres obsvoid,  $\frac{1}{4}$  lines high, their bracts in three series, in-might and and very obtains, include to be scartousmargined at summit rather than green-tipped, but the short outer cose less obtase and with ever prevent price ray-dowers

about 4, those of the disk about 6; achenes with only a few hairs; pappus of about ten palee, the greater part of them somewhat lanceolate, or oblanceolate, the others narrower and shorter.

Foothills of the mountains back of Silver City, New Mexico, collected by the writer Sept. 30, 1880.

G. FARGUTUATA. Size of the last, but less slender, the stem and laves still more sparingly sub-orthous, somewhat granular and quite viscid, the leaves fow and widely spreading, the axils bearing short very leafy branchlets mostly stells, but some monocephalous: inforescence somewhat dichotemously cymose-panield: involuteres oblogaclaxate, 2 lines high, their bracks in about 4 series, all accept the broad innermost ones with erect and stout green-herbaceous tips: flowers of lisk and ray about five each; schemes somewhat sity, and pappus of lanceolate pales only fower in the ray, nearly a long as those of the disk.

Collected at Grand Junction, Colorado, 26 Aug., 1896. The flowers are all of a notably pale color for this genus.

G. HNULL, Very sleader densely tifted stems erect from a much branched woody base, desitute of leaves at flowering time, bearing above the middle numerous fastigiate afmost filform reedy branchiels shardy and guilar and diritellouw-seabrous, clothed with scattered short and apreading leavy bracks: involuces oblog-obevid, less than 2 lines high, their narrow bracks with acutish green tips: flowers of ray and disk each of o 5: approaples lancedate, acute.

Obtained mar Gray, New Merico, in August, 1398, by Miss Stohan, and also calteted on Eagle Chief Creak, Oklahoma, 12 Oct., 1896, by L. F. Ward, whose specimens are in the U. S. Herbarium. The species of quite peculiar aspect, the leaves harving mostly failure at flowering time, the bushy tuffs of naked reedy stems bearing only a few bracks on the filtorm write; or the flat-topol inflorescence. G. LEPTDOTA. Loosely tuffied on a woody base, the ledy and forifrons stems 14 for blight, smooth and glabrous, the rather large heads loosely cymose-panieled: lower leaves unrowly oblanceolato, obtune, the upper successively narrover and these under the paniele linear, all ascending, only their margins subrons, the surface marked with large dots each bordered with a hyaline scale, olterwise glabrous: the very distinctly turbinate involucers about 3 lines high, their bracks in about 4 series, all with thick bluur green tips: flowers of ray and diak each 6 or 7, light-yellow: palse of the pappus all lanceolate, neute.

Plains about Grand Junction, Colorado, 27 Aug., 1899, collected by the writer. Species very distinct by its scurfy indument and large turbinate involuces; as also by the character of its leaf-outline.

G. SENGTERA. Low slender rather diffusely panieled stems tufted on a short erect lignosu base, the whole less than a foot high: the slender angular branchlets and very narrow linear spreading foliage dark green, only very sparingly seaberulous, the leaves somewhat punctate: the numerous heads mostly solitary at the ends of short fillform branchlets: involucers barely 14 lines tight, roundish and subcamtives are brack brack and obtuse, not very notably green-tipped: flowers of the ray about 5, of the disk almost they as almost, pashes of the papous oblong and obtuse in the ray, oblong-lanceolate and either obtuse or acute in the disk.

Plains about Treson in southern Arizona, beginning to flower lack in attumn and continuing through the winter; excellent specimeus in fruit, and with some beads still in the flowering state, were collected by Prof. Toursey; S March, 1899; and distributed for *G. spherocophala*; a species which has, like this, a lar inforescence of nearly spherical heads. But that is an annual, while *G. servina* is strictly suffrutescent like most others. G. DYERGERS. Notably suffratescent, 2 feet high or more, glabrous or merely granulascaberulous, never turly seabrous, the panieled rather than everymbose branches nearly destitute of foliage at flowering time: involuces 4 inch high, obvatie-unionate, their oborate obtase barcts well imbricated and with blant green tipe: idsk-flowers 5 to 7, those of the ray about 5; place of the papus 9 to 12, very unequal, all narrow and acute, the more numerous short ones sometimes conjoined at base with the longer ones, so that these appear trifid, i.e., as having short lateral segments.

This is the most common species of the genus in southern California, and is excellently represented by Mr. Parish's specimons distributed from the San Bernardino mesas; and also, under no 2241, from new Fall Brook, San Diego County. In a more slender and less glabrous form, with maller involuces and comparatively narrow brack, it occurs in the herbaria from Mission Valley, San Diego, collected by Mr. Oreut. In the Botany of the Californian State Sarvey Dr. Gray guessed the plant to be Lagasen's *G. linsorifolia*; and in the Symptical Floren he erred about as wildly in referring it to *G. Californica*, a species everywhere marked by its for and rey largo heads, these variously scattered or glomerate. In the present species they are panieled as in no other North American *Gutterresia*.

# SOME WESTERN SPECIES OF XANTHIUM.

Having long desired to attempt a segregation of our American species of this graus, I have thus far been deterred by the seeming impossibility of identifying the older species. Even those of the Oil World are wretchedly confused by Linmus; both his X. drumarium and X. orientade are aggregates, and several plants from both hemispheres are included by him in each X. orientade, in spite of its mane, has a

#### SOME WESTERN SPECIES OF XANTHIUM.

Virginian plant for its type, if the species can be said to have, with Linnæus, any type at all. Miller's X. Canadense is perhaps as complex ; but, as he defines no species at all, the name might well be treated as a nomen nudum ; and especially in view of what, to me, is manifest, that it has been applied by different botanists to perhaps not less than a dozen distinct North American species. The X. Americanum of Walter and X. maculatum of Rafinesque are equally indeterminable, insomuch that the elder De Candolle, to get rid of so bad a lot, proposed a new name X. macrocarpum var. glabratum to cover all the North American members of this group known to him. In a monograph by Wallroth, published in 1842, that author seems to have found the difficulties with the older North American species altogether insurmountable. He therefore rejects all the older names, assigning new ones to the five species which he makes out as belonging to our country. The identification of these will devolve upon him who shall undertake to disentangle eastern and southern Xanthia. At present I know nothing as to what his X. lævigatum, pungens, Pennsylvanicum, xanthocarpum or oviforme are. Presumably, however, they all belong to the Atlantic slope of the continent. Little or nothing was known of this genus as represented west of the Mississippi in the year 1842. As all the following are from far-western regions, I shall, in naming them as new, incur small risk of becoming a manufacturer of synonyms.

X. VARANS. Upright, simple or sparingly branched, froctiferous in all the axis almost from the base: slean very sparsely and minutely setose-hispid: leaves varying from lanceolate and serrate in the lowest to rhombic-orate and broadly orater/ignonos in the upper, these not lobed but doubly serrate-dentate, all tapering (though some abruptly) to the petiole, buth surfaces sectors: irruing involuces oral, 8 to 10 lines long, densely prickly, the prickles half as long as the diameter of the body, sleader conical, brownish-

hirsute to the middle, the body of the involucre with a few short stiff dark prickles beneath the main ones : beaks stout, short-hispid up to the very short incurved tips.

Sandy banks of the Columbia River, Klickitat Co., Washington, Oct., 1893, W. N. Suksdorf, n. 1583, distributed as X. strumarium. Remarkable for the variability of its foliage.

X. AFFXE. Size of the preceding, the informescnee equally centered, the sparse roughness of the stom stripes: lawrer variable but all more or less distinctly deltoid, none lanceolate or should be bass, though abruphly narrowed to the petiols, all doubly deniate, but none lobed, the surface sparsely atripulose-sabous and minutely resinousdotted: fruiting involucers 8 lines long, narrower than in the last, with only about half as many unciante prickles, these more slender, far less hirsute, the body of the involucer gland-tipped acules; backs more slender, less hispid and with longer intervet tips.

Habitat of the preceding species, and by the same collector, distributed without a specific name, under n. 1584. Distinguished from X. varium by the appressed hairs of the stem and very different fruit.

X, strummotures. Stem stort and tall, glabrous and purple-dotted below, strigulose towards the summit: large leaves from lanceolate-daloid to deloid-ovate, 4 to 5 inches long including the petiole, not at all lobed, but very evenly cosmely and doubly dentate or serrate-dentate, the base either almost truncate or abrouply tapering to the petiole, the surface sparsely matricate-eabrous and resin-dotted : fruiting involucers oval, 1 inch long or more, densely eshinate with long prickles which are strongly and retrosely hirsuic, especially dorsally, up to the long maked horny to, this somewhat doubly for circuitately unclease and fahhook-like; beaks conspicuously longer than the prickles, more shortly hirsute, strongly incurved at apex.

The type of this strongly marked species is of Mr. Suksdorf's collecting from the banks of the Columbia, Sept., 1833, the specimen preserved in the U. S. Horbarium. Another specimen, with broader and less elongated foliage, is Sandberg and Loiberg's n. 440 from Rock Island, Kittitas Co., Washington, July, 1893.

X. GLANDLIFERUX. Bather slenden, purplestemmed, the upper part of the sam strigos-bispildulos: leaver rather small, long-patiolel, not at all lobel, all of adloid-orate outline, broadly cansate and entire at base, doubly dentate from below the middle to the apex, strigose-bispid along the veins, the surface rather strongly strigose-scabrous: fruiting involuers oblog-ovoid, i (inch long, rather loogs) echinate with shortish pröckes, these with some whiltsh hirsteb hirst and many shorter gland-tipped ones, the body of the fruit also bearing many sessile or subsessile resin-glands; beaks sheader-conical, which-bispid divergent, incurred at tip.

Collected at Walsh, Assiniboia, 15 Aug, 1895, by Mr. John Macoun, and distributed for X. Canadense, but the species evidently new, and thoroughly distinct. The ticket accompanying my specimen bears the Canadian Survey number 10,910.

X. carrisrnz. Stort floxions branched stems strongly angular, marked with short purple lies and sparsely acr brous, the upper portion hispidulous: leaves of irregularly vortet-figmous outline, noi lobel, coarsely ubsinutetoothed and saliently dentate, the surface strongly muricatisebrous: fruiting involucers annorw-ovid, i luch long or more, densely exhinate with long prekles which are rather shortly and sparsely ferruginous-hispid up to the middle, and with some sessils glands; backs notably longer than the prickle, very stort and hispid, their tips little instruved.

Fertile plains of the Sacramento River, in middle and northern California; the best specimens collected by myself, near Chico, Jane, 1890; but there exists in the U.S. Herbariam a good one from the Wilkes Expedition obtained near Sacramento.

X. cataronstructs. Stout and freely branching, the stem schurchingkloubs and the lear-fornice very rough with short sharp strigulose hairs, the veines bearing some that are longer and strigulose hairs, the veines bearing some that are larces many and densaly clustered in the axilis, oblongovoids, about an inch long, pubseent and somewhat glandular between the only moderated' proved prickles, these rather short and stout, sparsely white-hispid toward the base, otherwise maked', beaks a little longer than the prickles, stout, hispidulous and glandular, somewhat inenverd from the base and also loxed.

Common in middle California, especially about San Francisco Bay, being the X. Canadense of my Manual and of the Flora Franciscana in large part.

X. ACUTUM. Stems naked and purple-straked below, bipidulous shows: leaves obscuriely and inequilaterally ovate-trigonous, nearly truncate at base, very acute or almost asominate at apace, unevenly averative control of the margin, bipidulous-scabrous and with copious small resin dots among the hairs: fruiting involucers reacomes or subumbellate in the axils on a pedancle an inch long, with also a sessile one at base of the pedancels, or the uppermost all sessile and glomerate, each involucer about § inch long, oblogr, rather paresly estimate, both the body of the involarer and its prickles toward the base invested with sessile resing flands and a few short while hairs; heaks little exceeding the prickles, straightish and little divergent, glandular and white-hipidalous.

#### SOME WESTERN SPECIES OF XANTHIUM.

. Known by a single specimen obtained at Stockton, California, by Mr. J. A. Sanford, in 1888.

X. FALUSTER. Erect, rather alender and simple, 2 or 3 feet high, the stom green and glabous, only seabrons above: strongly muricate-scabrons lavres, of broadly ovate online, often indivinedly 8-lobed, the blade abraphy tapering to the long slender petiole, obtuse at any che, margini coarsely dentate: fruiting involuces axillary and sessile in twos or threes, algibly obovate-oblog, deussly echinate with remarkably short prickles, these hispid at base, and the body of the involucer either maked, or hispid with more or less numerous stout gland-tipped hairs; basks short and stoat, hispidulous, and with very short inflexed ito.

Known only from the brackish marshes of Suisun Bay, middle California. An exceedingly well marked species, referred to by me as an indigenous state of X. Canadense in the Flora Franciscana.

X. ACREMENT. Shems very shout and flexnons, strongly schrous above: laves broadly and subcordately owner, obtuse, crenate-dentate, very seabrous and with rather copious minute resident dots: fruiting involucers about 2 in each axil, one of them peducate about subsenile, about 12 inches long, very densky précidety, the précket long and slender, hirsate or hispid to near the summit and with copious short-statiked resin-galands intermixed with the hairs, the naked spin-secant apex in about half of them perfectly braight and access, in the rest more of less curved or hocked; beaks slender-conical, little divergent, hispid up to the short strongly incerved tips.

Known only from the valley of the Red River of the North, where it was collected by the writer, near Fargo, North Dakota, 4 Sept., 1893.

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# FOUR NEW VIOLETS.

All these proposed now species of *Viola* are of the scaulescent purple-flowered group. All except one have been known to me more or less imperfectly since 1897, and have been referred to one and another published species; but their distinctive peculiarities have now this year been strongly forced upon me by seeing them in flower alongside these with which I had confused them.

V. PRATINCOLA. Rootstocks mostly elongated and ascending, stout and knotted, herbage wholly glabrous and rather light-green : early leaves reniform-cordate, evenly and closely crenate, those of summer of similar outline but 21 to 4 inches wide, cuspidately acuminate, commonly much broader than long, therefore cordate-reniform : peduncles of petaliferous early flowers, stout, elongated, bearing the flowers mostly above the leaves, terete, though with a narrow groove up and down the upper side ; bractlets very short, broadly triaugular-subulate, inserted at or below midway of the peduncle: sepals oblong-lanceolate, obtuse, nerveless, or the uppermost one 3-nerved, all with short nearly truncate entire auricles: corolla & inch broad, light-blue, all the petals broad and rounded, white at base, the lower pronouncedly purpleveined, the laterals strongly bearded at base with long white hairs mostly terete and cylindric but some abruptly clavellate-dilated at tip; apetalous flowers of summer mostly or altogether hypogeous.

I collected this plant in its summer condition, on the first of July, 1896, in a low mendow of natural vegetation (the land never baring been ploughed) near the banks of the Des Moines River, at Windom, Minnesola. It was growing in great abundance in the rich black prairie soil among grasses and like (Likim windeldatm). Copious living specimes of the plant in full vernal flower were sent me this season, from the same spot, by my nicee, Miss Nellie C. Greene, so that I have now all needful data from which to determine its rank. Of its distribution I know little; but it may safely be inferred that it is common in low prairies of at least southern Minuescia, northern lowa, and paris adjacent.

It is to be observed that in V<sub>p</sub> ratinuola, as in perhaps not a few of the more northerly analysecutivolets, equates and seeds are produced freely from the early and petalliferous flowers, these, of course, being borne on pedaneles that are even in maturity as at flowering time; but still, the greater proportion of seeds is produced from the later more or less subtermane and horizontal pedanels.

V. DICESONI. Allied to *V. cupidata*, but the herbage light-green, the publescence more sparse and hisphildulons, the petaliferous flowers on nearly torete pedancles about equalling the leaves and bibract-older heart is heart and the space and fine havenee-black, the paried petals, sepscially the two uppermost, obovate-rhomboidal, the haternis white at base and strongly barded with indistinctly classified the fits of the petal shorter and narrower than the others, more or leas strongly barded with indistinctly classified the fits at base and purple-wined above the white: summer foliage leas broad in proportion to its length than in *V. cupidata* and more apt to be cuculate: apoclatons flowers on short but nearly or allogether hypogenous pedancies.

A common Canadian violet of woods and thickets, referred by me to *V*, coupidate when first seen in dried material; also commented upon by Mr. J. M. Macoun at page 1860 rolume xii of the Ottease Naturelia (Iana, 1890), under that name. But the description given is only a reprint of that of *V*, coupidate and is now found to be very inapplicable to the plant of Canadian habitat. The plates issued by Mr. Macoun are also, most unfortunately, and through
my own fault in large part, wrong for *V. Dicksonit*. Figure 5 of plate ills, at to all but the flower, and arrawn from a small Canadian specimen fresh in all except the flower; and arrawn from a small Canadian speciment fresh in all except the flower; and this part of the figure was supplied from a dried ocrolla; although it does not at all represent the real corolla of either *V. Dicksonii* or *V. compidata*. But plate 6 was made from a dried specimen of true *V. compidata* which had been collected by myself lats summer in northern Illinois. I must here do Mr. Holm the justice of stating that he, after having made the drawning for these plates, expressed the opinion that the specimen from Illinois and that from Canada were of different species; a conclusion which was forced upon myself as soon as I aw the two plants in flower side by side in my garden last May.

V. ELEGANTULA. Acaulescent and low, the whole plant at time of petaliferous flowering barely 3 inches high and the peduncles far exceeding the leaves: rounded and cordatereniform leaves pale-green and slightly succulent, about # inch wide, short-petioled and the petioles erect, the margin lightly crenate and all parts wholly glabrous; peduncles obscurely angled, bibracteolate above the middle, the bractlets subulate ; sepals lance-linear, obtusish ; corolla rather more thau & inch in length, not as broad as long ; petals all similar in size and outline, oblong-obovate, obtuse or retuse, lightblue, the lower 3 with conspicuous violet veins on a white ground at base, the laterals bearing a low and thin tuft of short strongly clavate hairs, or some of them shortened to mere papillæ; 2 upper petals naked, in full expansion deflected and concealing the calvx; style elongated; late apetalous flowers small, aerial on short horizontal or recurved peduncles.

Species collected by the Messrs. Macoun, not far from Ottawa, Canada, said to inhabit low moist places in the midst of sandy fields. It seems to unite the foliage of V. blanda with flowers of something like V. cucuilata; though the characteristics of the corolla of *V. elagantula* are very striking. The petalaser much longer and narrower in proportion than those of *V. cuculada*, and the uppermost pair are deflexed, instead of standing upright as in other species of the group. It is also like the *V. blanda* group in respect to its greatly elongated podurales which support the corollas away above the folinge. It is also suggestive of *V. cuculata* to a certain degree, but chiefly by its small size as compared with other numbers of this group. The folinge in the last named is, however, of very marked character, and its flowers are of a dark-blae, and not hore above the folinge.

V. VAGULA. Larger than the last, with dark-green glabrous rather notably fleshy herbage: leaves at time of petaliferous flowering about an inch in diameter, somewhat deltoid-cordate, the length equalling or surpassing the breadth, the margin lightly crenate ; peduncles surpassing the leaves, obscurely angled or semiterete, bibracteolate in about the middle, the rather obtuse bractlets with a few obscure glandular teeth : sepals oblong, obtuse : corolla nearly an inch in diameter, the breadth commonly greater than the length; netals deep violet, at base darkly venulose on a white ground, all obovate-spatulate, obtuse or notched, the odd one especially broad and often obcordate, the pair next to it hearing each a dense tuft of rather long and slender not in the least clavellate hairs : style not prolonged beyond he anthers: apetalous summer flowers aerial, but their peduncles short and more or less horizontal; their capsules short and thick, not dotted.

Collected by Mr. J. M. Macoun, in the Ottawa district, and at first taken by him for *V. senustula*, which it resembles in some particulars, holding a place intermediate between that and *V. cucultata*, as to foliage being more like the latter.

# NEW OR NOTEWORTHY SPECIES .- XXIV.

ARGINGNE SQLARDOSA. Percential, the stort branching and apparently decumbert branching stems 2 feet high or more, rather sparsely hispid, the spinse rather slender, and been spinose-bipped. Howers, and also the fruits, assile at the oppo-symmes summit of the stem: sepain very hispid with assending spinse: corolla of index broad, the white petals overlapping and expanding to the rotate: expanies more bracklink herbaceaus and also rotations index productions of the stem is a spin-structure of the production of the stem is a spin-structure of the petals overlapping and expanding to the rotate: expanies more a bracklink herbaceaus and also roughened with short coarse stoke hirs, the body of the whole expand similarly both prickly and stokes-pubscent.

An exceedingly pronounced species in the characters of the capsule; this organ appearing as if covered with spinoscent bracts. Its habitat is southern New Mexico, where it was collected in August, 1898, by Miss J. Skehan.

ARCHARGENE SANCIPERA A. Mericons, yar. rose, Couller, Bok. West Texas, p. 12. The beautiful plant so anomed by Prof. Coulter is surely no part of A. platgerows, a species which is, I believe, wholly Maccian, and not known within the United States. The petals in A. snquinee, so far from being rose-solved, are of a dark, almost blood red. It is to be regretted that it is not in cultivation, and that oven in the berdrait it exists in only search and fragmentary material.

✓ LESQUERELLA VALIDA. Stout decumbent flowering stems numerous, axillary to the outer leaves of a rosulate tuft, the whole with a single tap root, the stems about 5 or 6 inches high, and, with the leaves, calyx and pods silvery with a close lepidoto-stellate indument: obovate or somewhat spatulate basal leaves entire or few toothed, tapering to a petiole, the cautine oblauceoate, entire: racemes short and dense, hardly more than corymbose even in fruit: pods orato, somewhat compressed, tipped with a style of half their own length; cells about 6-ovuled.

Collected at Gray, New Mexico, by Miss Josephine Skehan, 1898.

ARAGALLUS RICHARDSONIL. Ozutropis splendens, var. Richardsonii, Hook. Fl. i. 148. The Ozytropis splendens of Douglas was published in Hooker's Flora as including two varieties, one of which he named vestita ; and this is Douglas' type of the species. It is distinguished readily as exhibiting an elougated spike which is very conspicuously bracted, the bracts considerably surpassing the flowers. It is less common within the borders of the United States than is that which I here raise to specific rank under the name of A. Richardsonii. The greater proportion of our Rocky Mountain and still more westerly so-called Oxytropia splendens belongs to the present species, which is characterized by much smaller flowers, forming an elongated and narrow spike, and this without the manifest bracts subtending the flowers. Bracts are indeed present, but, not equalling the calyx in length, are wholly inconspicuous.

ARAGALETS CATEPATTES. Size of *A. splendens*, and with 4 to 6 indice in the whort, these all elliptic-lanceolite and very acate but energial, the largest an inch long, but others in the same whort searcely half as long: scapiform peduades very librate, bearing a broad and short spike at the utmost ended by very arrowly linear and strongly librate caudiform bract of an inch in length: flowers rather large, apparently reserved (daing link-perpice): fruit on seen.

Specimens collected at Moose Jaw, Assiniboia, 26 June, 1896, by Mr. John Macoun (Canad. Surv. n. 13,957). The

spike before expansion of the corollas is only round-oval, and appears as if it were a mere cluster of long almost filiform plumose bracts.

Sournace puresons. Erect, 3 fest high or more very leafy up to the dones short permitting handle of short spreading or alightly recurred abruphly ending and obtase recemes of hancelate, acute or acuminate, slightly but evenly serrate from near the base to near the apex, distinctly 3-merved and canceent or almost heavy no bin faces with a dense rather soft puberulence or pubesence: pedicels and branches of the inforcesence almost to neartubace: brack of the more than middle-sized involuces in about 3 series, the short outer ones sholtace linear, the inner long ones also visibly narrowed from base to apex bat obtasish ; flowers apparently lightyellow.

Collected at Moses Jaw, Asimibioin, 13 Aug., 1805, by Mr. John Macoun, and numbered 10,893 and 10,894 in the Canadian Survey Hierbarium. An uncommonly good species of the section to which *K. Canadassis* belongs, but with the indument of such species as *K. Collfornica* and *X. nane*, no approach to which is made in any eastern or southern forms of the *K. Canadassis* group.

EIGENTALES MACOUNT. Tall and a mply leafy but rather studer, sparsely but rather roughly phenument: lower leaves oblong-lanceolate, 3 inches long, the upper oblongsemile by a broad half-diaping base, all acute and remotely but very sharply serrate: heads for and corymbon, about 4 inch high; involuces broadly turbinate, their bracks in about 4 series, all lanceolate, very acute, purplish and stiffly ciliolate marginally, but pubescent on the back and very cilionate marginally, but pubescent on the back and very achences pubescent; papur-bristles rather slender and soft, but the longer one dilated upwarks.

Vicinity of Victoria, Vancouver Island, July, 1893, col-

lected by Mr. John Macoun, no. 447; distributed for Aster radulinus, and later referred by me to Eucophalus Engelmannii, from which its pubescence, serrated foliage and narrow pubescent involueral bracts completely distinguish it.

Of this species, remarkably distinct from all others known in character of foliage and involuces, only a flowering branch apparently broken off from what may have been a large plant, is preserved in the U.S. Herbarium. It was collected by T. E. Wilcox in 1891, at some unrecorded station in Arizona.

MACRERANTIERA CONMITTA. Stems 6 inches high more or less, apparently from a personial root, reddith and glabrous below, hirtellour-scabrous above: leaves large for the plant, spatialets, seriest, 3-nerved : involuces several a termional coryon, large, campanulas, their brates in 3 or 4 series, broad, with triangular-sublutlet visid-granular spreading green tips: rays many. Jarge and shory.

From the Henry Mountains, Utah, 1894, by Marcus Jones; the specimen preserved in the U.S. Herbarium, mounted with specimens of the next. It might be reforred to the Colorado *M. Pattersonii* but for the conspicuously 3-nerved leaves and the characteristic involuce of broad short-tipped bracts.

MAGREANTREAN WEIGONATA. Low complicies percential, rather smaller than *M. Pattersonii*, far more sheater, but heads as large: leaves mainly basal in tofts, oblanceolate, entry, patiolate, at apex cospitalely macronate, nearly glabrous on both faces, but margins finsly ciliolate, and the petioles ciliate: sequiform peducales decumbent, sheader, 3 to 6 inches high, bearing 1 to 3 large campanulate invotores, but in rarrow bracts in 3 or 4 series, with long subulate attennate thin-berbaceous hispidulous spreading tips of purple color: rays many and showy: acheeus glabrona.

Rather copious specimens of this are in the U. S. Herbarium, all from Mr. Jones, and collected in Arizona in 1894, at two stations, designated as Thompson Cafion, and the Buckskin Mountains.

BIDENE VULATUS. Conseand stort somewhat fastigitely bounched annual commonly is to 6 fest high, observely pubaseaut or almost gibbroux: largest lasters 6 to 10 inches long, divided into 5 lanceolate includy serrate abruphly acminate divisions all petiolate leafest, the two lower cut at base into one or more secondary leaffest: fruiting leaff free and very large, learnianting the somewhat corymbose branches and branchles, the more strictly terminal once branches and branchles, the more strictly terminal volucre surpassing the head, their petiolar base ciliate: rays where and in the source thicking on the margin, more or less pubsecent, the outer yellowish-green, sparsely tuberculate on the back.

One of the commonest and most annoying of autumnal field and wayside weeds throughton the Eastern and Middle U. S., and one which has heretofore passed for *B. frondows*: perhaps supposed to be the type of that species. But the real *B. frondows* of Linnaus, equally common, is a more selender plant, more widely praching, with heads hardly half as large, whose best specific character may be its narrower slenderly, or even candatory, acuminate larfield.

# SEGREGATES OF CALTHA LEPTOSEPALA.

During almost thirty years I have been acquiring familiarity in field and berbarinu with the white-flowered Catha species common in alpine or subalpine districts of our farwestern mountains, from New Mexico to Montasa and from middle California to Ataska, all of which have until now been referred partly to C. Mjöra and partly to C. Lykopsapia; or else, as by all our botanists not long ago, even C. hjöra tielt, and all the rest were called forms of C. Leykopsapia;

The species last named was founded on specimeus derived from the scaboard of subarctic North America, a country as different climatologically and phytologically as Lecland is different from the mountain districts of Italy and Spain.

I have never yet had the good fortune to visit those highnorthern shores which are the habitat of the genuine C. leptosepala, and so have never seen it growing ; but it has for some years been evident to me, from the herbarium specimeus, that nothing answering to the diagnosis of C. leptosepala is found within the limits of the United States, or even near our borders : for all our southerly and alpine specimens are most strictly acaulescent, their flowers, though numerous, all being solitary, terminating axillary scapes, whereas, in the far-northwestern plants each individual displays but a single apparently terminal leaf-bearing stem with two flowers, one of which is properly terminal, the other axillary to the solitary leaf. Moreover, while the far-northern plants exhibit filiform filaments, our mountain species, at least some of them, have short and more or less flattened filaments. When one has detected such strong differential characters as these which I have thus indicated, it is no longer possible to regard all these things as variations of

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Caltha leptosepala; and I suggest the following tentative classification of the species:

\* Caulescent; or the peduncle solitary, terminal (apparently), leaf-bearing, usually 2-flowered.

C. mrzoza, DC. Syst. 310° Leaves numerous, longpetioled, erect, apnendaged at hase by reyr compisions broad obtuse dark-brown sheathing stipules, the blade round-emiform, the broad rounded basal lobes overlapping and desing the sins, the marging versily creanizate, in withh 11 to 3 inches, the length considerably less: cauline last fike the others but smaller and short petiolate, inserted below the middle, with a broad classing stipule, and forming a very obvious node, the veo pedunclesvery usequal: asspale oblong or obvirus-holds, there a tathers.

This diagnosis is made, independently of the original Candollean description of C. biflora, from specimens collected on moist mountain slopes at Bailey Bay, Alaska, 14 June, 1894, by Mr. M. W. Gorman, of Portland, Oregon. The specimens are beautiful ones, and two sheets of them are known to me, one being in the herbarium of the Catholic University, the other in the National Museum. It is probably the real C. biflora, DC., though certainty can scarcely be hoped for until the originals, supposed to have been preserved in the Banksian herbarium, have been examined. At one point our specimens fail to answer the requirements of De Candolle's diagnosis ; the leaves in our plant are not " reniform, cordate at base, with a very broad sinus." They are more near to the orbicular than to the reniform, and the sinuses are closed. I accept, though with much reluctance, the explanation of the late Dr. Huth, that as in the dried specimens the basal lobes are often folded upwards over the body of the leaf and pressed closely down so as to be half invisible, so De Candolle was misled as to the existence of a broad open sinus where, in the fresh plant,

### SEGREGATES OF CALTHA LEPTOSEPALA.

there was no sinus at all but a closed one.<sup>1</sup> The apology is a lame one, indeed; for, if Dr. Huth and I could see that the broad sinus was artificially or accidentally made in the process of drying, why should not such keen eyes as were those of De Candolle hare detected this? Nevertheless, upon no other supposition can this Alaskan plant of mine baccepted as representing C. bifors; and so I assign the name with a mark of doubt. At same time, if this be not that species; then none of our while flowerd calitabas can bac

And 1 here offer willingly a suggestion that has lately been made to use in a letter, by the most experienced of all botanists in the flore of far-northern and northwestern A marics, Mr. John Maconn. This friend has failed to find any plant in any of his many expeditions to the Northwest, or in any of the numerous collections made there by others, which he can condically receive as answering to the description of C. biffore in the important points of the foliage. But he finds plants of the yallow diverse  $d_{i}$  parameterization But he finds plants of the yallow diverse  $d_{i}$  parameterization precisely the foliage, basal and calling, sarched be C. biffore,

Now against the accepting of this view, that C. biform is a simple-stammed two-flowered yellow Gulfaw with remiform leaves showing a broad open sinus—as seen in many subarctic specimous—against this lies the fact all the yellowflowered plants have five obovite sepais instand of the ten oblong ones which are, by distinct implication, attributed to C. biform.

Otherwise, it must still be admitted that, in the absence of any white-flowered *Calba* answering the requirements of *Colifora* sate of foliage, Mr. Macoun's suggestion is a valuable one. But the Alaskan plant here somewhat hypothetically taken for real *C. bidlora* Mr. Macoun has not seen.

C. MALVACEA. C. biflord, Torr. Bot., Wilkes Exp. 215, not of DC, nor Hook. Habit, stem and geminate peduncles as

1 HELIOS, ix, 68.

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in the last, but herbage light-green (as in C. paluatris), the leaves orbicales, 21 to 4 inches bond, 2 to 5 inches long, the sinus narrow or closed, the margins rather coarsely and deeply create, the petioles (in mature plant) fo 5 inches long, with obtuse but very short stipules; cauline leaf nearly semiorbicals, 2 inches broad, on a petiole of 1 inch, inserted above midway of the stem and with broad clasping stipule: segals apparently only 6 or 7; finament filliour: a carples distinctly stipulate, the stipe gibbous at base by a rather notable protuberance.

An exceedingly well marked species, known to me in only two specimens, both in the U.S. Herbarium, one of them (in flower) from the Wilkes Expedition collection, obtained "near the Cascades" in eastern Oregon; the other by G. R. Vasey from the mountains of castern Washington, 1889.

As far as descriptive terminology can go, this plant might quite as well be C. biffora as not. But the habitat must probably exclude it from all close relation to that species; and its yellow-green herbage, and large very mallow-like foliage remove it completely from all other white-flowered Calthas. It is not certain that the plant is even subapine. It may possibly be of wet subsaline plains "near the Cascades."

C. CONTRING. Low and stort, with the usual deep-green herbage: head leaves long-peioled, round-significtions, acutish, subscrite, the situus narrow and rather sharply angular; caline reniform, subsessile, entire ; pedundes 2, short (1 to 2 inches long), stort, divergent: sepais 5 only, broadly obvate, brownish without, milk-white within: filaments short, flattened and linear, the whole stamen shorter than the numerous pixil.

Founded on a single specimen, imperfect as to foliage, obtained in July, 1894, near the Reindeer Station at Port Clarence, Alaska, by Dr. James T. White, and deposited in the U. S. Herbarium. In this we have a two-flowered

### SEGREGATES OF CALTHA LEPTOSEPALA.

Callha imitating as closely as conceivable the two-flowered states of *C. palustris*, even to the broad petals limited to five in number. The leaves are almost precisely those of the Castalias in their round-sagittiform eut.

C. LEPTORFALA, DC. Syst. i. 3107 Hook, F.I. t. 5, (g. J. doubles. Basal leaves erect on long and rather slender petioles, round-oral, obtues, with subcordate or subsagitate base and short rather open sinus, the margin cornely and somewhat irregularly create or created-exists; the cauline one smaller, more nearly truncate at bass, petiolach, inserted about midway of the stem, its stipules inaccolate-sublake, not classing it, the node indistinct, the lateral peducies horter and more slender than the terminal one: sepals 6 to 10, olong-linear, obtues: filaments linear-filform, three the length of the anthers, the whole stames aurpassing the rather for pitalis: mature argues substipitate.

The plant here described answers well to the original account given of  $C_{4}$  plotspace, and to Hooker's figure. But still its habitat, as far as I can read it in the herbaria, is different from that assigned by De Candolle. No souch specimens are in on y herbarium, nor in that of the National Museum, but here are three sheets of it in that of the Candolle. No souch specime the second state of the that of the Candolle Norway of Otasza, namely, n. 1, 253, from moutanies south of the Julameen River, R. C., 27 July, 1885, collected by Dawson; n. 1, 252, Tai-Fuid Mountaios, B. C., in swamps and marshy meadows, 14 July, 1896, by the same; and n. 10, 246, from Maclenana River, Farser River, B. C., 31 July, 1888. They are all British Columbian specimens, and may there no no improbably represent the real C. lephospale.

C. MACOUNII. Size of the last, but leaves smaller, on shorter and not erect patioles, more cordate at base, the sinus often closed, the margin from entire to repand-deutate or shallowly crenate : peduncles several, 1 to 4-flowered, usually with a reduced leaf inserted below midway, on a slender petiole, but scarcely marking a distinct node, an occasional peduncle leaffess and scape-like: sepals 6 to 10, oblong-linear, commonly quite unequal: filaments elongated and narrowly linear: carpels 6 to 10, rather thick, substipitate.

A beautiful species, well marked as such, though holding an intermodiate place between the two groups herein outlined; only the smallest specimes presenting the solitary two-flowered peduncle; all the larger exhibiting several stems, one of which is one-flowered and brackless. The British Columbian specimens collected by Mr. Macoun are unmberd as follows: n. 1, 255, from along streams at 6,000 feeton Mt. Queest, 23 July, 1889; n. 1, 256, obtained in a lpine sumpas at 5,500 feeto u. Mt. Arrowsmith, Yancouver Island, 17 July, 1887; and n. 1,257, collected near the snow line in the Selkirk Montania, 290 Aug., 1885.

I also locate here a number of specimens in the U. S. Herbarium, which are from about the same geographical region within the U. S. boundaries. One from Mt. Rainier, at 6,500 fest, collected by Mr. C. V. Piper in August, 1885. There is another from Cougar Peak, Oregon, by Coville and Laberg, 1898. This is in fruit, and all the folging is quite entire. A third is "from beyond Florence, Idaho" L. F. Houderson. This is specime achilts large leaves quite definitely creases, and one stem has three flowers, with a pair of and Laberg 70. TSI (1890), from SV an other S. Stee ends, has four pedmicles, such axillary to a bract of its own. The filaments in all these U.S. Specimens, as in the more northerly ones, are so much compressed that they are linear raber than filtern.

C. CHELDONI. Dwarf, the largest 4 inches high, others 2 or 3 inches; herbage very dark-green: leaves all roundcordate with open sinus, acutish, slightly, and for their size rather remotely, creania, mostly less than an inch long, spreading, short-petioled, the cauline one ont small, rather

### SEGREGATES OF CALTHA LEPTOSEPALA.

long-petioled, inserted near the base of the stem or scape, its axillary peducle short and slender, never much more than haf as long as the terminal one, its stipules somewhat lunate: flower small, the oblong obtuse sepals 5 to 8: filaments linear.

Known only from Yellow Head Pass, in the Rocky Momtains of British America, where it was collected 13 July, 1898, by Mr. W. Spreadborough, who records that it grows by the margins of alpine riveles. It is no 1920 of the Canadian Survey herbarium. It is not named in reference to any likeness to the calculate of modern boary just it is most closely imitative of what was formerly known to all bonnists as Chridionium minua, i.e. *Ficaria* remunculoide. As a species it is less intermediate between the two groups than is the last; for only one specimens shows a true scape, all the others having a solitary flower stem, and this bracted and forked peculiarly near the base.

\*\* Acaulescent; all the flowers borne on azillary and bractless peduncles.

C. HOWELLE, C. hijner, HOwell, F.L. 20, not D.C. C. Loplangela, var. Hoseilini, E. Huhi, in Helios, is: 68. Stender and rather flaccid, the long-petioled round-reniform leaves 2 to 5 inches broad, the rounded basal lobes mostly closing the sinsu, the apex oftend distinctly retures, the whole margin from entire to repand-dentate: scapes 2 or 5, often nucle vacceding the leaves : sepals about 10, large for the plant, variable, some oblong-linear, others in the same flower obovate-oblonz, all obtase: filtaments filtform.

Common at subalpine elevations in the montains of Oregon, thence southward to at least middle Colifornia in the Sterra Newala. Good specimens have been distributed by Mr. Howell, from several Oregon stations, especially from the base of Mr. Hod, 1880. Mr. H. E. Boren has sent it abroad from Mr. Shasta, June, 1897. Mrs. Austin obtained and distributed large and beaufild flowering specimens

from near Colby, Butte Co., Galif., in 1896, and Mr. Sonne, from Mr. Stanford, 1890. It is in my herbarium also from Lassen's Peak, Chesnut and Drew, 1891, and also from my own collecting in the Scott Mountains, west of Mt. Shasta, Aug., 1870, these specimens being peculiar as showing a very ownly and regularly repand-cleate leaf-margin.

C. DOURSDIFUL. C. Leptosepala, var. redundi/olia, E. Huth, Le. Like the last in habit and inforesemen, but herbage of much firmer texture, the leaves always longer than broad, sommonly round-obvate, sometimes more elongated, the small basal lobes commonly overlapping and closing the situs, the margin from substitute to rather unevenly dentite: scapes mostly about 3, in fruit sometimes more than a foot high, always setuit: sepala largo, oblong-obvate, thickishi, bluish without: filaments flattened and rather broadly blues.

A most widely dispersel and variable alpine species, common from Coloudo to Montan, westward to Idaho and the subalpine moist plains of northeastern California ; probably also in Ulah and Newada. The specific name is inappropriate; most Calitabs being more naarly round-leaved than this. The entire-leaved form on which Hath established his variety is somewhat rare and exceptional.

C. CINCOOPILLA. Acculescent, with stontish pedincles and scopes, and leaves thick and firm in texture, their outline from oral-subsagitate to oborate-subseniform, or even somewhat panduriform by an evident constriction below the middle, the whole margin usually corarely and sharply dentate: earliest scapes either not equalling the leaves or tilte acceeding them: sopails 10 of sever, oblog to obovate, large, the flower often 1 j inches in diameter: stameus very short, the filments not longer than the anthese and widdly dilated, o oblong outline, and even the connective sublatedilated: matter earpels not known. Obtained in the montains of southern Colorado, near Pagoas Peek, at an altitude of 11,000 feet, by Mr. C. F. Baker, 28 Aug., 1899; and some earlier specimens in the U.S. Herbarium from southern Unh appear to be referable here, manely, those From Fish Lake at 8,000 feet, Marcus Jones, 8 Aug., 1894; also others from Marysvale, by the same collector in the same year.

# NEW SPECIES OF ANTENNARIA.

A sourch Stem densely (infed rather than cospitose, for 5 inches high, firmly seech tur third selender: stolons crowded, ascending, leafly throughout and not resultate leaves oblanceosta, acute, i inche long, more or isse conduplicate, numerous on the flowering stem, and much alike here and on the stolons: the indument of both faces soft, rather loose, duil as to color, heads much to 10 or more, humispherical endos, acute, i inches and statestic forming a themispherical endos. I and a statestic forming a themispherical endos and statestic for the statestic for their sarious tips obvicts-oblong, or some narrower, many with a few coarse servate testh, the innermost of enden cupidately appendante, all of a decided but often dingy or brownish pink color.

This formed a part of my original A. roses, but is known only from the higher mountains of northern Colorado, where it occurs in moist analy soil at 8,000 to 10,500 (set. Mr. G. S. Sheldon's n. 128, from North Park, near Toller, well represents the specimens from the headwaters of Clear Creek, these having been collected on the 11th of September, 1899. It can harrigb be the original war, roses of D. C. Eaton ; but that name should be ignored, being a normer awadem.

A. HOLMII. Cespitose, the erect flowering stems of the female plant (male not known) 5 to 8 inches high and rather

alemder: stolons short, depressed, rownlatdy lady, the lawres plane and spreading, about 4 inch long, obovate-spathulke, very obtuse, not even abruptly pointed, 1-nerved, greenish above yet clokhed with an extremely fine and closely appressed silky tomestum, beneath silvery-while with a more dense indument of the same kind: cauline lawres oblong, acutish, spreading or ascending: i.esds lange, 3 or 4, seeille or short-pelicellate: bracts of the involucre in about 4 series their scarious tips orate-lanceolate or narrower, acute or acutish, finitly tinged with pink, the herbaceous portion of the bract anding in a rather consolence on shorts aport.

In open places among the more elevated pine woods on Long's Peak, Colorado, at about 10,000 ft, Theo. Holm, 8 Aug. 1890. Species allied to *A. eprica* of the lower mountains, but essentially different by its thin plane roulate obtune lawes, and their peculiar fine glitesting indument; and the involuces with their brown-spotted bracts are also quite unlike these of any form of *A. eprica* which has yet appeared.

A xANDTA. Cespitors, the slender stems of the male plant (female not known) about 6 or 5 inches high, tinged with red-brown under the sparse indumed1: stolons wiry but very slender, 2 or 3 inches long and sparsely or more densely leafy, the leaves all narrowly oblanceolate, of firm texture, almost languaging mucrowlate at the actest exp., both faces canescently tomentose, the indument fine and appresed but not lanstons: calible leaves thin, narrow and event; heads to or more, very distinctly pedicellate and forming an almost exact corpus: tips of the involucral brates oborate, obtuse, large and spreading, of very fine stature and a milky whiteness, though with a dark-purple spot at base: dilated tips of the pappan-brisiles entire or eventals rathet han servalate.

An exceedingly graceful and beautiful species, at least as to the male plant, found by Mr. Theo. Holm on dry ground

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### NEW SPECIES OF ANTENNARIA.

under spruce trees at about 11,000 feet on Mt. Massive near Leadville, Colorado, 22 Aug., 1899. His specimens were found in only a single patch, and are all staminate.

The specific name has no connection with the grass genus Nardus; but the foliage of this Antennaria is suggestive of that of lavender, of which one of the early names was Nardus.

A. PROFINGU. Near A. armspless but more slender and only haffs alregic, the stoloar softwirely more elongated and more copiously best with black gland-tipped hairs, the bracks of the flowering branch clone rather strongly elilate with them: mature leaves 1] to 2 inches long, with almost elilpite blade and short petiods, macromathy acuts, bright green and nearly veinless above, while tomentoes and obviously triple-averade basenatic information for the strong mater which alone is known 3 to 6 inches high, bearing periodicate: blassical, with leage elacer-white chology obovate obtass tips: brisides of the pappus only slightly dilated and abarty services at in.

Collected only by the writer, on an open billide at Harper's Ferry, W. Va., 14 May, 1598; only one large patch seen, and that male. Tooggh obviously a near relative of *A. Parlinsi and arnogloses*, its small size, very differently shaped foliage and peculiarly narrowed and servicated male papens-brinkles, compel one to regard it as wholly distinct. Those that the female plant may be detected at no dustant time. There is no *A. arnogloses* in the Harper's Ferry region.

A. ALENDODES. Near A. needloics, much like it in size, rather more slender, but the heads on shorter pedicels and thus more congested; stolons much more elongated, somewhat flexuous, equably leafy throughout, seldom resultate at app x: leaves much more clearly differentiated into blade

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and petide, the blade ovate, acute, mucronate, abruptly narrowed to a sheader petide of more than it so own length, the whole leaf an inch long or somewhat leas, green and senntly siky-lanate above, while bounds with a sliky tomentum ; heads to 10, subcorymbose; brats oblong linear, the herbaceous portion green, much longer than the scarious semi-blong and obtuse in the outer, to lanceolate and acutish in the interim

My specimens of this elegant species are all from the District of Columbia and adjacent Maryland, and of my own collecting in the autumn of 1897 and spring of 1898. I had believed them to represent, as a geographical variety, A. neodioica ; but the first careful inspection made of the materials has disclosed characters which seem to demand the recognition of a species. The habitat of the plant is low and rather moist open pine groves. In such stations I have seen and collected it at Marshall Hall and at Magruder, in Maryland, and between University Station and Terra Cotta, D. C. It is frequent, though not plentiful, in its localities, and never forms extensive patches. No other Antennaria has been found associated with it, nor have any male plants been seen. The fully mature stolons, with their depressed mode of growth and scattered ovate-netiolate leaves, are remarkably-for an Antennaria-suggestive of Alsine media.

A. surota, Greene, Pitt. ili. 236. Stolons short, leafy, rigid and subligences, forming a rather deuse mat, their leaves  $\frac{1}{2}$ to  $\frac{3}{2}$  inch long, spatulate-lanceolate, acutish, white on both faces with a permanent woolly tomeature. if overing branches erect, slender, 2 to 6 inches high, lanate throughout, leafy to above midway with linear acute leaves, the upper portion naked and peduceillorm: heads 4 to 7, in a dense glomente cluster, or one or more of them distingting padicallate and thus standing apart from the rest; bracts of involucers with dark greenish-brown tips in outling from broadly oblong and obtusish to linear-oblong and acute or acuminate : pappus of male flowers very little dilated.

One of our beginners in botanical authorship has lately published the complaint that, of m  $_{\mathcal{A}}$  have an obscription has been given.<sup>1</sup> The complaint is not, I must confess wholly groundless; although in giving the essential characters of the species as compared with those of *H* underivated on the one hand, and of *A* alpins on the other, I fully satisfield the actual requirements of publication, at least as regords the public of experienced phytographers. Nevertheless, I acknowledge it had been better to have given a diagnostic character for the species; and that is now done.

What I hold for the more typical A works is the plant of the Sierra Nevada of middle Galifornia; such as Mr. Some has repeatedly collacted and distributed from localities not far from Donner Laks. I judge it to occar all along the crest of that range of mountains, northward to Mr. Hood, whence Mr. Howell has distributed it. The British American specimens formerly cited by me are less typical, and might be distinguished as a variety.

The following is nearly allied to A. media, yet must be held specifically distinct.

A. BORKAILS. Habit and foliage of A. modia, but stolous less frum, thir leaves less densely wouldy-connectives: flowering stems less alender, somewhat taller, lesity up to the inforesence: heads 4 to 7, more generally pelicialita, thus forming a more corymbose cluster: bracts of involucer with more amply developed sarious tips of a light redish-bown, the outer broadly but somewhat cansately obovate, obtune, the inner oblog-obovate, acution, all more or less lacentéserrulate, in maturity somewhat squarross-spreading: male plant not known.

Disenchantment Bay, Alaska, 10 Aug., 1892, Fred. Fuustou; his n. 101 (of my set).

1 E. Nelson, in Bull, Torr. Club, xxiv. 210.

# WEST AMERICAN ASPERIFOLLE .-- IV.

As the result of a prolonged and careful study of our North American species of Marstressa, I, an convinced that nothing properly referable to *M. Stbircia* is known, at least to me, so inhabiling our contineent. And as for *M. penicirlata*, that seems to be subarctic, nothing quite answering to it having been found within the United States. Most of the specimens in our herbaris bearing one or the other of these names may be referred to published species, some of which were proposed long ago and then suppressed. Such are the following:

M. CILLATA, Don., originally described as *Pulmouria ciliata*, Torr. Ann. Lyc. ii. 224. Common in the Rocky Mountains; excellently defined by Torrey; its most salient characteristic being the short calyx, with oval or oblong obtuse ciliate lobes.

M. rearranses, Heller, Bull. Torr, Club, xxvi. 550. Although Mr. Heller compares this with *M. Fendleri*, with which be says it grows, all its real affinities are with *M. eilidat*, from which I had separated it, in the arrangement of sheets in my berbarium, on account of its narrow and acette calyx-lobes. But i should not yet have proposed for it specific rank.

M. FRANCISCARA, Heller, I. c. 549. This plant was collected by myself ion years since, on the slopes of M. San Francisco. I had noted its peculiarly narrow-tubular corolla besides a few other feeble characteristics, but had not thought it specifically distinct from *M. ciliata*.

M. STOMATECHIOIDES, Kellogg, Proc. Calif. Acad. ii. 147, fig. 43. In the Sierra Nevada and Cascades this takes the place of *M. ciliats*; has a longer calys; though the lobes are as obtuse as in *M. ciliato*, but have are not ciliate. No such hairs as Dr. Kellogg attributes to the species have been found by me, or are likely to be discovered. I apprehend Dr. Kellogg's error to have been that of taking a stellate hair fortationally attached to the *Metrausia* from some other more probably, certain somewhat pastulform though flattered and low protuberances abundant on the lass-surface, were what he saw, and approximately reproduced in his figure.

The two species next succeeding, apparently hitherto undescribed, are of this same group of rather large moist-land species.

M FOUTPUTCLA. Stema about 14 to 18 inches high, strin ing singly from the branches of a rootstock, apparently without radical leaves, but very leafy from near the base to the samanit, the whole herbage glabrous and very glacocon: leaves oblong-lanceolate, mesily about 3 inches long including the short pectole, abverylt sent as thot in each spreading or scarcely according, enother face calcos-punctus, the margins obscuryle callos-desclutate: flowers motily subcorganises at the very formation of heliuman: each short helium inch long, bright-bland, the rather ample campanitate labout field long, bright-bland, the rather ample campanitate limb somewhat longer than the sub-plindric tube: obusely and regularly ranges nulses well second for the earlys.

In elimps of dwarf willows, at 12,000 ft, usar Pagos Pask, southern Colorado, 8 Aug, 1890, C. F. Baker. Related to *M. ciidata*, Dona, so ecompon in other parts of the Bocky Mountain region, but it is of very different habit, and has a eilolospunctate laciararize and distinctly elliation lacimumgins. Our plant is particularly remarkable for the simplicity and the copious lacinness of its stem, the laware boing all alike, only that the uppermost are subsessile while the rest are petiols. M. PERCEARA. Root to known: stems almost as leafy as in the lask, weidenly a yard high more or less, the brebage devoid of bloom and dee-percent: leaves elliptic-lancolated, or of inches long, very actus, subsessife, roughish on both faces with muriculate points, the margin elliptic with short and rather fine incurve lanks: infloresmeen narrowly paulied: peeicels white puncticulate: lobes of the short ealyx triangular-oxta, obtase or acutish, ellipticdee-blue corolla about 1 inch long, the ample limb slightly looger than the tube: nutles rather sharroly razos.

Moist ground at 10,000 ft, near Pagosi Pack, Colorado, 15 Aug, 1590, C. F. Baker. By tis naly this also would be placed near *M. eilidata*, while by its lack of bloom, as well as by the character of its folinge, it is far enough removed from it; for that has a lest-arriace marked by broad low orbicular callosities, extremely unlike the small raised and bary-conical punctuation of the present plant.

M. sricos, Don, first published as Pulmoneric pilons, Cham in Linnau, ir 449, bash a subgroup of these large Jowland plants, belonging exclusively to the Pacific coast, and distinguished by their more than ordinary hairness. This one is from the high North, beyond Bering Strait. I, have not identified it in any of our herbaria; but its long corollas, 1j inches long, with tabe pilose-pubesent within for half its length, are its sesarial characters. The other mombers of this small assemblage are alike in possessing a very short and broad corolla.

M. stratorsa. Plant manifestly tall, but lower part of stom and the basel foliage not seen: cauline lawse ovate-acuminate, subsessile, 2 or 3 inches long, finely strigose-troughened above, more loosely and coarsely strigose beneditpadieles and eajly canesonally somewhat villoos, segments of the latter lancolate, rather short, not eliste but both faces clobed with the rather edges strigose-fillos or pulses hairi ness: corolla little more than  $\frac{1}{2}$  inch long, decidedly broad, the tube shorter than the limb.

Known only from along the Tananah river, Alaska, where it was obtained by Mr. Octavius S. Bates in 1881. The stream so named is, I believe, one of the tributaries of the Yukon.

M. PLATYPHYLLA, Heller, Bull. Torr. Club, xxvi, 548, is certainly of this group: and all three here associated are plants having a far closer likeness to the genus *Pulmonaria* than other and more typical *Martensia* species exhibit.

M. SURCONATA. Stems two feet high, elender and elightly fextous, lefty up to the loosely puncied inforcesce; basal leaves not seen, those of the stem ample, very thin, ovake, very acuts, recurded or subcording the stems of the left. The petiolate, the petioles sparsely hirrat-cellate, this pubecence extending to the whole lower face of the left. The upper surface sparsely maricate-scabroar: flowers few, in the paper of the left stems of the cellyr strigges publescent; cordina about 8 lines long, the eqliption they rather with a shorter than marrow-summanulate limb.

Species known only as collected by Mr. Howell, in the Umpqua Valley at Roseburg, Oregon, 3 May, 1887, and very distinct by many characters; the texture, outline, pubescence and remarkable petioles of the leaves all being peculiar; and the herbage seems to be not at all glancoux.

The three following species, proposed as new, belong to the group of more strict and simple-stemmed small upland comparatively xerophilous plants.

M. FUSIFORMIS. Stem erect, six inches to a foot high, usually solitary (occasionally two or three together) from a large oblong or fusiform root, simple and leafy to the summit: lowest leaves spatilate-oblong, long-petioled, the others linear-oblogg and sessile, all obtuse, glabrous beneath, rather strongly stringen-pubscent above: flowers in numerous shortp-pdnucled cymes axillary to all the upper leaves, or sometimes more exclusively unberninal; catry, parted to the base, its incecedate segments marginally almost criticbirsta, the pedicise and back of the calve stringules: corolla about 4 lines long, light-blac, the tube strpassing the calva, but not longer than the rather numbe campanitate limb.

A subalpine apparently dry-land species, obtained on Bob Creek, Colorado, at about 10,000 feet, by Baker, Earle and Tracy, 28 June, 1898, being n. 2006 of their collection and distributed by mintake for *M*. *obsoluțiolica*. Also in Mr. Baker's collection of 1800, from Graham's Park, Rio de los Dines, at 7,200 f., said to be frequent in fields, and openings in pine woods; this plant smaller, and the leaves more strongly pubewent above.

M. BLACHTICHA. Tuffed stems a foot high or more glanbrons glaucosa, lawfy throughout but the lower lawers much reduced and narrowly oblong; those of the middle portion oblong, the upper oversholong, all seesile, somewhat cuspidatly or merconstely acute, glabrons or alightly publicesenbrons: flowers in a short leafy paniele, the poduncies apparently ever: early a turbinane, its broad saturds-calinate lobes only half the length of the tube, most of them broadly work and acutish: corolia barey a half-inch long. lightblon, the cylindric tube rather shorter than the broadly fonnelform limb.

Foothills of the mountains of northern Colorado, near Fort Collins, 24 May, 1896, C. F. Baker, and not otherwise known to me; but the species is uncommonly well marked. It was distributed by Mr. Baker for a form of *M. lanceolata*, to which species it is not especially related.

M. BAKERI. Stems low, less than a foot high, tufted on a branching caudex from a branching root, simple and leafy up to the rather dense and short terminal paniculate cymc; herbage pale with a somewhat willows-tomentoe publescence; lowest leaves oblong-spatiate, petiolate, the upper oblongments linear-lanceolate, obtained, heardy somewhat willowselliate, and also externally, together with the short tube and the pedices, stripses-publescent: corolla dark-blue, about 8 lines long, the tube twice the length of the calyx, its limb notably subcampanalate.

Summit of Mt. Hayden, southern Colorado, at about 13,000 feet, 14 July, 1898, Mearsa Baker, Barle and Tracy, n. 576. Bearing considerable likeness to *M. Fendleri* as to size, foliage, inflorescence, etc., but very remote from that species, as the ealyst fully demonstrates.

LITHORFERSING ALERCANS. Near L. anymitificitum, but some only 2 or 3 from the rook, very ever (from the base, commonly more than a foot high at first flowering, slender and simple up to the shortly meensmes summit; base of stem, as well as pedicels and calyx, while with a fine and dense strigos publescence, other parts allvery-hoursy with a less fine and dense indument of like character: leaves linear, ascending or subserts, the margins sarrowed prevolute, baset with closely appressed actase indir: combine yellow, the rounded lobac createments: functing round, origin yellow, the rounded lobac createments: functing round, origin smooth, while and shinting.

Collected at Arboics, southern Colorado, by Mr. C. F. Baker, June 10 and 55, the spectrums of the first data being in early flower, the others bearing fruit, and also the later and emailer corollas. Perhaps some New Maxima and Texan specimens which have been labelled *L. anguit[bitmum may belong here;* but the species is well marked by its peculiarly strict upright and simple labit, while pubseence, small corollas and very mooth nutles. LTROWFERSTWICHILDATY. Also alled to L. angutiftimm, the stems, often 6 or 5 from the root, souths, ascending, harely 6 inches high at first flowering, equably leafy throughout and rather roughly strigose-pubsecnt: leaves oblog-inner somewhat spreading, the margins not in the least revolute, finely setulos-ciliate: early eorollas large as in L. engustifying, but the tube not as long (only 1 inch), of a rather light-yellow, the large rounded lobes erose: fruit not known.

Collected near Los Pinos, southern Colorado, 18 May, 1899, by C. F. Baker. The rough character of the pubescence, which on the stem is not appressed but spreading and hispidulous, and the plane foliage marginally ciliolate, are points which distinguish this plant from *L. angustifolium* clearly enough.

Litrosermetric outcours: Related to the last, and like it in habit, the sheards stams mouth very numerous, ascending, only 4 to 6 inches high at early flowering, only sparsely lastly, their public states of the state of the state of the either a pressed or spreading; leaves short, usually less short public states, with revolute margin and a sparse short public state of appressed briefly hairs from a completously patible base; flowers very few in the axile of the leaves at the semantic of the strength, all inches long lightly allow, the imposed in the largest, 1 linches long lightly allow, the imposed patible of the largest, 1 linches long lightly allow, the imposed patible not strength one creating the number actu, white and shining, not at all pitted but alightly targing and rugos.

Hills about Aztec, northern New Mexico, growing among Nut Pines and Cedars, 26 April, 1899, C. F. Baker.

OREOCARYA BAKERL Perennial, the stout tufted and more or less decumbent stems about 6 inches high, sparingly

### WEST AMERICAN ASPERIFOLIA.

branching, leafy and floriferous almost throughout: layes broadly oblanceolate and elliptic-lanceolate, perioditate, strigose-bispid and with a more dense fine cleaely appressed spreading bristly hairs: racemest few, solitary or geminate, crowded, bracteate, the narrow-lanceolate bracts surpassing the fruiting ellyars: sepala lance-orate, bracd and short for this genus, not greatly surpassing the nucles, these erect, orate, sharply and somewhat simulately rugses on the back, this circumscribed by a narrow margin, the ventral face pitted.

Collected on the Mancos River sage plains in southern Colorado, by Messra Baker, Earle and Tracy, S July, 1898, and distributed under n. 827. Species notable on account of its broad short calyx and strongly bracted inflorescence; and the nutlets are much more roughened than in other members of the genus.

ORDORARTA LITTENERS. Stems 6 to 10 inches high, erect and simple, one from each of the many branches of the decambent and partly subternance ander; the whole herbage densely silvery-strigulose, the inflorescence with also a vellowish hirsus pubsecnee: lowest leaves narrowly oblanceolate, those scattered on the flowering stem more oblog-lanceolate: flowers in a short dense subcapitate thyrms: calyx-lobes elongated, narrowly linear, all but their tips concealed by the dense yellowish hirsus the hiriness: corolla § inch long, light-yellow, salverform, the tube well excerted from the calyx.

Common on hills about Aztec, New Mexico, 25 April, 1899, C. F. Baker.

In naming and defining the following species of LAPPULA, several of which are of what may be called the cupulate group, I make no attempt to continue in use Gray's varietal name cupulatum, for that was made to include, as one variety

of L. Redouskii, a number of easily definable species; and there is no determining to what one of the segregate species the name should be applied rather than to another. Moreover, the earliest known cupulate species obtained specific rank far anteriorly to the publication of L. Redouskii, varcupulation; I refer to

L. TEXXX, first published as *Echicopersum Texamum* by Schoele, Linnas, xxv, 260. Any one who can read Scheel's characterization of the species must see that it had capatiate nutlets; and Gray cited it as a synonym of hir var. *equidatum*. The original is said to have been found proving under mesquite bushen user San Antonio, Texas; but I have not yet seen any specimens that naves we will the description.

L. COROXATA. Annual, erect, only a few inches bigh, with few saceholing branches and a rather broad oblong foliage: nutlets all alike, whitish, the body entirely devoid of tuberculation or murication, every smooth or else merely wrinkled, marked by a distinct but only slightly raised dorsal ridge, and circumserbid by an elevated rounded and erewr-like inflated margin which bears a row of very short prickles glochidina es the fip.

On mesas near Tucson, Arizona, collected 18 April, 1884, by C. G. Pringle. Species very different, both in habit and the character of the nutlets, from all others. The aperture of the crown, through which is seen the low smooth or wrinkled and ridged back of the nutlet, is broadly and roundly ovate.

L RETROSFERAT. Larger than the last, diffusely branching from the base, or the starver specimens more upright and less branching, bat with no taft or rosula of basal leaves ; all the branches floriferous from the base and lossely so, each flower subleaded by a leafy branc, this far arguments the mature fruit: nutles dissimilar, 3 with an elevated consider miticement abover. lanceolate aperture, the fourth with about 6 acules almost distinct, but each dilated and slightly inflated at base, those on the opposite margins closely approximate, leaving exposed only the line of sharp marication which forms a dorsal ridge; the body of all the nutlets maricate ventrally, i.e., outside the disk or crown, i even the crown finely muriculate below and among the acules.

The oldest specimens of this in my possession were colleted by myself at Peach Springs, contern Arizona, 2 July, 1889. They consist of a few dead and dry summer stems divested of folings, but basring pleaty of mature fruit. Better ones, showing folinge and flowers as well as perfectly formed nutles, were distributed last yasr by Messre. Baker, Earle & They, from near Mancon, in southwestern Colorado. In these the berbage is subcinerous with a hirust publecence, the proper leaves linear or oblong. linear ; those of the loose spike oval, corollas pale-blue.

L DENERTORUM. Habit of the last, the numerous branches equally floriferous from the base, but the inforcessnee more reweled, the bracts much smaller, not surpassing the furits: nutles not strongly disimilar, the long acules dilated below, in one almost disconnected, in three quite connected at base and unitedly somewhat vaulled over the disk of the nutlet, sarredy or not at all inflated; both faces of all the four nutlets strongly muricate, a line of coarser murication forming a ridge up and down the disk or dorad side.

Deserts of central Nervala; described from specimens obtained by the writer, near Holbora, 16 July, 1886; and there is another in my horbarium, contributed by Mrs. Bingham, of California, who picked it up at a railway side. Too, many years since, somewhore to the eastward of the State of Nervada, probably in Ulah or the eastern part of Wyoming.

L. COLINAN. Stems several from a large and dense rosette of basal levers, resemonely branched toward the summit; herbage canescent with a rather soft pubsecence : rachis of the spike or raceme rather sheader, the bracks small and narrow : nuttes densely while-tubercolate on all sides, and with a marginal series of about 5 stota accelors, these unconnected at base in one, in the other three connected and often somewhat indiated below.

Species extremely unlike *L. desertorum* in foliage, pubescence, mode of growth, and of different habitat, but characters of fruit less pronounced. Ik now the plant only as in the U. S. herbarium from Marcus Jones, who obtained it at various stations in Utah in 1894; one being Kingston, at 5,000 feet; another, Pahria Cañon, same altitude.

L MONTANA. Erect, shender, branching only at summit and the spikes not elongated, the stem from andia 4 dense basal roseste of short elliptic-lanceolate leaves, the calline foliage oblanceolate, the whole berbage cincercoux with a pubecence mostly appresed bracts of the short spikes small and incomplexous: nutles narrowly ovate, the disk very small for the nutlet, circumerized by a distinct though not very prominent cartilaginous entire margin, from along the inner base of which arise Sor 10 short subtreets aculos : the surface of the nutlet on all sides rather coarsely muricate tubercular.

A very strongly marked species in the character of the nutlets; known to me only in two specimens communicated to me long since, by the Rev. F. D. Kelsey, and collected by bim at Heleua, Montana, in 1887.

L. FREMONTH. Echinospermum Fremontii, Torr. Pac. R. Rep. xi<sup>1</sup>, 46 (1960). Lappula cenchroides, A. Nels. Bull. Torr. Club. xxvi. 243 (1899). This species, well defined by Dr. Torrey almost forty years since, is usually a much larger

### WEST AMERICAN ASPERIFOLIÆ.

plant than any of the foregoing; and the great length of the main row of prickles is more characteristic, perhaps, than the fact that, outside of this definite row, a series of smaller acules is commonly developed from what in other species appear as a mere lateral murication or tuberculation.

Besides having examined the original spectrum from which the description was drawn for Stevers Report, I have one collected by myself at Laramie, Wyoning, 23 July, 1889; another is from Prof. Nelson from the same region, this representing his entirely synonymous *L. canchroides*; and a third sheet of the same, though the specimese are smaller, was given me by Mr. John Macoun, who collected it in the Milk River district of Assinfoir, July, 1895.

Since Torrey distinctly credits the species to a locality within the limits of what is now California, whence, however, no specimes have come during all the time that has lapsed since 1800, and all our supplementary material is from the Rocky Montain region, one is completed to believe that the collector of Dr. Torrey's type specimen was in error as to his recollection of where he obtained it.

L COUDENTALS: Echicaperanan Relavacity art. octiondate, Wats Bot, King Exp. 246, hap rart at least. This is very wildely dispersed from toward the Rocky Mountains almost to the Pacific const; is well marked among the species here defined by its 7 to 11 strongly developed marginal prickles usually of triangular-subulate form, lightly or not at all connected at has, and, I believe always, grooved or channeled down the whole inner face; the surface of the nullet being tuberelake, not unricate.

There is no evidence of the occurrence, anywhere in America, of the true L. Redowskii.

# NEW OR NOTEWORTHY SPECIES .- XXVI.

# WITH PLATE XI.

Orksactras renorcemant. Low subdyine percential, with many decumber leafy stems 5 to 8 inches high from a branching roottook, and no rominite tufts of basal lawar stotish stems and younger foliage cancesculty tomentulose: leaves rather short, on long flattened petioles, once or twice pinnately parted into rather crowded, divariante or retrows egementail obsus: heads large, nearly an iteh high, shortpeduncled, solitary at the ends of the few branches: flowers whiths: pappurpales about 6, horter than the corolla hut not of very unequal length, 4 linear-oblong, 2 narrowly linear and somewhat shorter.

Mountains of southern Colorado, at 11,000 ft., above La Plata, Baker, Earle and Tracy, 16 July, 1898, n. 556. A percunial species, of the group hitherto represented only by the two annual species, *C. macranthe and C. Xantiana*.

MAGMERANTIFIERA VARIANS. Biennial or short-lived perminal, the sense netref, from the base, commonly a yard high, simple and leafy up to the coryonbose or somewhat panields amunit, from narty glabrous below to glandular-highdlous or hispici leaves linearlanceoiata, usually 3 or 4 inches long, sessile, varying from entire to more or less regularity spinulose-toched, mostly glabrous on both fixes but marginally glandular-pubesceri or cillate: baseds numerous, large and showy with many parple rays; bracts of the hemispherical or subcampanulate spreading glandular-risid herbaceous tips: oblong-linear acheens nearly glabrous, hardly strate. Mountain parks near Pagess Pask, southern Colorado, at 8,000 (etc.) A Oarg, 1890, C. F. Baker; also at Channa, N. Mex., 4 Sept, by the same collector. Related to *M. aupera* of similar localities in northern Colorado, and intermediate between that and *M. Bigelovici*. A large and showny species, remarkable for the variability of its foliage, and differences in degree of pubsesence.

MACREANTREA PARTESTON. Anoual, storish 2 feed high, narrowly paniculate from mart the base; stem and branches canescently tomentulose: leaves pinnately parted into 5 to 7 narrowly considern segments, these again more or less depty (cit): heads short-pedandel at and near the sods of the short branches; involucere campanulate, 4 or 5 lines high, of several series of narrow bracks all with long linear-acuminate granular-viscid more or less spreading green tips: rays many and narrow: achenes oblonglinear, compressed, strongly striate under an appressed sitky pubescence.

C. G. Pringle, Davidson's Cafion, Arizona, 10 Sept., 1884, distributed as *Aster tanacetifolius*, but very different from that.

LECCENERS ALENCIDES. Branches of slender candex naked except at summit, here bearing table linear-spatiale near leaves which are strongly hispid-ciliate with hairs in flexed or incurved abox the middle, the leaf otherwise schrons and granular-viscidulous; cauline leaves similar but linear, those of the sterile branchiets across and appressed, tipped with long alender white briefles; pedicels of the heads cancernet with apprecised somewhat silty hairs; bracts of involucre very acute, sparingly strigulose and schrollen.

Rocky hills and plains at Concho, western Texas, flowering in April and May; distributed by Reverchon. Sourcaso mainterview. Turked decumbent stems 2 to 5 inches high, these and the whole herbage glabous except the sparsely scaborus leaf-margins and a few hairs at the base of the pointers: lowest leaves orbicalt, the butters successively round-oborate and spatialts-oborate, all coarsely create, on broad petioles longer than the black, the uppermost narrower, cunsate at hase and sensile : heads few, large capitaleclustered at summit of stem; bracts of involuers oblong-lanceolate, obtrasih, in about 3 series, the margins of the inner sentorous-serulate at tip.

Collected by T. J. Howell, on Mt. Adams, Washington, 8 Aug., 1882, and distributed for S. pumilus var. alpina.

POLEMONTER LETENCE. Perennial, a foot high, more or less, the stema arising singly from selender almost horizoutal rootstocks, simple, or toward the summit sparingly branched: berdage glaboxs, only the caly, and pedicels showing sasttered short and slender torizons hairs: leaftet oblong hancolute, sacrely actusk, it of inching, rather crowled, in 10 or 12 pairs: flowers mostly solitary or in pairs in the axil of the upper lawow, modify solitary or in pairs. In the staffs of the upper lawow, modify solitary or in pairs in the staff of the upper lawow, modify solitary or in pairs. In the staffs of the upper lawow, modify solitary or in pairs in the staff of the upper lawow modify on short pairs (he spreading from a short tabe, the whole more than 1 inchine long and menty as bread, the breadly obvaria lobes either very obtuse, or very abrupth shortpointed.

This is Mr. Pringle's n. 6930, from the Sierra de Pachuca, Hidalgo, Mexico, 1898, distributed under the name of *P.* grandiflorum, which is a villous-pubescent plant with long and not widely expanding blue or purple corollas.

GREARDIA LANGFORIA. Annual, slender, 2 feet high more or less, and sparingly branched from the middle or from toward the base; herbaceous angles of the stem and branches, as also the leaf margins, delicately and sparsely scaberolous; he plant otherwise glabrous: leaves thin and plane, mostly 2 to 24 inches long, linear-lancoolate : flowers on fillorm spreading poicles an inche long this with the flower not equalling the floral lawers: ealyx with venulose tube and triangular acute test broader at base than long; corolla rese-red, more than a  $\frac{1}{2}$  inch broad, with very short broad and open throat, this and the tube together secredy longer than the lobes, the upper of these oneshift a shorter than the others, not strictly erect but even somewhat spreading like the others, all lightly pubseent and eliolate: stamens distinctly exserted; filameots very hirsute, anthers less so.

Collected by the writer, on a sedgy river-bank, near Ridgeville, Indiana, 24 Aug., 1890. Species allied to *G. texuifolia*, but very distinct from it in foral character, and quite remarkable among true Gerardias for the length and breadth of its foliage; these giving a leafiness of aspect to the plant as a whole, awhe as none of its allies exhibit. (Plate XL)

Ourmocanyus custingares. New O inducionate, which it reasonates in size and habit, but the leaves elongated, eleft to below the middle into 3 narrowly linear lobes, or some entire and linear-attenuate: lowest brated of the spike lanceolate to vate, with or without a pair of short subhastate lobes at base, the others purple and chartaceous, oval, entire, bottes, caupidately meromate: corolla light purple, large, much exceeding the brates and the lip strongly inflated, the gales nearly straight.

Ashland Batte, Siakiyon Moontains, southern Oregon, 18 July, 1837, Thomas Howelly, the specimen distributed for *G. pachystechyna*, but differing from that altogether in balki, folgae, inflorescence and floral characters, and equilb distibute from *O. imbricatus*. I balieve that *O. pachystechyna* is not yet known except by the original specimens collected and distributed by myself in 1876, its locality being the philos of Shatas River in onthern California.
PLATE XI.



GERARDIA LANCIFOLIA, Greene.

Vol. IV.

Part 22.

# PITTONIA. A Series of Botanical Papers

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JANUARY-MARCH, 1900.

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Price, Fifty Cents

PATOT, UPHAM & Co., San Francisco: WILLIAM WESLEY & SON, London

## NECKER'S GENERA OF FERNS-I.

Among many interesting and some quite surprising propositions made by Professor Underwood in his recent Review of the Genera of Ferns, the most surprising of all to me is the statement that none of Necker's fern-genera "are based on types, and no earlier references are cited." Having long regarded Necker as among the most original and discerning of eighteenth-century botanists, I have studied him, at intervals during several years, with a steadily growing appreciation of his genius; and, having acquired some sort of mastery of his rather peculiar terminology-such as no one can gain but with some time and patience-I have not usually found it at all difficult to identify his genera. In a word, my experience with his phanerogamic genera has shown me that his generic types are indicated quite as plainly as there is any need of indicating them. I should never have supposed that any botanist could say that Necker's genera are not based on types; and I can only account for Professor Underwood's pronouncement upon two hypotheses. One is, that he has not seen Necker's work at all. The other is that, having access to the work, he could not take the necessary time and pains to learn to read it.

In running over the fern-genera of this author, the first nuture vectore upon that is indicated as a name for a proposed new genus is Achonomes. Conversant with his methods in nune-making. I feel perfectly confident, without stopping either to read the generic dignosis, or to note his positive statement of where in Linnaus the type-species are to be found, that the genus is taken out of Trichonnes. I recall, for example, that out of Linnaus' Smetrio Necker took a genus Assecio; out of Verbena Reguns Abena; out of Ver-

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beina a genus Abeina; out of Lycopolium an Acopolium, and mary more such. But, as I have initimated, we are not left to merely infer that the type of Achomans lies somewhere in the *Trichomans* of Limmus; Jor, having so well described the genus that a good pteriologist might, I believe, make out the type species without a word of bibliographic reference, he yet proceeds to say that the type is a certain species of *Trichomans* according to Limmus; and, when he adds to this the further hint that it is samout the simple-fronded species, it is told us as plainly as need be that the type of Achomanes is *Trichomans* membranaeum, Linn.

I grant that guadam is a more or less unhappy type-indication, in that it may be singular, indicating a monotype, or it may be plural, indicating a genus of several species ; but that is here of no importance. According to Professor Underwood's understanding, as well as my own, about generic types, the type-species is the first species enumerated in the group. Linnaus has a group of simple-fronded Trichomanes made up of three species : but T. membranaceum heads the list, and so, even if Necker's auxdam be given the plural rendering, that species is still the one type-species of Achomanes. Moreover, as compared with the other two species of Linnæus' group with simple fronds, this one is preëminently simple, for the fronds of the other two are pinnatifid; they are only technically simple. The only Linnman Trichomanes which is obviously simple-fronded. and which no one could at first glance mistake for a fern with pinnate frond is this one.

It will be discovered by any one who will make the investigation herein outlined, that this Accoustiss surgemaxascus (Trichomenes membraneoum, Linn; Learnium membraneoum, Preul) is with Linneus, at least in the Specier Plendarum, the type-species of Trichomenes. But this fact is of no importance here. What I am controverting is only its statement-a most unfortunate one, angrey-that all Necker's fern-genera are nonentities, not represented by types, nor to be recognized with certainty.<sup>1</sup>

There is another of our author's fern-genera more easily recognizable, if possible, than Achomanes, and that is Erosis. It is taken, Necker is careful to tell us, out of the simplefronded Pteris species of Linnæus. The Linnæan group placed under the caption "Frondibus simplicissimis" is made up of the four species, P. lanceolata, lineata, tricuspidata and furcata. Now, out of Necker's indicative note "Frondes simplices. Quad. Pterid. Linn." aloue, we can make nothing more definite than that some one or more of these constitute his Elosis. But we have not yet read his generic diagnosis, or even that part of it which according to the terminology of Linnæus was called the character essentialis, and which with Necker is termed the character peculiaris. Now this particular and decisive mark of his Enosis Necker says is, that the lines of the fructification are parallel on the frond as a whole. In this light the perfect identification of this genus should be as easy as the distinguishing of two parallel lines from two converging ones. In order that any frond may have its marginal fruiting lines parallel, it must not only be a simple frond but a linear one. P. furcata can not be a member of Elosis because its fruit-lines converge in pairs, each pair forming two sides of a triangle. P. tricuspidata is equally excluded by the fact that, while along the linear and entire middle of the frond they are parallel, they take the very extreme of a zigzag course across the cleft frondal apex. P. lanceolata has a lanceolate frond, whose marginal fruit lines never do. and by the most obvious certainties of mathematics never can run parallel, so long as the frond retains a lance-shaped outline. Only one of the four remains, and that is P. lineata. Its fronds are all invariably simple and linear; its fruitlines are absolutely parallel; and there is no fact in all the

1 See Mem. Torr. Club, vi. 259.

genus-making of the centuries more certain than that with Necker (Erosıs was a monotype equivalent to *Pteris lineata*, Linn., and the *Vittaria lineata* of later botanists. But Necker's nume antedates *Vittaria* by three years.

Among the older and more unquestioned species of this genus, the following may be enumerated :

CE. LINEATA. Phyllitis lineata, Petiver, Fil. 126. t. 14. f. 3 (1712). Pteris lineata, Linn. sp. Pl. ii. 1073 (1753). Vittaria lineata, Swz. Syn. 109 (1806).

CE. FILIFORMIS. Vittaria filiformis, Swz. l. c.

CE. ZOSTERÆFOLIA. Vittaria zosteræfolia, Willd. sp. v. 406 (1810).

CE. ISOETIFOLIA. Vittaria isoetifolia, Swz. l. c.

CE. ELONGATA. Villaria elongata, Swz. l. c.

CE. ENSIFORMIS. Vittaria ensiformis, Swz. l. c.

There was, I think, no eighteenth-century botanist, unless it may have been Adanson, who equalled Neeker in respect to the number of well-defined new genera which he based on old species as types. It is whole work, in the *Elementa*, was that of undoing *Linnwas'* artificial groups, miscalled genera, and indicating natural ones in their stack. I recall no instance in which he proposed a new genus based on a new apocies.

Let us observe after what manner he dimembers the rather large binname, genus Appleiraim. His segregates of it are two only; and the first he names Osopteria, giving, over and above the generic character, the statement that the Linman Asplenis with compound fronds represent it; and if one must demand of him, unreasonably, that he name a type-species, has he not done so in the very fact of his having adopted one of the Linnæan species names (A. Onopteris), as the genus-name?

It is the most natural and rational of inferences, that when a species-man is raised to the rank of a genue-mum, the genus including that species, and species is the type of the genus. But curiously enough, Necker's *Outpictris* is doubly anchored to *A. Ouspicris* as its type; for that name is a syrony of *A. splexium*. Addanton sigrary, *Linn.*, and under this its prior appellation, it heads that *L. linnaus* group of compound-fronded species which Necker cites as the equivalent of his proposed new genus. If, as a critic of ferngenera, I had even wished to avoid knowing what *Outpicris* is or what its type-species is, J to outse how it could have been done but by wilfully ignoring all the indications which Necker gives.

And as for the Asplenium of Necker, it is made to include Scolopendrium and its near allies, and has the true Scolopendrium for its type. That is clearly enough indicated by the author's writing the French name of the Harts Tongue, Scolopendre, as the vernacular (French) synonym of his Asplenium. But what is more, the description is that of Scolopendrium and not of any Asplenium of later authors. And in this our author was simply standing by the doctrine of many early and learned botanists, as well as some of the ablest contemporaries of Linnæus, that the Asplenium of the ancients was the Harts Tongue. Even Linnaus, it may be observed, places it in the first of his four groups or subgenera Asplenium. So that the Asplenium of Necker can be disposed of intelligently and accurately in no other way but as a synonym of Scolopendrium, i. c., Phullitis

## A FASCICLE OF SENECIOS.

S. SCAARIS. Stems apparently single from the perennial root, rather sheaden, 1 to 2 feet high and erect; the growing leaves and also the brack of the infloresence showing some floculent tomentum, but the plant otherwise glabrows: haves of the basalt taft oval in outline, it to i inch long, detate or subplimatifia, slightly succellent, very erect on sotu peitoles an inch long; canline leaves longer, of linear or narrow-lanceolate outline, sessile and pinnatifid, very erect, alwost appresed to the stem : head's 4 to 10, shortpeticellate and forming a densely subcorymbose cluster : bracks of the brack and and short involucer about 12, broadly lanceolate, acatte, glabrous and of a vivid green : rays conspicanus, orange-color.

Collected in the Sierra Madre, Chihanhua, Mexico, at 7500 feet altimet, 13 July, 1809, by Mr. Cownead; communicated by Prof. E. O. Wooton. A member of the same group with S. ancea, but distinctly unlike any of the many Rocky Montain allies of that appeels. My specimens are imperfect as to the subternancean parts, and the individual stem with its und of basal leaves may possibly be one of a connected bunch from a branching crown or caudex, but I see uo indication of such mode of growth.

S. FLAVUES. About a foot high, ereet and slender, from a short and nearly upright rootsch, leafy toward the base, glabrous or nearly so except the margins of the petioles, which are densely arachnoid-bounces: leaves small, variable, the lowest very small, suborbicular, creante, those next successing or avelation, acate, eventy but more incisely cut, these in turn passing to more alongated subsessile or sessile ones, which are biccreants or somewhat pinnatific, those next the eymose unbell sessile and bracelike: heads 20 to 60 r, on slender upscall peediceles, subcampanulate, little more than 1 inch high : rays numerous but short, all the flowers light-yellow.

A member of the difficult group of which S. surven is typical, but well enough market by its small size, prevailingly cordate-orate acute small lawres, and short broad heads of light yellow flowers. Such densely white-lanate margins to the petioles are not seen in other allied species. The plant was collected by Mr. Carl F. Baker, at Arboles, southern Colorado, 15 Juna, 1899; the habitat is said to be damp shadp places along steems.

S. DEMORPHORYLLES. Stems a foot high more or less, from short erect rootstocks, herbage wholy glubous, lightgreen and apparently in some degree succellant; basal leaves motly about an inch long, oral and searly or guite entire, on flat somewhat winged petioles of about the same length, these commonly much dilated at the insertion, or some spatialtet throughout, with no distinction of blode and petiole; cauline few, scattered, triangulant, sealing and elasping, from coarsely creants to deeply simulatotottid; leads few, mostly 3 to 5, rather cloadly corpusoe; involuces subcampanulate, ouly 3 or 4 lines high, rays numerous and much longer, golden-rellow.

In sprice woods toward the limit of trees, at 0,500 fest in the monthins of southern Colorido about Pagoas Peak, collected 6 Aug., 1890, by C. F. Baker. A member of the & aureur goroy, and a similar plant to smaller plant of the S. Colorido, with rays affron-colored, forms a part of the S. curreur arc, coroug, Gray. The contrast is very marked between the small always rounded and obtase basal leaves, and the broad tringular pointed ones of the seme.

S. VALEBIANELLA. Plant glabrous and the herbage thin and delicate, the rootstocks siender and densely tufted, bearing numerous and crowded slender-petiole arect leaves, the blade not half the length of the petiole and about \$ inch

In diameter, from round-obovoid to almost orbicular, lightly but rather eventy remains: flowering stems should, decumbent at base, 4 to 6 inches high, commonly monocephalous, rarely with 2 heads; cauline bracks very variable, a few oblanceolate, some sublate-Jancesche, others somewhat 1yrate: involucere subcampanniate, 3 or 4 lines high and of nearly tie same breadth, of numerous broad thin bracks and one or more rather broad and herbaceous braclets at base; rave 10 or more, broad and short, colder-vellow.

This is Mr. J. B. Leiberg's n. 1376 as seen in the U.S. Herbarium, collected in 1895 in the Coart d'Alene Mountains, Idaho. The sheet is labeled S. perzeuz, but the plant is extremely unlike that species, and very much resembles in its rootstocks and pale thin foliage what some small valerian might be.

S. ovruts. Densely tufted rootstocks stoat, the whole plant dwarf, the lawres only 1 inch high inclusive of the petiole, the monocephalous scapiform stem not more than 0 utilise, from suborbicular and distinctly petiolate to subspatialise, none mores than § inch in diameter, all coarsely dentes, the petioles foccellera , thesat when young: head subcampanulate, § inch high and about as broad exclusive of the 12 to 15 rather long and shory yellow rays: bracks of the involuces lanceolate, but tapering shraphly and somewhat accuminately from east the middle.

Collected on Sheep Mountain, Alberta, Canada, in July of 1895, by Mr. John Macoun, the specimens bearing the number 11,619 of the Canadian Survey Herbarium.

S. CANNIDESIMUS. Allied to S. uernerizefolius, rather larger, the rootstocks subligneous and more enduring, the leaves broader and more conspicuously petiolate, both their faces very while with a thick dense permanent tomentum: leaves oblanceolate, obtuge, mostly entire, some with a few testh toward the apex, all with a narrow revolute margin, the broad rules of mixels and several of its homolase very prominent beneath: scapiform flowering stems white-floccose, 3 to 5 inches high, bearing small and few scattered brates: heads in a subcorymolece claster, some longpedicelled, others subsessile; involucres houry-tomentose: rays golden-yellow.

From the Sierra Madra, Chihanhun, Macioa, at 7,200 feet, collected by Mr. Townsend, 24 May, 1890. Though much like its Rocky Mountain homologue named above, as to mode of growth, the foliage is almost exactly that of the shrubby *S. Palmeri* of Gundalupe Island. It is a beatiful precise, never in the loss glaburate in materity, and the leaves of two seasons are evident upon the subligneous and rather elongated caudez.

S. PURSHIANUS, Nutt. Trans. Am. Phil. Soc. vii. 412 (1841). S. Laramiensis, A. Nels. Bull. Torr. Club, xxvi. 483 (1899). More than twenty years since, I knew this plant somewhat familiarly, and took it, on faith in authorities, for S. canus, as Mr. Nelson did until lately: and so. when what afterwards came to pass, the real S. canus came to my notice. I saw its distinctness from the other and named it S. Howellii. When this error of having made a synonym for the true S. canus came to be recognized as an error, I attempted to make out the characters of the Wyoming plant as distinct, and should have created a synonym for that, as Prof. Nelson has now done, had I not discovered it to be the S. Purshianus of Nuttall. Its range is not so very limited. I have collected it myself not only near Laramie, but also in several places about Chevenne, as well as in northern and even middle Colorado, where it is subalpine or almost alpine. I have a suspicion that in its most reduced high-mountain state it was actually referred by Asa Gray to his S. werneriæfolius, to which species it bears quite as much likeness as to normal and typical S. canus, as Prof. Nelson has observed.

PITTONIA, Vol. IV.

Pages 111-126. 10 Jan., 1900.

S. FENDLERI, Gray, Pl. Fendl. 108 (1849). S. Nelsonii, Rydb, Bull, Torr, Club, xxvi, 483 (1899). Prof. Nelson apnears to have been the first writer to describe the habital peculiarities of S. Fendleri in its mature condition. That the species is emphatically multicipitous, forming usually a considerable and rather compact mat, as it were, of flowering stems and short leafy crowns, has been observed by me, since 1870; and I have seen and known it as such, all the way up from middle New Mexico to southern Wyoming. But this characteristic is one which Dr. Gray never inferred from the herbarium specimens, though many must have passed under his eye from which he might have drawn such inference. But there is another inference which, it seems to me experience should have taught both Mr. Rydberg and Mr. Nelson to make, and that is, that multicipitous perennials must, in their early life, appear as simple and single individuals; and with me it is a matter of repeated observation, that S. Fendleri, as well as the rest of the multicipitous species, at its first year of flowering, appears as a much larger plant than usual, more branching and more copiously flowering, the leaves more ample and quite undivided, and all from a single, simple leafy crown on a perpendicular root, with no sign or hint, as yet given, of the final, well matured, normal, and therefore typical multicipitous state. It is evident to me, as I read again the original diagnosis of S. Fendleri, that what the author had before him was, the rank juvenile single condition of the species, such as Mr. Nelson certifies to as existing in the Engelmann herbarium and there representing it. Much of the confusion that has been made in Rocky Mountain Senecios has originated in ignorance of the fact that all these matted species, propagating by seeds only, as all of them do, exhibit nothing of their ultimate multicipitous habit until after the year of their first flowering. Collectors, of course, gather in and distribute specimens of the same species under these different aspects, and the closet botanist does with them what he can.

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The young and simple states of this I have found, and so have others, in a hundance at the northern limits of the species, often with foliage almost totally unlike what is seen in the old and perfect state; and the old, matter and widely multicipious state is just as common in New Mexico and southern Colored; though the plant of the South, in whatsource stage of development, is more than twice as large as at at of the cold and dry hills and plains of Wyonning, where all southern species, if they reach that range, are starved and stanted.

S. MUTABILIS. Resembling S. Fendleri, but stouter and of more herbaceous texture, the branches of the caudex stout, in no degree subligneous, erect or ascending, the mature plant thus forming a small and dense tuft rather than a broad loose mat : pubescence extremely varied, some plants with foliage glabrous above but more or less tomentose beneath, some equally and hoarily tomentose as to both faces, but the tomentum always more loose and flocculent and far more apt to be deciduous than in S. Fendleri : leaves as to outline varying from obovate-spatulate to broadly or narrowly oblanceolate, the margin from almost or quite entire to tridentate at the apex, evenly serrate-toothed throughout, or sinuately or pectinately or even somewhat lyrately pinnatifid; even the reduced cauline ones from oblanceolate and entire to linear and pectinate-pinnatifid : heads usually rather fewer and larger than in S. Fendleri, the involucres glabrous: oblong 4-nerved rays more deeply tridentate, varying from light-yellow to nearly orange-color.

In dry lowlands about Arholes and Lex Pinos, southern Colorado, collected in May and June, 1890, by C. F. Baker. A species difficult to diagnose, on account of the extreme variability of its foliagn and the degree of pubsences: but as a whole indubitably distinct from  $S_{\epsilon}. Fandleri by its$ fichnines and compact habit. It is, indeed, quite analogous $to the <math>\delta_{\epsilon}$  compacting the plains of northern Colorado, and perhaps alliged to it as closely are los  $S_{\epsilon}. Fandleri$ . S. convartes. Stems 10 to 16 inches high, commonly almost naked and scapiform and bearing a corymk of 3 to 6 or 7 beads of larger than middle size ; hardage green and almost glaboras, varying to a lanost canoscenyt to mentulose; laws in the basal (uft creds, slandar-patioled, from oborate with cannot have, to standar-patioled, standarmatifield, 10 alg-inches long, on slandar patioles often twice as long; reduced cauliae ones when present oblanceolate and mesty phoneto-tooked; heads about  $\xi$  inches land, the ligh, on elongated and minutely unbulke-brated patiolation, with stattered almost patioliform hair on the angles.

In dry lowlands at Piedra, southern Colorado, 11 July, 1899, G.F. Baker, Species as it were intermediate between *S.Balasmila* and *S.matobila*; very distinct (rom the last by its nearly naked stem and large beads. The stems also seem to have been solitary, or nearly so, from stout assending or partly almost horizonial rootstocks. The semaller plants are monosephalous. The rays vary in intensity of coloring.

S. cnocaros, Rydb. Ball. Torr, Club, xziv, 299. II I were revining the gounts Sensol, or the North American species of it, I do not see how I could avoid rejecting this as a meane nucleas. All that could avoid rejecting this sate is have been draw from the Foldman specimen from Montana which Mr. Bydberg citas. The pretended synonym "8, sources, var. coccess, Grav" avails under head and way, to a considerable saggregate of things belonging to what Mr. Bydberg citas are given. Dr. Gray gragged of things belonging to what Mr. Bydberg himself would regard serve dissignated marely as having saffron-colored or copper-colored flowers. In some it was concodict that the rays only were dissoned theorem.

saffron-colored; in others all the corollas, both of disk and ray, were thus colored, while in some there were no rays present, and the disk was red. In view of the fact that S. aureus, as Gray in 1863 regarded it, was an aggregate of some dozen or two of species, as Mr. Rydberg and I understand them, what reason or sense can there be in one's pretending-as Mr. Rydberg most certainly does pretend-to make Dr. Gray's S. aureus, var. croceus, the equivalent of some one particular species? If Gray had indicated some one particular form of his numerous red-rayed ones as the type of his variety, and had then given it something of a description, the case would have been very different. But let us assume that Hall & Harbour's n. 332 may possibly stand as typifying true S. gureus croceus. What then? Well; first of all, the mentioning of a type specimen which has never been described does not constitute publication. A name printed with only that kind of a clew to the form is but a nomen nudum. Secondly ; Grav in the place cited admits that just this n. 332 of said distribution, including Parry's earlier n. 408, is made up of a diversity of things, all at agreement in that some or all the corollas, though confessedly varying much in shade, are of some color more red than yellow. Thirdly ; the only sheet of Hall & Harbour's n. 332 existing in Washington, though containing five or six specimens in excellent condition, exhibits not one with rays of a deeper color than light-orange. Yet, the same thing, specifically, which Hall & Harbour's p. 332 in the U.S. Herbarium represents, has been seen by me again and again with corollas as dark as what Grav calls " copper-colored ; " and I know it well, from certain localities, with rays not only pure yellow but even rather light yellow. All through the Rocky Mountains, and westward to the Sierra Nevada, occur a very considerable number of allies of *S. aureus*, in every one of which the corollas vary from yellow to deeporange or saffron-color. What, then, is S. crocatus, Rydb.? It waits for a description by which a botanist can identify

it, and in default of that, it remains as far as publication is concerned, little if at all better than a name only.

S. WARDL. Dwarf and compactly titled, barely 3 inches rece, obvate-lancolate, entire or creants, it of linch long, opticides tries as long: brack or related leaves of the sampform stans triangular-lancolate, sessile by a very brack have, the arrigin more or line deply create it hashs and menty hemispherial cluster; related brackless of the pedicels hands on the margin (the only pubsence): invaluent bracks 10 or 12, brashly and source that elliptically hancelater: res.

Collected somewhere in Utah, in the year 1875, by L. F. Ward; the specime deposited in the U. S. Herbarium and labelled "S. aureus, var. dpinus, Gray," which means S. pefrans, Klatt; but the plant is no near ally of that species. It may or may not be apine.

S. PERROCALLIS. S. petrophilus, Greene, Pitt, iii, 171. This is a second attempt on my part to assign to the Rocky Mountain S. petraus, Klatt, a tenable name. Even S. pefrophilus had been used by Klatt, apparently in the early uineties, for audher species.

S. MILLETIONER: Nearest S. atratas, similarly tafted, more than twice as large, the largy and very copiously floritorous stems a yard high more or less; whole plant heary with a loose but persistent tomentum; leaves of sterils beas labouts commonly a foot long including the short petiole, lanceolate and oblong-incocalas, merconancely acute, rather remotely deutate, the testh calion-pointed; cauline leaves half as large, hanceolate, seeling, more deeply dentate; heads excessively numerous in a very large compound and somewhat fastigates cyme; involvers narrow, erilipticing, about

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12-flowered, bracts about 8, linear, with acute blackish tips, otherwise green : rays 3 or 4 : achenes small, glabrous.

Stony dy river beds about Pagoas Springs, Colorado, 27 July, 1899, C. F. Baker. A fine large species, remarkable for the great number of small cylindric heads; the species intermediate, in a way, between S. atratus of the middle Rocky Mountains and S. umbraculifer of Chihuahua, northern Mexico.

S. NEMUCATCS. Allied to the last, but stems perhaps solitary, 2 to 5 inches high, barring for and somewhat ample leaves and a terminal corymb of few hasks: lowest leaves lancolate, accur, mucroansidy detats or deuticalist, tapering to a short usually somewhat winged petiole; cauline out much reduced in size and similar in outline, deutation, etc., but broad at base and amplexicanly both faces of all, as well as the stem, heary-domestations: involucers rather broad and short, with broad lanceolate conspicooraly blacktipped bracts and several uncernal but nonsumonly large equally black-tipped calyculate bractlets at base: rays 8 or 19, elongated, link-y-vellow.

Collected at the Reindeer Station, Port Clarence, Alaska, 9 Sept, 1894, by Mr. James T. White, the specimens deposited in the U.S. Herbariano. Species remarkable for the large size of the calyculate bractlets, these giving the involarers as a whole the appearance of being somewhat imbricate.

S. SOOPULKUS, S. Bigelowii, Yar. Hallii, Gray, Proc. Philad. Acal. 1963, p. 67. S. Bigelowii yar. monocephaka, Rothr. Wheeler Rep. 178. This plant, common in the montains of middle and nothern Colorado, is thoroughly distinct from S. Bigelowii by its pecaliar pubsesone of manyfound and crisped hairs. True S. Bigelowii siail unaknown except from southern New Maxio, and is of very different aspect, with thin and not at all sensentent deeprene harb-

age, usually no trace of any pubseence, but this consisting of short still straight hairs whenever present. This, the real *S. Bigelonii*, was distributed by Mr. Wooton, from the White Mountains of New Maxio, as *S. Rudoji*, an error for which I am solely responsible. The species is nearer to *S. Rudoji* than it is to *S. scopalinas*, which latter I have until recently assumed to be typical *S. Bigdovi*.

S. CHORANTROS. Allied to the preceding and to S. Bigcoit, latter than either, commonly a yard high or more, leafy throughout, desp-green and glabrous, or occasionally with a scarsh inducent of many-jointed deflexed thairs on the pedparles and about the insertion of the upper leaver: lowest lawrs narrow-hanceslate lappering to a winged patiole which is at base dilated and almost sheathing the stem, the whole 6 to 10 inches long; the middle caulies spatialklamostate and, like the broad-based orate-hanceolate upper most, seekie; all very accite or assuminate, evenly and sharply deuticulate: large and long-pedmelded nodding based soften as sumy as ten and forming a strict recome, sometimes one or two only: involucers and greenish flowers much as in S. Rawley or S. Biedersi.

Monutains of southern Colorado, near Pageos Pesk, at 9000 feet, 15 Aug, 1809, collected by C. F. Baker. I should have referred this, though with doubt, to S. Rusby, had I not detected the characteristic pubsessnee in some of the specimeas. S. Rusby, quite different from this in inforcesenee, then arcease being long, strict and almost makel, has also traces of a pubsesence, but the hairs are so short and stiff as to be scaberellons.

S. PUDICUS. S. cornuss, Gray, not of Linn. f., is another member of this group of Rocky Mountain species with nodding heads; but the name at first assigned by Dr. Gray, being a homonym, is to be avoided.

S. AMPLECTENS, Grav. Sillim, Journ., ser. 2, xxxiii., 240: but in part only of Syn, Fl. 384. At least four species are confused with this in the Synoptical Flora : but one conversant with Rocky Mountain botany will find no difficulty in determining which one of these is the original S. amplectens ; for at the time when this was published Dr. Gray knew none of the others, hence his diagnosis is clear. The associations of the plant have not, I believe, hitherto been mentioned. It occurs only in open woods or along their borders, well below timber-line, while all those here separated from it are alpine, even almost high-alpine, occurring only far above the limit of trees. S. amplectens is always tall; its large long-rayed heads are very abruptly-nodding. their involucres almost black with a dark pubescence, of which no trace is ever found on any of its allies; the excessively long rays are 5-nerved. As to the subterranean parts, its rootstock is quite horizontal, superficially seated, and from this the stem arises very decumbently.

8. TABAXACODES. S. ampledens var. learanceides, Gray, Proc. Fhilad. Acad. 1803, p. of 7, but in small part only. Dwarf, the very leafy and usually monocophalous stem only 2 of 3 incluse high, very creet from an ever rabes stout and fleshy rootstock, this short-jointed and bearing orpicas white rabers of an ad fleshy elongated root: whole hortage, the involuter excepted, permanently antehnold-tomentulose: when 11 to 2 incluse long, archively simulating these of a method of the store and the store of the store of the angular touth are solidon; runcinste, the whole hef margin commonly revolute: hend only hortizontally nodding: involutor dark-green, glabrous except a few white antehnoli heris: ray a jinch long, light-yellow, 4-nerred.

Dr. Gray's var. tarazeoids was based on two very different plants, the other being wholly glabrous, and much more nearly related to S. Soldanella than to S. ampletens. I choose the present one as type of my species tarazeoids for the

reason that it is much more suggestive of *Tranzaceum* than is the other; but its by no means as common as the next. I never met with it in my own explorations, and so have never seen it growing, though the other 1 an familiar with in the field. The specimes of *S. tarazzoide* examined by me recently are the following: It all d Harbours at 317, as represented in the U. S. Herbarium (contains one specime of this, and two of the one next to be described)? File's neame locality by Ganby, in 1856 : Garl F. Baker, Camerou's Pass, in northern Colorado, at 11,500 ft, in 1896 ; Theo. Hom, at 13,000 ft, o. James' Pask, 1890.

8. HOLMII. S. ampletens, var. farazooida, Gray, L. e. in part. Commonly 6 inchen ligh, the stoutish stess mostly several from a branching rootstock, leafy at base only, the padmentiform stem with only 1 or 2 reduced learners; stem and petioles of a vivil red-purple at and near the base, the whole thickthan and somewhat Raby herdage appearing glabrous, a lens revealing avery sparse and minute hirdelizes at the set of the pathematic structure of the set of

This, as I have intimated above, is very distinct from my & farmzooide, though forming perhaps the greater part of Gray'swriety of that name, and is much nearer S. Soldandla, from which its larger size, long showy ray, and very dissimilar follage, abundantly distinguish it. It is known only from Colorado and Wyconing. Wr. Patterson's 81, from Gray's Pack, in 1885, well represents it. I take pleasure in delicitatig it to Mr. Holm, who has lately collected it, while engaged in a prolonged field study of the Colorado alpine flore.

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S. SERIDOPETLUES, Near S. ampletens, similarly thinleaved, but never in any degree foccose, glaboras throughout except a minute and sparse pubsecence of hirdelines hirst albase of involcers and along the margins of the leaves, or even this wanting and the plant wholly glaborous: stoms sheader, 50 to 10 inches high, leavly, bearing at summit It of a lander-pedundel large slightly nodding heads: leaves oblog-characteristic inches hog including the abort petiols, variously toolhed or denticalities, sometimes consely licenizat-toolhed, occasionally atmost entire : heads about § inch high : rays light-yellow, § inch long, 3 to 5nerved.

This is one of Dr. Gray's later additions to that aggregate of his which was named S. amplestens, var. tarazacoides ; though it is really less unlike the original S. ampledens, and far enough removed from that. It is Mr. Watson's n. 679, from the Clover Mountains, Nevada, at least as represented in the U. S. Herbarium, where also I find it in specimens collected by Mr. Jones at Marysvale, Utah, at 11,700 feet, it being his numbers 5929 and 5958. The above description, however, is drawn from my own collecting in 1896, on the Ruby Mountains, Nevada : and these specimens exhibit more distinctly than others a characteristic short hard rootstock. with an investiture of chaffy leaf-bases which persist from the foliage of other years. Those of S. soldanella, tarazacoides, Holmii and the rest are always elongated, fleshy and naked. This more westerly plant is strictly alpine, though with the thin foliage of the subalpine S. amplectens.

S. LACTORING, Nearthelast, but the tinfed stems usually a foot high or more and lasfy throughout, the basal leaves smaller and on greatly elongated petioles; branches of the thizome or caudes assending, hard in texture and more less fibrous-acaded by remains of the petioles of a former season, the fibrous roots few, much more wiry: herbäge fabrous: radical leaves from obvarias to ellipticoral, very season. closely, deeply and sharply toothed or sometimes almost laemiate; cauline elliptio-lanceolate, 2 or 3 inches long including the short winged petiole, the margin as in the others: heads, usually 3 or 4, largo, nodding on erect and elongated pedancles: rays *i* to 1 inch long, deep.yellow, 7 to 9-nerved.

On story alpine slopes at 12,000 fest in the mountains of Colondo near Pagoas Park, C. F. Baker, 9 Aug., 1889. It in a measure unites the subterranean characteristics and tall letty stem of *S. empletens* and the thick folinge of *S. Holmis*, though in point of lear-outline and indentation, and peculiarities of the flower, it has enough characters that are all is own.

B. OCCENERALIS. S. Premonti, var. occidentalis, Gray, Bot Calif. Surv. 118. Descriting this as a variety the author named characters enough to have warranted its being placed in specific rank; but in addition to those given at the place cited, I have to say that the achenes, puberalent in S. Premondii, are in this plant of the Sierra Nevada perfectly glabrous, and also longer and narrower than in S. Premondii, I is quite possible that other Pacific coast plants besides S. occidentific ares to be segregated from the Rocky Monntain region are easily distinguishable from it.

S. CARTANGORSS. Stems tuffed on a persistent yet searcely more than herbaceous enades or rotatock, decumbent and nearly leafless below, or the lower leaves at least much smaller and more sparse, the whole plant seldom a foot high, yery leafy above the middle: leaves variously obovate and obvrate-oblong, commonly 2 inches long or more, sessile by a broad somewhat hnatate and clasping base, the margin coarsely and doubly dentate, the testh endloss theyed: heads \$ itom high, evert, subcampanulate, the set of the

either very short-peduncled or subsessile and scarcely arceeding the subtanding foliage, solitary of 0.0 3 at the end of the main stem, certain lateral and widely divergent branches, equalling the main axis and very leafy, usually sterile: rays short, not as long as the diameter of the head: achenes short, canescent with a minute strigulose pubescence.

Alpire on the mountains of southern Colorado; collected by me in 1869, obtained in quantity by Mr. C. F. Baker, mar Pagosa Peak, at 12,000 feet altitude. A decidedly socculent plant, exhibiting an access of large carbinamus-like foliage, and very few hands. The acheens in *S. Fremoslik* 1 if righty identify thin as the plant of northern Colorado and adjacent Wroming, are distinctly augular, and puberulent between the angles; but in *S. carbinaviolis* the angles, if present at all, are hidden by the dense uninterrupted indument of short appressed but stiffsh hairs.

S. marconnes. Allied to the preceding, quite as tall, the unnerous stems from a firmer and more work rotatical, all the branches florifierous and the based on rather long and slender peduncies house well above the leaves: leaves an lice long or more, from spatiallocoblong to obvrate-oblong, sessile and half-clasping, coarsely dentate: heads on bracted pedices of 2 or 3 inches long, rather more than 1 inch high, the diameter less, the rather numerous rays well cloughted, somewhat over 1 inch, deep-pellor: achees narrow, slightly contracted at apex, very glabrous and striate.

Collected at 12,000 feet on Mt. Elbert, middle Colorado, 28 Aug., 1899, by Mr. Theo. Holm; the species intermediate, as it were, between true Sc. Fremonitia and Scarthanoidar, yet with perfectly glabrous acheeuse. It may exist among other collections from Colorado, but I have not hitherto met with it exceept in this recent collection by Mr. Holm, who

has also brought, though from another locality, what seems to be genuine S. Fremontii, a much smaller plant than this, and with achenes puberulent between the angles.

S. INTRESERVENTS. Sitems much branched and apparently depressed, only 4 to 6 inches high, clustered on a thick hard and distinctly subliqueous rootstock, very leafy from the base up, and more than usually angular by decourrent lines from the leaf-bases: leaves  $\frac{1}{2}$  to  $\frac{1}{2}$  inches long, spatialistheory of the subscription of the subscription of the subtrained by the upper arrians aboving a for scattered usate a long the upper arrians aboving in the scattered main base is to be upper arrians and the subscription main base is the upper arrians and the scattered main base is the upper arrians and a subscription (upper arrians main base is the upper arrians and a subscription (upper arrians) in the high: rays few, about as long as the diameter of the head: acheenes atriats, glabrous.

Known to me only from 12,000 feet on the mountains about Pagosa Peak, Colorado, where it was obtained by C. F. Baker, 23 Aug., 1899.

## NEW SPECIES OF COLEOSANTHUS.

C. HOWLES. Shems solitary or several logsther arising from a horizontal woody cautics or rotatock, mostly 6 or 8 inches high, some monocephalous, others with 3 to 5 corrymbose hades: leaves from casta-insceolate to linearlaneoolate, about  $\frac{1}{2}$  inch long, entire or raraly with 2 or more serrate teach, distinctly 3 nerved heneath, both faces green and glandular-scabrons, the stem white, similarly scabout : functioners about  $\frac{1}{2}$  inch high, short-polumicled; bracks about 4-mered, all neute, the inner linear: achenes dark-borw, hispitalious along the ribs.

Sandy hills, growing with Pinus edulis, at Arboles, southern Colorado, collected 21 June, 1899, by C. F. Baker, the

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## NEW SERIES OF COLEOSANTHUS.

specimous barely in flower at that date; only a few heads exhibiting well formed though inmature achiences. The species is allied to *C. oblongitolius* and *limitolius*, but differs from both in its greener and lass witchdous follage, and especially by its underground growth, most of the stems appearing to rise singly from the horizontal and mostly subtermanean woody part. Nor are the leaves at all featherveined as in its near relatives.

C. ADDREWARDS. Brickellia oblogifolis, was observated gray, Bot King Exp. 137. This is an alpine undershrub, extremely different from Coblongifolis in habit, the tarked shows being very selender and depresed, even almost prestrate; the leaves are much thinner, broader, and commonly abiling to toulost i also the outer breaks of the involume sechibit broad green herbaceous tips, such as are not found at all in others of this group. These points of difference, along all in others of this group. These points of difference, along all in others of this group. These points of difference, along ability to the second second second second second second franks of a species. It was seen and collected at the original station near the summir of the Mest Humboldt Mountains, by myself, in the sammer of 1894.

C. VENERSA.CRN. Shrubby, the dowering branches 2 feet long: leaves originous a line his long, oblong counsiform, entire below the middle, with a few pairs of coarse serratures bowd the acute apex, dark-grees and ahiring above, though with some scattered pubscence, the lower face 3 acurved and visiticalize as will a hoary with a loose subnounces bairtvise: heads one in each axil of the uppermost leaves, limb visiticalize as when very avanity inductions that the torbinant, its brane very very sharply pointed apex, all about 5 herver's i achene willow.

I have this plant, and have seen it in other herbaria, under the name of "Brickellia oliganthes," from which it

is easily distinct. It is Parry & Palmer's number 355, from San Luis Potosi, Mexico, 1878, as far as specimens under that number are known to me.

C. DESRES. Stems several from a thick knottel woody crown or root, 10 2 fest high, hady and forifressos almost from the bass: leaves mostly alternate, broadly lanceolate, lj inches long, subsessile, lightly serrate or creante, subcoriaceous, rugose-reliculate, canescent with a rather coarse and rough tomentum : heads subseyllidrici, lightch high or more, nearly sessile by twoe and threes in the axile of the leaves; bracts of the involuces few, the short outer ones oblong-lanceolate, the inner oblong-linear, all acute, 5nervei : achenes villeus.

On rocks in the vicinity of Chihuahua, Mexico, C. G. Pringle, n. 635; distributed under the manuscript name Brickellia oliganthes, var. crebra.

C. FORXATTERENTS. Apparently tall, stort and shrabby, the mere flowering paniels 2 fact long and more than 1 foot broad: lower issues not seen, those at base of paniele evate and obbiogravity, lo 2 inches long, subcorincesus, rather remotely wernate-toothed, scabrous-pubsesent and rugoeweiny: branches of the paniele virgis-resonmes, the turbiunder state of the paniele virgis-resonmes, the turbisented state of the paniele virgis-resonmes, the turbipact, from oblicagoral to obligations, all obtaines but curspidately nucroants, evenly about 7-nerved : achenes very villons.

Rio Blanco, State of Jalisco, Mexico, Edw. Palmer, 1886, number 59.

## A DECADE OF NEW POMACE.E.

ARELANCENER CREATA. Stems low, clustered and bushy, the branches very stoat, rigid and divariante, the bark ashgray: lowes subcoriacous even at flowering time, nearly orbicaler, i § 1 inch in diameter, evenily bat rather lightly and coarsely create all around the margin except the Motorymloses thore-polencied clusters, the polencies and Motorymloses thore-polencied clusters, the polencies and Motorymloses thore-polencied clusters, the polencies and Motorymlose the cluster cluster cluster cluster cluster segments of the cluster cluster cluster cluster cluster segments of the cluster cluster cluster which but red externally before expansion: filaments very short, slightly subjuid-dilated.

On rocky declivities near Aztec, New Mexico, 23 April, 1899, C. F. Baker; the species altogether peculiar in the crenate character of its leaf-indentation.

AVELXMENTER POTCARYA. Small branching tree, the branches not start, though numerous and short, with red bark and no trace of pubmeence: leaves small, the largest bardy an inch long, tound-obscut, despersen above, paler beweath, numarkably reiny on both sides and wholly plaboons, deeply and rather slargely servate from below the middle, the base entire, often subcordate; petioles rather leadner bat mongri aborter than the blade: flowering twing very short bat numerous, the racesmes for-dowered: cultyx, and even the summit of the overay within it, perfectly glabrous: fruit depressed\_plobos, ecoward by a short cultyrlinb and its triangular-lanceolate segments.

Collected at Piedra, southern Colorado, 10 July, 1899, by C. F. Baker, who records that it grows on low level lauds

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and/bears a great abundance of fruit, as the specimens well show. In the apparently total lack of pubescence the species recalls A glabra of the subalpine Sierra Nevada, though the two are not very intimately allied.

AMLANCHER RUBBERS. Arboresent and 10 rd 15 feet high, or bushy and only 4 to 6 feet; rather intricately branched and the branches very stoat, short and divaricade, the bark after the first asson of a dark saby gray: laves small, seldem an inch long, ovate, acuts, serrat-toothed almost throughout, only the rounded base entity, camecently tomentaless on long through the duely and argoving Branchists and influences. The duely and the growing Branchists and influences more than the argoving Branchists and influences and the duely and the tube, the whole exterior as well as the inner face of the lobes houry-commentales: petale small, about  $\pm$  inch long, reddish externally in the boda, and in a lass the entry.

In arroyos and among the hills about Aztec, New Mexico. 24 April, 1839, C. F. Baker. If I mistake not I have seeu the same from somewhere in northern Arizona. The species is remarkable for its small leaves and their prevailingly orate outline. The fruit is not known.

ARELEXENTER BAREN. Shrub or small tree, the stome thed, and with short sout rigid divariates branches of the last, but the more redshis bark publiculat even to the second and third years' growth. Is sever says short-petioled, orbicular, 8 to 10 imes long and of the same breadth, subcertains and emitter at base, show the middle and across the broadly rounded or almost transate appx coarsely and eventy serial, both faces sparsely tomostilose; sipplies eventy serial, both faces sparsely tomostilose; sipplies tomornose: meaning and both somewhat villous as well bowered: only villous-tometane, the triangular-lanceolate segments as long as the tube and closely reflaxed: petide segments as long as the tube and closely reflaxed: petide Collected at Los Finos, southers Colorado, 16 May, 1869, by C. F. Baker. Much like the northern *A. aluifolia* as to leafoutline, but totally unlike it by its short, stiff, spreading branches, puberulent branchlets, and small leaves and flowers.

A. GONLANL I assign this name, in commemoration of Mr. M. W. GONLANL and furtill researches in Alaska, no the Alaska northy, or small tree which has passed under the name of A. alaska? It is distinguished from that species by a more slender habit, larger and relatively longer oval, or oblong-boxets eisender-ptoiled leaves, its long loose parfectly glahorous racemes, and a very characterised only. This organ is extranally quite glaborous and distinctly glaneous; its limb is notably dilated under the insertion of the petals into a brook sascer-shaped rim; and the lanceolate segments, either sered or somewhat spreading, are longer than all the rest of the endyrs, and are insertioned within. The fruit in this species makes an approach to the periform in outline and it glaceous.

My best specimens of this very beautiful species were obtained by Mr. Gorman, at Yes Bay, Alaska, in 1885, the flowers having been gathered on the 16th of June, the fruits on the 6th of September.

Sources purpose. Shranb with clustered but slender and drops crestenses to 5 for builty. bark red, which dotted and glabrous, except on the growing shocks, in these rather leaves small, only 3 to 6 inches long and the leaflest motify 5 pairs, the rathin willows-pubsench. But leaflest quilt glabrous on both faces, oblong or oblong-inneolide, to 1 inches long, evenly and lightly serrate factority glandtipped, the space of the leaf abruptly attenuate to a long tender point, uniter bade accessently villous: cynessently uarrow, low-pyramidal rather than flat-topped: pedicels and calyx pubserient.

A somewhat local, but very distinct species, known to me only from ML San Francisco, northern Arizona, where I collected it in flower, 10 July, 1880. It exists in the U.S. Harbarium from the same locality as collected by Edw. Palmer in 1860, and by Mr. McDougal, 7 July, 1860. From the date of its flowering in that low latitude it will correctly be inferred to be subalpine. Its macrest affinity is the uext species, and both are related to *K. Americana* rather than to the Pacific costs *Sorbus* species.

Sonnes scoreurs. Shrub 8 to 12 fest high, not sinder; the growing branchlets arey aparely villous or himitulous: leaves 5 to 7 inches long, the rachis glabrous, or somewhat pilow at the joints ; landte in 6 or 7 pairs, glabrous on both sides, about 14 inches long, oblong-hancoolate, very neute, deeply and often doubly earner from base to apar, the sernatures rather salient, not at all gland later or callous at they glabrous: ample cyme more flat-topped; pedicels and base of calvx searing villous nucleus laters.

Mountains of northern New Mexico (Holler's n. 3711) from Santa F Cafon, 5,000 ft, June, 1877, Ocloando (C.F. Baker, at 9,000 ft, near Pagoas Peak, 10 Aug., 1809, alao the same from Pour-mile Hill, Roott Co., 8,500 ft, 1809, and Ulah (L. F. Ward, east of Gunnison, 9,000 ft, 1875), and Marcus Jones, at Provo, 5,000 ft, 3 July, 1891. This has been referred, usually, to *S. sambuechia*, which is a native of Kamtechtatz, but it has as often been included in *S. Americana*, to which it is more nearly related, indeed; but many characters distinguish if from the typical form of that species. I know not how much of the more northerly on northwestlery *S. sambucking*, it, s., of Moutana and Idaho, may be included in *S. sequelina*. My types are the specimens of C. F. Baker and Mr. Heller.

SORBUS SUBVESTITA. Bark of mature branches dark-redbrown, scarcely dotted, of growing ones canescently tomentulose : leaves 4 to 6 inches long, the leaflets in about 8 pairs,

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oblong, scutish, simply serrate from above or below the middle, the base entire, notably inequilateral, the lowest pair very small, of one-fourth or one-fifth the size of the others, the largest 1½ inches long, glabrous above, tomentnlose beneath, as also the rachis: winter bads densely tomentoes: cyme short-pednucled, ample.

This species, exceedingly well marked by its peculiar leaflets and indument, especially of the winter buds, is known to me only in Sandberg's flowering specimens from "Woods, in St. Louis Co., Minnesota," collected in 1890.

Sonners occurserating, Greens, PI. Fr. 64, as to the name only. *Fyrus occidentist*, Wats Proc. Am. Acad. xxiii. 298, excluding the Chilfornian specimens and habitat. Mr. Watnos's diagnosis was drawn mainly from specieness of an alpine shrub of the higher mountains of Oregon and Washington. This, the type of the species, is marked by rumerous isologisted (linear-oblong) dots on the puberliefu from particular species with subscription of the species of the puberliefu of the species with subscription of the puberliefu of the species with subscription of the puberliefu from puberliefu of the species with subscription on the species of the species of the species with species of the spe

These are the salient characters, as they appear in specimens collected by myself on Mt. Rainier in 1889.

SORDER CALIFORNICA. S. accidentation, Greene, F.I. Fr. 34, as to the character, and Californian habitat. Shrub or small tree many times larger than the last; brauchlets glabrous, neither reddened our notabily dotted, the dots when present not elongated: lawse short-petioled; leafiest sharply and othen doubly series almost or quites from base to apex, mostly in 5 or 6 pairs; fruits of a more scarled or erimmon red and sot glancescent.

Common at middle elevations in the Californian Sierra, far below even the subalpine regions, and not remote from the heated plains of the interfor; an excellently distinct species, as compared with true *S. occidentalia*, with which, however, Mr. Watson confused it.

## A FASCICLE OF NEW PAPILIONACEE.

LTETRUS ADVECTS. Low decumbent perennial, the stems skolow exceeding a foot in height inclusive of the single terminal racence; whole plant silky-canesent: leafiest mostly 7, about 1 inch logn, narrowly oblog-lanceolate, obviously mucronate-caspidate: racence subsessile, quite long for the plant, the small forwers in distance whorks: caslys with a short but prominent and almost hooked spor: corola about 4 lines long, deep-blo, the subsequal petals notably stratat-weined, the banner with a white spot in the middle soon changing to redistion-purple; lead shorter than the wings, not falcate but rather stout-pointed and blant, naked.

A decidedly handsome lupine of dry ravines among the sandy hills at Aztec, New Mexico, collected by C. F. Baker, 2 May, 1899.

LETENCE BAKEAR. Personnial, the turbed stams erect, very stout and somewhat fisiclose block, 2 or 3 foct high, pale and ashy or somewhat silvery pubescence, the lower part of the stem villou-hirauticlose with short spreading hairs; lower nodes of stem apparently leafless and having only grave stipplar appression scales: Lands 7 to 0, about 1 to 14 indexs long, elliptic-inacoslate, acute, almost equally pubescence of middle international stars, there index not weakers of middle international stars, there index not with the usual spot on the banner at first while, then red or purple: banner ontably shorter than the other putes is keel short and nearly symbiotrom, completely enfolded by the wing, densely would-citikate the stars.

Growing in large dense buuches in oak thickets at Los Pinos, southern Colorado; collected 31 May, 1899, by Mr. Baker.

#### A FASCICLE OF NEW PAPILIONACES.

LUTTURE INCLATURE Related to L decombene, less branching, with few and nabassile accounts of very small and crowded flowers; all parts glabrous except a fine silky indument on the cally and policies and the youngest growing parts: leaves short-petioded and crowded; lessfes 9, oblong but constately apering to the hase, obtaue, compidatemucronate: flowers evidently verticillate on close inspection, but crowded into a dense unitaterrapted narrow spike, the corolla only 3 line long, white or sorid, with no tinge of blue or parple; patals subequal, but the falsets maked keel with its pointed tip exerted: poles small, quadrate-oblong, silky villos, 4 seeded.

Frequent in low grassy lands at Chama, New Mexico, 2 Sept., 1899, Mr. Baker. A homely species, but with a fair exhibit of specific characters.

LUTINUS Nao-MIXTGAYS. Perennial, the inflod and subevent south at senses 3 feet high of rest, these and the patioles pilose, or a parsely hirstite: leafiest about 7, oblog-lanceoalex, acute, 1 to 14 inches long, and to be conductive they glabous, the margins and lower face rather strongly somewhat strigose with long but not very rigid straight hirs: will-developed solitary racems short-pedualed, rather hax, the flowers solidom obviously verticillate; raching, pedicels and capty density 'llong-birentations but the indument short: corollas nearly 1 inch long purple, the bunner relatively small, little more than half as long as the wings, keel not longer than the wings, of exactly bread-lunate outline, naked.

About Silver City, and in foothills of the Pinos Altos Mountains, southern New Mexico, collected by the writer in 1877 and again in 1889, no other specimens now at hand. It was at that time called *L. Silgrenveit* by Mr. Watson, but is less related to the type of that species than that is to several older ones that might be named.

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LITENESS HELTARE. Ferennial, the rather rigid subcreds scarely branching stems 2 or 3 feet high inclusive of the rather dongated and showy subsessile received. Herbags silvery-cancent with a very fine appressed-silky indument: leafiets 7 to 0, about 11 incluse long, oblacacolate-linear, acut, pat to be conduplicate, the upper face greener and more sparsely silky-hairy: solitary recense 6 to 10 incluse long exclusive of the abort pedmedge, in its undeveloped state showing an inbricated series of ortzeline colate acuminate creat and closely appressed bravit, menty spursel, petale blacepurple, subsequit, shout 5 lines long, be banner with a few silky hairs on the middle of the back; keel somewhat fajeate, examity clints in the middle and toward the apex with toritoon hairs.

This is Mr. Heller's number 3557 of my set of his New-Waxian plants of 1897, taken from "a cafion one mile southeast of Santa Fo," and distributed for "L. arguetau," a Purshian species of most uncertain identity, never adequaledy described by that author, nor positively identified by any subsequent writer on our lapines, on which account the name itself ought to be dropped. Mr. Heller's plants differ specifically from the common L. desumbans of Rocky Mountain plains and bills by its cancescan slikiness, unbranching stems, longer raceme of larger flowers, and its spurred ealys.

LUTENESS STRIAMTON. Size of the last, but the element freely branching above and the remomes several, very dense and the flowers of the smallest; stem purplish and only sparsely strigulose; petioles slender and the 7 to 9 leadest narrowly oblauxedats, acutish, perfectly glabrous above, finely and rather densely strigulose beneath : racense 2 to fouches long, subsessile, in bud aboving bracks with attentuate and spreading tips; flowers violet, verticillate but the whords closely contiguous; pedicels and easyz densely vii

## A FASCICLE OF NEW PAPILIONACE ...

lous; corolla less than 3 lines long, the petals equal, the short and broad keel delicately ciliolate.

This is another of the alliss of L decambra, but most ditient by its excessively numerous very small forers, appearing in fine close racemes at the ends of all the branches. It may possibly include on small part of the so-called L, granizer of low meadows in Wyonig, Uth and Newda; but my type specimens are from the meadows about Guninon, Colorado, and were obtained by myself, 15 sept, 1808.

LUTINUS ALGOPHILES. Tail, branching and small-floweed as the last, with still greener and seemingly glabrous herbage, but leaves fewer, very large and ample; leaflets about 8, those of the middle and lower portion often 8 inches long and 1 inch broad above the middle, oblong-lanceolate, oblaw, mucconsts, pails and glacessoni beauti, groun and another the strength of a latches back, much back and the strength of the strength of the strength covered than in the foregoing; any with very short, these not plants and blant, the margin naked ; pool densely rullons.

In subalpine thickets near the summits of the mountains above Cimarron, Colorado, 30 Aug., 1896, collected by the writer. Remarkable as combining the largest of lupine leaves with almost the smallest of lupine flowers.

LETTRUE ORDOFFICTS. Personnial, with tuffed shoulder evect of decombent stems 1 to 2 foct high, not branching, and with a single short raceme of small flowers; the whole plant almost while with a dense sliky tomesture leaflest 7 to 9, the longest 2 inches long, oblancedate, obtass, mucroands, the periodies longer than the leaflets: flowers violet, rather distinctly whorled; policels and enlyx velvely, the latter gibbons or subscaceta st base; petals equal, the banner, and sometimes the wing-petals also, densely villous on the outside along the milview, keel short but somewhat

falcate, densely woolly-tomentose marginally rather than ciliate.

Dry foothills along the Cimarron River, southern Colorado, 29 Aug., 1896, collected by the author.

LETENES ANDOFILES. Perennial but not tuffied, the stemm aring aingly from an extensive aysiem of rather despeated horizontal rootstocks; the stem and raceme together § 10 fell long, but the large raceme mouly longer than the leaf-bearing portion, the whole very stout, somecoarsely hirmste with long white spreading or defixed hairs: laddes 5 or 10, censate-obvente to broadly oblancolate, lightsgreen and gabarous above, aparsely hirmste bench, 10 i lineshes long: racement lenge and above; pedicels and gibboux ealyr hirelious: corolla about 5 lines long, thus with a yellow got in the middle changing to durk-red, the petals otherwise purple; keel falcate, the long back-like lup thinly woll-relinst - ovaries denay to mankows.

Sandy bottoms of dry streams at Aztec, New Mexico, 20 April; also at Los Pinos, Colorado, 18 May, 1889, C. F. Baker. A very distinct lupino, bearing no obvious marks of uear relationship to any other.

THIFOLIZEM NERODALE, Caulescent but low, the flowering tenss only 30 is inches high, tutled on the branching cover of a stort perpendicular root: lowest leaves on petioles plants prevailingly 4 or 5, oborate-oblong or breadly oblong, 1 to 5 inch long, very obtas, sharply serate-toolind, bright, preven and galaxies above, canescently pubsecut by the start of the start of the start of the start of the between the test, the leader that mappensing almost woollymargined: hand seldom more than 2, often 1 only, nearly hemispherical, if inch broad; only canescently villoon, the

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#### A FASCICLE OF NEW PAPILIONACEE.

subulate subequal teeth rather longer than the tube : petals apparently purplish red with salmon-colored tips.

In open groves of Finus zopulorum, at Los Pinos, Colorado, 17 May, 1880, C. F. Baker. A most interesting and handsome dwarf caulescent clover, whose nearest relatives are in the desert regions of northwestern Nevada and adjecent Californi. Miss Eastwood, who obtained it near Mances, Colorado, some years ago, mistook it for the rare *T. Plummeres* and distributed it under that name.

Threpoticus arrespondent values of the straightform, rather larger, less densely complicies, horizing generate though with some sitely hairiness : leaflets nearly or quite 2 inches long, nerrowly linear, accuminate, outlier: scapiform publicules in flower not equalifying, in fruit harely a little longer than the larger should be emispherical, few-dwored c hards at base of outer publicles somewhat ovate or quadrate, as broad as long subtrunced, or marely with an abrupt accumination: soly a test of the state of the solution of the solution of the elongated and associating hance world surgessing the other petals and slowedry, almost scanceously, accuminate peticles in defaced in age.

Along alpine ledges at 11,500 feet, among the mountains ner Pagos Perk, souther Coindo, 6 Aug. 1809. C. F. Baker. A beautiful new ally of *T. dasphyllum*, which hatter has relatively much longer polundes and smaller lawse, twice as many and smaller flowers in the head, and these never deflexel, even in full muturity. The isendedry pointed leaflest and banne-potal are also very characteristic, suggesting the name of *T. atemuatam*.

T. ANEMOFILIUM. Equally allied to *T. damphyllum*, but dwarf, the whole plant when perfectly developed sometimes no more than 2 inches high : short and erowded foliage and peduncles white with a silvery-silky closs indument: bracts subhending the outer pedicels of the head mostly

truncate and tridentate: calyx-teeth equally silky with the foliage, longer than the tube: corolla dark red-purple; banner scarcely exceeding the other petals and quite obtuse.

Binch hills of southern Wyoming, about Laramie; distributed by Mr. Buffurn in 1894 as *Hirolabut and asphyllum*, but throughly distinct. It should here be remarked that in *T. daughyllum* the bracks subtanding the outer policies of the flower-cluster are long, should, entire a subulatsciacous; very unlike those of either here described as new.

HEDTARATE MARDINATUR. Tuffed stemms erect, 2 to 3 feet high, minutely appressel-pubscene, lacify throughout : leafless in 5 to 7 pairs, oblong lanceelate and oblong, obtune, merconulets, thin, obviously pinnate-viende beneath and pubscent, the upper face glabrous: racemeslarge and showy, in fruit sometimes a foot long including the elongated pdandel: calys-teeth shorter than the tube, broadly subalate: corolla rose-purple, about i finic housy: longated of from 2 to 4 (usually 3) large obovid joints, these commonly  $\frac{1}{2}$  inde long, in matrity exhibiting a thin searious wing-like margin, the surface strigulose and very irregularly reticulate. Mountains above Cinnarron, surtherr Colorado, collected by the writer, 30 Aug, 1909; also near Pagoas Springs, Colo, 20 July 1900; C. F. Baker.

THERMOSES FIXEFORM. Sheens at Govering solidom more than a foot high, often less would yaimple, rather laxuriently leafy, the solitary quite semile spike few-flowered: leaflets of the lowest leaves smaller than their stipules, oborate-oblog, camaginate, these at midway of the stem ample, obvate-oblom, obtase, 2 or 2] inches long, on petioles aborter than the inequilaterally corate-over leage stipules, all the folgage glabrous above, more or less hairy marginally and beneat: cally somewhat villons, the triangular subalate teeth shorter than the tube: pods ascending or suberect, straight, acute, pubescent or strigulose, about 3 inches long, 10 to 12-seeded.

Common in pine woods of southern Colorado, at cousiderable elevations; collected by myself, in fruit, below Marshall Pass, 4 Sept., 1860, and by Mr. C. F. Baker, at Los Pinos, in flower, 23 May, 1899. Apparently also extending through the mountain districts to southern New Mexico.

# NOTES ON VIOLETS.

#### WITH PLATE XIL

I have left too long unpublished the results of some further bibliographical study of two of our common violets; and now, at least one of the nomenclatural corrections consequent upon this piece of research has already good before the public at second hand; appearing, as it does, upon the labels of that distribution of herbarium specimenes of violets which is being made from the U.S. Herbarium, and under the immediate direction of Mr. Follard. The resolution of the names V, finitriation and V, papilionance seem to be well warranted, as I shall here endeavore to indicate.

V. FUMBRIATCLA, Smith, in Rees' Cycl. 23 Dec., 1817. V. primutefolds purels, Pit. 173 (21814), not Linn. V. Nova, Nutt. Gen. 145 (1818), To Mr. Nutall, equally with Sir J. E. Smith, must be credited the discovery that what Purch has mistaken for V. primalofolio, Linn., was a true species and in need of a name; for, while Smith's proposed name for it was published earlier by perhapse half/war, ryt the publication was unknown to Nutall; as is evinced by the fact that he, like Smith, cites the V. primilarloid on Pursh as a synonym. And the actual priority of V, finibriated over V. coada was never demonstrable until Mr. B. Daydon Jack-

son had given us, in 1895, the precise date of publication of the issue of *Rees' Cyclopedia*, which contained this genus.

V. PAPILIONACEA, Pursh, Fl. i. 173 (1814). V. cucullata, Le Conte, N. Y. Lyc. ii. 137 (1828), not of Aiton. V. communis, Pollard, Bot. Gaz. xxvi. 336 (1898), not of Wittrock. V. obliqua, Schweinitz, Sillim, Journ. v. 60 (1822), and Britt. & Brown, Fl. ii. 447 (1897) in part, (of Hill??), also V. obliqua, Greene, Pitt. iii, 142. My reasons for regarding this very common and very beautiful violet as V. papilionacea, Pursh, are several. Of course Pursh's diagnoses of his violets are all too brief, often if not always failing to touch the real essential characters by which the species are distinguishable; and I assume that, in the case of V. papilionacea, the specific adjective itself is about the best part of the diagnosis. This is true of hundreds of species, that the specific name is the best part of the specific character. The species of violet here under discussion has a more papilionaceous looking corolla than any other violet known to me. The peculiarly long and narrow keel petal is always concave and boat-shaped, quite as Mr. Holm has shown in the drawing here reproduced (Plate xii), and the side view of the whole corolla is uncommonly like that of a true papilionacea. Moreover, the whole of Pursh's specific character, so far as it goes, is applicable to this species. It is true that, in his notes he describes the corolla as " blue," whereas it is in our plant violet-purple. But a glance at Pursh's pages in respect to the colors of violets reveals the fact that he was always wrong where it was a question of blue or purple; for all the blue-flowered sorts are described by him as with " paleblue" petals, while all those that have them violet he describes as having them "blue."

His statement that the hairs on the petals of his V. papilionace are yellow was for a time, with me, a weighty objection, though the only objection, against accepting our plant for that species. I can find, in the field, violats in plenty which exhibit white hairs set in the background of yellowish-white or greenish-white base of the ptal, but no yellow hairs. Until the "yellow hairs" are found, I shall no longer believe that such exist, in any blue or purple violet.

About the best imaginable confirmation of the view that V. communis of Pollard is the V. papilionacea of Pursh exists in my library, in Le Conte's beautiful water-color of what he knew to be the plant of Pursh. I say, of what he knew to be that, because he was on terms of familiar acquaintance with Pursh, and they two were contemporary specialists in the study of our violets. They knew each other's herbaria, and each other's mind in relation to the species of this genus; and although Le Conte at the time of the publishing of his monograph regarded V. papilionacea as identical with V. cucullata Ait., yet, at an earlier date, at the time when he made the drawing of V. papilionacea he labelled it by that name, as the unpublished plate in my possession shows. I think it probable that, at that earlier time he had not decided what was to be considered as the true V. cucullata. Indeed, the unpublished figure which he made of what we now understand to be V. cucullata he left to the last without a name.

It will be an interesting bit of information to those studying the violes of Maryland and the District of Columbia to know that Le Conte found Pursh's V. popifinance "abundant on the Island of Analostan, in the Potomae Kiver opposite Georgetown," and that the fine drawning of it still extant after the lapse of at least eighty years, was obubless made here in Washington, from specimes grown on that island; while Parsh's type itself was from no farther awy than "near Philadelphia".

V. MISSOURIENSIS. Acaulescent, 3 to 7 inches high at early and petaliferous flowering, the stoutish rhizomes ascending and branched, the leaves and flowers quite numer-

ons, the latter from scarcely equalling to somewhat surpassing the former; herdage glabross and both fraces of the leave closely puncticulate: earliest and small foliage mostly rounded, obtuse, subcordat, as a broad as long, those developed along with the corollar from subcordate-delutid to subheatte-triangular and even triangularity lanceolate, 13 to 2 inches long, remotely and sometimes obscurely creanteser-rate, the peticles often and tonger than the blade: spalls oblong-lanceolate, obtuse, their margins rarely maked, often more or less (initiate: pedia with, dowrate, obtuse blade, violet or paler and sometimes white, three of them dessely barded with rulter long alightly clavate hairs: late and apathous flowers short-poduncied, horizontal and at least partly subterranea.

A very well defined species, known to me only from Missouri. Its very distinctly tigonous folgae led me at first to refer it to V. emerginate notwithstanding certain discrepancies, sepscially its larger corollas, sourcesthat cillate sepalsect; but later posimers show distinctly the depressed or partly buried apetalous flowers. My specimens are from Mr. B. F. Bush, Leeds, 19 April, 1885, Oarntey, 10 May, 1898, and 30 April, 1899, and from Kenneth Mackenie, Independence, 24 April, 1808 and Analohp, 25 April, 1899.

# SOME NEW OR CRITICAL RANUNCULI.

R. UNMUTURING. Sheans solitary, a foot high more or less, from a dame fassible of short thick and taptoring white and glabrous roots: ranical large a lor 2 only, erect, elliptical or oborate-elliptic, entire, or remodely and obscirately dusticality, acute, 5-merved, 2 or 3 inches long, on petioles as long or longer; canline similar but narrower and shortpetioled : flowers 2 to 4 in the smaller plants, twice as many in the larger, each terminating a long naked puberlieut





VIOLA PAPILIONACEA, Pursh.

#### SOME NEW OR CRITICAL RANUNCULL.

olate, oblers obovate, spreading: petals about 10, with narrowly oblong or oblong-linesr blade tapering to a distinct claw of a half-line long or more, the pit and scale at its sistent along with the matter fruit: achenes glabros, anrowly and inequilaterally obovoid, little compressed, backed by the stoat and slightly resurved style, not very numerous and forming only depressed globces or even a hemispherical head.

Common "on sites of old snow hanks," at 11,500 feet in the mountains of southern Colorado, C. F. Baker, 28 Aug., 1890. Very large, for an alpine member of the *Flammula* subgenus of *Ranunculus*, and remarkable for its long narrow and distinctly unguicalate petals.

R. axioonosers. Fleahy-fibrons roots as in the preceding, but the plants crowded and forming a tufk, the stems seldom exceeding 6 inches in height; elliptic and ellipticlancolate leaves entire, somewhat feuther-reined and the veinites anastomosing, the petioles of even the radical shorter than the blade and dilated below into a broad searious sheathing base: flowers rather numerous, large for the plant, the petials for Jony, obvast, obtase, commonly persistent, as also are the sepair : achenes many, crowded, forming a dense globose head.

Subappine in the Ruby Mountains, eastern Nevada; collected by the writer, 20 July, 1806. The plant is next of *kin to R. alianellus of the Californian Siera*, but that, as I learned by observation in the fadd after having published it, has its own peculiar mode of root propagation, by virtue of which the selender flowering plant and their promgand sterile offspring form a complete turf along the fertile margins of treemints. The leaves are characterized by three pretty distinct parallel nerves; and the whole habit is most unlike that of this species of eastern Nevada, which grows in banches in otherwise barren clayes soil on mountin sides where the anovers have latity recoded in July.

R. CARDOPETLUS, Hook, var. PINETORIN. Stems shorter than in the type, siddom of inches high, the roots much more strongly and copioualy developed; stems and pedioles canescuty villous; voi lavers commonly subcordate, sometimes truncate at base, the margins crenate: corollas larger than in the type, an inche broad, the roundobovate petals overlapping; head of achenes never more than oveid, sometimes no more than clobes.

"Abundant in pine woods, at Graham's Park, 7,800 feet," southern Colorado, 12 May, 1899, C. F. Baker.

R. EREMONDERS, GRENCE, YAT, DEDERSEN, Much smaller than the type, differing from it in chilbiting swerel atoms from the root, all ascending; the fascide of roots itself larger, and the roots conserve : head of achenes and their receptatel aborter and more rounded; the individual lacking the thick marginal development which I fund curieval in the type, though it was not mentioned in my original diagnovis.

Obtained in southern Colorado, in the summer of 1899, by C. F. Baker, perhaps near Pagosa Springs; but the label has been lost.

R. TRIPOLATCS, Muchi, fide Schliechtendal, Animadv. fit. 30 (1820); R. faccicularis, Schl. 1. e. as to pitel it, but not of Muhleuberg. It has long been evident to me that the R. fuscienteris of even the most recent tookschood cataloguese momentes two remarkably distinct species; and I had the impression that oue of thom was in need of a name. There is a dwarf plant of the North, very early-flowering, which exhibits a large fascile of almost traiform fleely roots; and this napsers to be everywhere recognized as R. fuscicularis, and I think correctly. If Seems to range from Massechusets to Jowa and northward. Then from the vicinity of New York (bity westward and southwestward along the Alleghanies we have a somewhat nearly rolated several times larger plant having a large

# SOME NEW OR CRITICAL RANUNCULI.

commonly received as the *R. fascicularia*, Muhl. And from a young and not quite typical state of this Schlechtendal figured what he supposed to be *R. fascicularia*. But this plant, with its sample tuft of fibross roots, its large dimenions, and markedly trifoliolate leaves, was made by Muhlenerg, as Schlechtendal himself statests, a species distinct from *R. fascicularia*, and was distributed by him under the name *R. fascicularia*. In believe it is more commonly confused with *R. hispidau*; to which it is indeed, more nearly allosd that to *R. fascicularia*. In present, while collecting it has a state of *R. functionaria* and the state of *R. fascicularia* and not at all approximation of the same state with any one for *R. functularia*. Yet Dr. Britton has distributed it from Staten Island under this name.

R. AFRICUS. Dwarf perennial, near *R. fuscicularis*, but versu snaller, the fruiting plant often only 2 or 3 inches high; roots equally thick and fusiorm but rather shorts; appressed pubsecence not obscure: leaves parted into 5, or more commonly only 3, linear or linear-oblong entire or 3bothed segments, the terminal one often stalked, the others sessile: head of achenes smaller, and the individual achenes smaller and relatively thicker than in *R. fuscicularis*, broadly margined and indistinctly somewhat triarinate on the back, the back very shearer, almost straight.

Near Sapulpa, Indian Territory, 29 April, 1895, B. F. Bush. Said to be common on the prairies. Much like R. fascicularis as to the root, otherwise thoroughly distinct.

R. VICINALIS. Near R. cardiophyllus, but small, slender, the corollas proportionately large: stem solitary, erect, 3 to 5 inches high, from a fascile of long and rather fleshy white fibrous roots: lowest leaves of orbicular outline but deeply cleft or parted into about 7 approximate lobes, then again 3-cleft, the middle cauline pedately parted into 7

Humar or oblong entire lobes, those subtending the peduncless sensite and of only 3 to 6 lines. Holes, all the foliage green and with only some scattered and incompletous soft white heirs, or the petioles more obviously villous; sensite svate, obtase, villous, meerly spreading, purplish-brown at summit and the inner course adored with a distinct yallow petaloid margin; petals 5, broadly obovate, very obtase, 4 or 5 lines long; fruit not known.

At Fort Selkirk on the Yukon River, in dry gravelly sol, 9 June, 1899, M. W. Gorman. A distinct and very elegant species of the group to which *R. pedalifdus* and *R. cardiophylius* belong; the plants small and slender, the few flowers comparatively large and show:

# NEW OR NOTEWORTHY SPECIES .- XXVII.

Concoursement a seconcera. Plant larger than in the type-species, often more than a foot high, more delicately herbaccous and the roots fewer, and less wiry: leaves more ample and with fewer larger divisions: dowers far less numerous and the inforesence less corymose: petals more: stamess very few, commonly 10, forming a single series: head of acheness hemispherical rather than broadly turbinate as in the type: achenes shorter and thicker, hickest below the middle and even with a conspicuous dorsal globosity just above the insertion.

Occasional in dry avines about Golden and Morrison, in middle Colorado, at about 6,000 fest altitude, flowering late in May. This is the first Gyrorhipoche that was seen by me in my long course of Goldentudy of Rocky Mountain botany. I obtained it first in 1871, in ruines about Golden City, and was then informed by Dr. Asa Gray that it was the plant of Nutali. In 1872, when I first visited southern Wyoming, I aw and collected there another so very different from the Colorado plant that I. Supposed I and now a

#### NEW OR NOTEWORTHY SPECIES.

second species of the genus. But this, as I learned by further study, was the real C. ransuncinics; and during the succeeding years of residence in the region I did not again see the Colorado plant. Last spring I requested Mr. E. Bethel of Derver to go in search of it, giving him general directions as to its habitat, and with the result that I soon had in no flowering specimens of my long neglected plant, and later, some thoroughly mature achenes. The species is very well characterized, by its ford-flowerd infloresence, apetalous flowers, few stamens, and its short gibbous achenes in a heaving the da.

CLEMATE BALKELL: Stems simple, erect, rather slender, 2; for high, lesty up to the short-bounded noding terminal solitary flower; herbage canoscently short-villous or villouslands; leaves of lower and upper parts of the siom very diverse, the lowest pair oblanceolate, acute, eutirs, erect and either appresend to the sitem or spreading; the next pair commonly pinnately divided in 5 or 7 remote lanceolate on its segments, the others successively much larger and parted into as muny long pediolinits and termately compound, or and linear-inconduce: pedance seldon arguments, and often not erem equalling the apperment pair of decompound alwave: flower endury to inthe long, dark-prupel; spatia almost platrous below the middle, white, tomentoes toward the reflexed apex.

On hillidics among serub-oaks, at Los Pinos, southern Colorado, 19 May, 1899, the specimens in flower only. Related to the well-known C. *hirratissima*, Pursh, of far northern latitudes (commonly known as C. *Douglacit*), but a much taller plant, with smaller flowers, and vary different foliage, this in C. *Basier* ; achibiting extremes of diversity, as I have indicated. The perfectly distinct C. *Socilio* of other sections of southern Colorado in is noon eost intermediate, yet of different habit from either of these, and often severalflowered.

Grays accortance. Near G. strictum, both usually smaller, always less robust, the tufk of radical leaves presenting two distinct forms, the iowest bipinnate, of rhombio-val general cutline, the rather crowded divisions and subdivisions etu neiform and niceslytotobich, those next succeeding lyrate, with few and broad rounded and merely toothed or eleftsegments; base of stem and petioles hiratet; stipples smaller, more rounded than in G. strictum : style-tips more hairy.

Type-specimens from "damp, shady thickets" at Piedra, southern Colorado, 14 July, 1899, C. F. Baker. Others, obtained by myself at Sherman, Wyoming, in 1893, want the lyrate form of basal leaf.

ANDORACE CAPTLAIRS. Personnial, the crown of the root branching, forming a dense tuth, hearing numerous filform scapes all leafy at base, the whole plant 2 to 4 inches high, glabrous except a few scabrous points on the capillary pelicies under the calix: leaves ovato or ovat-lanceolate, denate, juch long including the broad petiole: flowers very many, which, minute; calix, campanulat, the triangular teeth 3-nerved, shorter than the oval or subglobose capsule.

This species, well marked in its vegetative characters, though in flower and fruits on much like A, *filtformic* of the Old World as to have passed under that name with all American authors until now, inhabits the margins of  $a^{-1}$ pice and subalpine streamles in morthern Colorado, northward through Wyoming to Montana. True A, *filtformic* is a tall and selence ranuon1, and is not found in America.

ANDROSACE ARGUTA. Perennial, the short crown of the root brauched, but the foliage forming one very dense tuff from the midst of which rise the 12 to 18 scapes: leaves linear-lanceolate, 1 to  $1\frac{1}{2}$  inches long, coarsely and somewhat pinnately dentate, roughneed above with an indument

#### NEW OR NOTEWORTHY SPECIES.

of short rigid forked hairs, glabrous beneath: scapes all terminating in a small 5 to 8-flowered subcapitate umbel: calyx glabrous, narrow-campanulate, with triangular carinate teeth: corolla white, hardly equalling the calyx-teeth.

Known only in flowering specimeus obtained at Port Clarence, Bering Strait, 28 June, 1890, by a former pupil of mine, Mr. W. G. Hay.

ASDBOACE GOMANT. Biendial or perennial, not multicipitous, but with the hidt of A septentrionatis, though smaller and more siender; leaves { to \$ inch long, plane, subscarcelet, from ovate to ovaris-spatials in the smaller (young 7) plants to spatialstelaneosiate in the larger, entire, or the upper portion with a few prominent teelby, glabrous beneath, the upper face almost hispidulous with minute banching hairs: scapes aprilia and scaberolinous, 2 to 4 inches high, bearing 6 to 12 or more small flowers in a dense umbel; easy cohymmidial, 5-angled, the carinate teelh scarcely hair the length of the tube: corolla white, barely surpassing the easyx.

An Alaskan species, obtained at Fort Selkirk in the Yukon Valley, "on dry gravelly soil and old river benches," by Mr. M. W. Gorman, 24 May, 1899. Distributed under n. 981.

Aronosace preservary. Perennial, not multicipitous, the often solitary scape from the multist of a suggle resulted apparently depresed leaves, these obtaincoolate, but tapering to a linear basal and peticiar part, the whole 1 inch long or more, the laminar part commonly with 2 or 3 pairs of serrate teach, the upper face scaberuloux, the lower hardly to, but, with the seape, purphist central scape 4 to 6 inches high, often accompanied by one or more lateral ones which are shorter: pedicels iess than 1 inch long, the unbel therefore contracted ; both pedicels and cairy colscurity scabralous: cairy-toeth subplates, more than half as long as

the tube: corolla white or pinkish with yellow center, surpassing the calyx and about 2 lines broad, the lobes obovate, obtuse.

In pine woods of Graham's Park, Rio de los Pines, at 7800 feet, southern Colorado, J2 May, 1890, C. F. Baker. The species bears more resemblance to real Old World A. Repletrivensil (so thelived by mo to exist in this country), than do any of the plants of the far West and North that have been referred to it. It is habitat, in its native southern latitude, is not even subalpine. The short pelicels and contracted urbed appertain, its may be to young and merkly from along irrigating disches, and being in fruit, eshibit from along irrigating disches, and being in fruit, eshibit are larger every way than in those from the plants are larger every way than in those from the plants above; a natural result of generous nourishing.

ATEROARE ASPERIA. Perhaps annual or biennisi, the root very select, sustaining a small roads and several low slender seapes with hax for-flowered umbels, the policies hearity as long as the scapes : leaves j incl long, spatialize to oblong linear, entity, glabrous beneath, nearly so above, the arguing rangely clinicity: engels, shad were the enty a rough with short hairs, these soldom simpley course of allel species. cay's broadly obyermidal, the broadly or triangularly sublate teeth almost as long as the tabe.

Rogue River Valley, Oregon, 16 July, 1887, Thomas Howell; distributed for A. explentionalis, and with the habit of A. diffuse, but exhibiting the best of specific characters.

PHYSALIS FOLYPHYLLA. Perennial, the erect freely branching and very leafy stems 6 to 10 inches high, from apparently borizontal roots; the branches and main stem

#### NEW OR NOTEWORTHY SPECIES

angular and subrous-puberalent: leaves mostly 1 to 14 inches long, the lower lancolate and notably factharve-ined with white but rather fine veins; the very numerous runnal ones mostly linear, or nearly so, and 1.nerved, all quite entirs and nearly glabrous except along the margin and veins, here strigulous: pedundes about 5 inch long, ascending in flower, deficaci in fruit: croils rather small, greenish-yallow, with dark green spots: fruiting calyx bradly and acutely ovasi, thinnish, reticular, glabrous excepts as to the rather shortly and broadly triangular-lanceolate teeth, these whitish-puberalent.

Collected at Fieldra, southern Colorado, 12 July, 1890, by C. F. Baker, it me specines movely not well past the sarly flowering. The species is related to what Mr. Rydberg has identified, thooght to up mind not satisfactorily, with *P.* Véryinkana; from which it differs greatly in its very many and networks, and their completions variation. The form of the mature catyx is also in lively contrast with that of *P. Véryinkana*, Rydb.

CASTLETAL LINEATA. Tuffed seems rigid and brittle, but not suffutescent, about a foot high form a prevential root, narrowly and not densely spicate for about one-third the length; herbage hoary-to-monso: leaves ascending, linear, 2 inches long, entire, or in more robust plants with one or more pairs of linear symmetrix, all strongly 3-merved and channeled and appearing striate: bracts similar to the leaves, more commonly plantady cleft to the middle into 3 linear lobes: corollas greenish and inconspicnosa, little exceeding the ealyx and bracks.

Moist slopes near Pagess Springs, southern Colorado, 18 July, 1890, C. F. Baker. Very distinct from all other Castilloias of the Rocky Mountain region, and not very closely allied to the tomentose species of even Mexico and California. VERMERA RUDS: Allied to V. brackson, but the numerons assurgent or nearly prostrate stems from the branching rown of a hard thick woody perennial root: stems less distinctly angular, and pubseences more softly hirsute: leaves source-toovate, variously incited or subpinnatilid, their sparse pubseence closely appressed: spikes loose and bracks only half as long as in V. brackson.

Arboles, southern Colorado, 18 June, 1899, C. F. Baker. Said to be a common weed of roadsides and cultivated lands. Its remarkably thick hard woody perennial roots alone would completely separate it from V. bractosa.

<sup>4</sup> VERMEAA CONFIRM. Also allied to *I*, *brackesa*, and the root annual, but rather tail metal branched stense sparently erect or ascending; herbage greener, but under a lens appearing sparsely hirsate: leares distinctly 3-lobed, the two lateral lobes short and divariate, the middle one many times larger and causels, incisaly toothed or eleft; spike elongated and very lax, many of its bracts and lowers in opposite pairs, the bracts smaller and narrower than in *V*. brackes.

Organ Monnians, New Marico, 30 Aug., 1897, E. O. Woosan (bis n. 400 of my set). I know so much, by field experience, about verbena hybrids, and even of such as have V. bonchose for one parent, that this plant would have been under supplicion but for the fact that, while Nr. Wooten called it V. brackose, his collection contained neither that species nor any other which, which V. brackose, could have generated this. I am therefore convinced that it is a proper species.

CHRNSOTIANUE BARERI. Low, compact, the crowded erect flowering branches only 5 to 7 inches high, from a much branched woody caudex and thick hard-woody root: bark of flowering branches glabrous and white; leaves about an inch long, narrowly linear, deep-grees and glabrous, but

conspicuously punctate: corymbose cyme dense, the heads rather large for the plant, 5 to 7.40 wered; involucers nar rowly turbinate, its oblong/inear bracts in about 3 series and forming vertical ranks, glabrous, with green-berbaceous thick tips and a very narrow thin-scarious or hyaline margin: ovaries glabrous.

Near Chama, New Mexico, 5 Sept., 1899, C. F. Baker. Allied to C. Greenei, but with very different leaves and involucre.

\* Contropers BARERT. Densely tuffed stems slender, about a foot high, darie-do or purplish, equality though somewhat sparsely leafy and the leaves ascending, frequently momoephalons, otherwise with a few leafy and monocephalons branches toward the summit: leaves 1 inch long, consetty oblanceolate, acute, neitre, strigulose-pubscent on both faces and with minute assilor resinous atoms underneath the pubscence: heads broad and short for the genus, subcompanuite; juvolucral bracts mostly dark-reddish like stem, more villous than the stem, in several series but not very regularly imbricated: rays of a deep golden-yellow approaching orange: cohenes silky; outer papens obvious, whiler than the inner but seaceous rather than paleaceous, rather scanty.

Common, growing in large bunches on ledges and in stony dry bads of streams, at about 9,000 feet in the mountains of southern Colorado buward Pagoas Peak, C. F. Baker, 23 Aug., 1899. A remarkably slender species for this genus, and well marked in characters of involucers, and the more than ordinarily deep-colored flowers.

 CREWSOFERE HIRSUTISTERA. Stems only 4 to 8 inchesh high, very erect and densely leafy, from a ligneous and branched caudez crowning a strong deep-seated woody root: whole plant of a silvery whiteness, the stem clothed with a long and rather stiffy hirsute or almost hispid white-hairiness,

the leaves as white with a done strigose pubsecence, their outline oblanceolate, all tapering to short slender petioles, heads solitary in the smaller plants, fastigitat-covyrubose in the larger: involucre very regularly imbricated, broadly turbinuts: rays rather lightyellow: achenes densely appressed-silky: outer papersolvious, indistinctly relaceous:

On dry rocky declivities leading to the mesas, at Arboles, southern Colorado, C. F. Baker, 5 June, 1899. Related to *C. hispida*, yet very distinct, as the strong ligneous undergrowth and abundant white indument attest.

CONTROPOSES PROPECTAAL. Stems numerous from a subjectors branching cauder, short and depressed, forming large mats: oblancedate leaves almost silvery-encescut with a fine appresed somewhat strigulose publescore: hands rather large for the greens, solitary or several on long almost naked pedinedes, these 2 inches long or more, often quite as long as the densely leafy stem itself: short outer bracks of the broad involutes exhaust builds, the innermost oblog-linear, all equally canescent with the foliage, often purplish on the margin: rays shorts, golden you're: achente densely silky; outer papper conspicons, of unequal narrow and danot stiftor paples.

Dry hillsides about Pagosa Springs, southern Colorado, C. F. Baker, 20 July, 1899. A beautiful species, altogether unique among its allies by its short decumbent or assurgent stems, and few long-beduncled heads.

<sup>4</sup> GRINDELLA SUBJECTS. Stome apparently several and documbent, a foot high or less, freely and rather loosely branched from toward the base, the branches slender, sparingly leafy, and mostly monocephalos: lower leave oblanceolate, or lignitate oblanceolate, commonly 3 to 5 inches long, rather thin, glabrous or the upper surface observely seabroux, the margin variously hat usually remotely inclusserates or even subjinualidid, theses of the branches oblong?

### NEW OR NOTEWORTHY SPECIES.

lanceolate and sessile, incisely serrate: involuces benispherical or subplobes, it of inch broad, the numerous and strongly imbriested bracts with long slender more or less squarrose green lips : rays numerous, long and showy, of a golden-yellow : achenes all targid and targitly ribbed, these of the ray trigonous, of the disk somewhat compressed and 2-edged: bristles of the panyna 3 in the ray, 2 in the disk, all short, slender for the genous, glabrous.

Chama, New Mexico, 5 Sept., 1899, C. F. Baker.

<sup>4</sup> Encusor accenzess. Habit of *E. discogens*, rather larger, commonly more than a foot high, cincerously hisratulhous: basal leaves of broadly oblanceolate outline, abruptly and completely actuality, nearly with only 1 or 2 such each, a for quite entire, all largering to a selector petiod twice the length of the blade; the proper caulies and rameal ones petuthalselinear, entire, sessile: hands subcorputos, the quite senter, entire, sessile: hands subcorputos, the more himsto, sub-qui in several series, linear, entire, results, pathogen, and ramerow, pake violati; pappua of rather few and very delicate bristles and a number of subulate minute squamella.

Collected at Clifton, Arizona, April, 1839, by Dr. A. Davidson. Evidently a more showy species than its near ally, *E. divergens*, from which its pinnately toothed and longpetiolate foliage as well as larger heads render it easily distinguishable.

«Entomory rungrances. Related to *E. composition*, similarly complicate though more loosely, and the monocephanloss pediancles scapiform, but leaves narrowly oblasceolate and entire, except a few of the earliest which are obvariation of the state of the scale of

with a few leafy bracts at base, somewhat villous-birstet at the gradually thickened summit: bracts of the involuces linear, accuminate, rather densely hirstet below, the acuminate tips maked and of a dark purple: rays numerous and sented; desidely shorter than in *E. compositions*, pinkish or fish-holor: pappus rather copious and firm, of a distinct purplish red.

Sandy river bank at Fort Schirk in the Yukon Valley, 29 June, 1890, M. W. Gorman. A most distinct new Erigeron, remarkable for the vivid color of the pappas. No more interesting plant has come to us from the far Northwest in recent years. It is threafore unfortunate that but a single specimen was collected; though that is a very good one.

\*Enconcer GORLANT. Near E composition, the herbarge of a nucle more virid green, minutely and densaty glandular and visied, scarcely pubsicent, but with a scattered and almost hisyle dilation on the pitchlose of the short and almost erest leaves; carliest foliage merely 3-dief or lobed and the lobes little divergent, chlorg, it latter lawres with the lateral lobes, and sometimes the terminal one, 3-lobed; numerous seques about 4 inches high, far arrynssing the lasers, linearbrated below : involcences only sparsely hirsube: rays very numerous, rather selender, fielp-loce.

Dry sandy soil at Fort Selkirk on the Yukon River, 28 June, 1899, M. W. Gorman.

<sup>4</sup> Decentators rotatores. Habit of *E*<sub>2</sub> pleases but smaller and less branching, equally plase and glaucone the leaves thinner, not reficulate, pungently microarts, the margin assbroard-dentealise under a less; branches of the corymboss paniels publication: involvers broad and subcampauliats, their function in a series, very broad and obtuse, empidiately or microartely pointed, minutely wollyclinitate, deeply purplestinged; rays very showy, about

#### NEW OR NOTEWORTHY SPECIES.

twice as numerous as in *E. glaucus*, broader and of a deep blue.

Shady slopes at 9,500 feet in the mountains towards Pagosa Peak, southern Colorado, 23 Aug., 1899, C. F. Baker. Much more showy than any forms of its ally, *E. glaucus*.

\* Towsskrora Bargar. Subscalescent and depressed permini: somewhat results leave oblanceolat, spatulately tapering to a long and marrow petiole, the whole I to nearly 2 inches long, the petiolar part, and also the naked and sampioran peduceles, causes at with a villous pubercene, the leaf proper glabrate, of membranecous texture : peduceles barely an inch long; beside rather large, the involuce hemispherical, the oblogo or elliptic oblog acute bracts inducional in about 3 series, deeg green, but with a narrow and cleady clickles acrinos margin: rays white, but externally green, or genesiab with a purple tinge: diskcordias of a viried green; pages of the disk pluriestoes, of the ray very short, not longer than the breadh of the achene, but statione rather than somemeliake.

On dry hills among pines, at Les Pino, Colorado, 16 May, 1889, C.F. Baker. This appears to be a short-level percunial, most of the specimena being small, with a tuft of leaves and peducales. From the simple crown of a perpendicular root. These I infer to be young plants of cas or two years from the seed. Others are much harger and relay multicipitous, the short branches of a former season having survived and put forth each is tuft of leaves and flowers. These must be older specimens, and have the habit of other multicipitous species.

MACHARMANTHERA PRITNOSA. Root not known, the stout widely and subcorymbosely panicled stem 3 feet high or more, purple, but whitened with a pruincee pubsecence of stiff, many-jointed hairs, but in no degree visield or glandular: leaves (only the upper cauline known) oblog-lance-

olate to oblong-linear, the largest 3 inches long or more, all thinsish, desp-graen, spaningly pubscent only along the 3 veins and their ramifications, nucronately pointed at the obluse apex, the margine venity and rather coarsely dentate: involucres at the ends of all the branches, very large (‡ Inch broad), campanulate, the excessively numerous brades closely individed by thirt white basin part, the long linearsubulate green and pruiness tips windry spreading; rays large and numerous, deep-purple: acheons anrowly oblanceolate, closely strinte, very glabrous; pappas in a single series, but nuceula.

Collected in the Sierra Madre, Chihuahua, Mexico, in Soldiers' Cañon, 11 Oct., 1809, by Messrs. Townsend and Barber. A very beautiful species, related to *M. Sicolovit*, but very distinct as to character of pubescence, indentation of leaves, etc.

<sup>×</sup> A IIINA BURYTHES. Perennial, the cornellike subharmonan bases of the stem fibrous-costed by the remains of last year's includes and motivation of the strange of the

In low wet places at Fields, southern Colorado, 12 July, 1890; C.F.Baker. Quite distinct from all other Alisma forms by its short petioles and peduncles, firm white-nerved and white-margined foliage, etc. The specimens are barely well in flower, no furth having arrived at maturity.

Vol. IV.

Part 23.

# PITTONIA.

# A SERIES OF BOTANICAL PAPERS

# EDWARD L. GREENE,

Professor of Botany in the Catholic University of America,

WASHINGTON, D. C.

DECEMBER, 1900.

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# A FASCICLE OF NEW ARNICAS.

\*Allies of A. CHAMISSONIS; stems tall, with few pairs of leaves, the radical ones wanting or inconspicuous.

- A. cnora. Stout, 2 feet high, with 3 or 4 pairs of cauline leaves, and 1 to 3 long-perdunced large hards: lowest leaves oblong-inaccolate, solic bey a broad base, sharp'p acuminate, obsenvely deuticulate, rather firm, slightly hoary-tomentulose on both faces; the stem and peduncles more hirstatulous, most of the hairs gland-tipped; hards i kinely high, 1 inch broad, almost hemispherical; bracts of involuers blearing, largevoly lanceolate, acuminate, hirstatulous, not glandular: large orange may 7 arreved, obtusely and not deeply 3-doubled; disk-corollas with short villous tube and harger broad-function glandus traces thereas, backs, softly and rather sparsely hirstate; papens short, faceous, subtymmes.

This is well represented in n. 19,445 of the Canadian Gool. Survey; the specimena collected by Mr. W. Spreadborough, at an altitude of about 5,800 feet on Canoe River, Inadwaters of the Columbia, River, in British Columbia, 11 Aug. 1398. By its large beachs, with showy orange-colored may, one would like to identify it with the very illdefined *A. molik*, Hook:, its thet pubseence and the foliage are very far from answering to the little which Hooker had to say about them.

• A. COLUMBIANA. Dimensions of the last, but the heads more numerous and rather smaller; stem more leafy, all

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the lawse lanceolate, 8 to 6 inches long, exceeding the internodes, more or less tapeing to the base and, except the uppermost and somewhat spatulate pairs, short-petiolate; pubescence fine but not tomentalose, the margins allendly dentate : no hairs even of stem or peduncies gland-dipped : involucres campanulate, their biserial bracks candidated coults, nearly acutish : rays light-yallow, bracker and shorter than in the last, S-nerved : disk-corollas slender, the long the willows, the narrow throat glabroas, the elongated teath slightly bristly : achenes setulose; pappus dull-white, merely barbolltate.

Also British Columbian, being n. 19,646 of the Canadian Survey, collected on MacIannan River, another tributary of the Columbia, by Mr. Spreadborough, 27 July, 1898. It can not be referred to *A. Chamissonia*, since it lacks the distinctly obverse leaf-ext, the broad, short disk-corollas, and the tawny subplumose pappas of that species. The pubeecence is also very different.

• A. Macovsm. Allied to A. amplacionnia, Nutt., but taller, often 2 or 3 feet high; leves spatialize-incodute and lanceolate, sessile and amplacient, often 4 inches long, best than an inch in width, lightly serate rather than dentate, the margins scalerulous, the upper face with scattered abort hairs not postalate; infloresence rather ample, corymbese-panielsd, the pedancies dothed with short hairs tipped each with a large gland: campanulate involucer not in the least glandular, its short lanceolate burnets sparsely hispidulous-hairy: mays about 6-merved, deeply notched (24cothed); function glabous threat: achenes slender, strongly-rabed, sparsely short-hirdy and with a similar distribution of sessile glands; pappus short, rigid, loosely barbeliate, marked, and shark and the strends of the start.

#### A FASCICLE OF NEW ARNICAS.

Near Comax, Vancouver Island, 1 July, 1893, John Macoun. Distributed from the Canadian Survey Herbarium as A. Chamissonis, but the plant is more allied to A. amplexicaulis.

<sup>12</sup> A. ovara. A foot high or more, stoutish, sparingly leafy, the leaves in only 2 or 3 pairs and not more than half the length of the internodes, rather narrowly ovate, or innee-ovate, acuitd, calloud-editicalite, the lowest on short winged peticles, all finely pubsecent on both faces, especially near and on the margin: heads about 3, subsended by a pair of ovate-hanceolate very acute bracks, the pedioncles makel: involvences campanaliset, their bracks lanceolate, acuminate, glandular-pubsecent: nys rather narrow, mostly -2dentate; diskcorollas with very short hinvalutous tube and wire longer narrow-funnelform throat including the elongated-triangular naked teeth.

Waksatch Mountains, Utah, at 11,000 feet, 31 July, 1879, Marcus Jones (n. 1,128 in my set); distributed for A. mollis.

A. MACLENTA. About 2 feet high, with 5 or 6 pairs of the rank of the laws, the lower pairs elliptic-lancolate, strongly connate-sheathing, the middle pairs lanceolate and oblong-lanceolate, assuite by a short spatiable base, the uppermost sessife by a broad half-clasping base, all obscurely dentate or entire, green and glabrous to the mainded eys, a lens disclosing a sparse indument of short britty appressed hirs on the upper face, and of more slender and somewhat woolly ones beneath; stem and patiolar sheatths hirstubles with whit more or less retersors hairs: heads about 3, on short slender paduncies; involvers charms had bout 3, on short slender paduncies; involvers campanulate, of 2 series somewhat appressed-villous with fine but obviously jointed hairs : may thin, broad, obtase, shallowly 3-demates : disk.

corollas with short villous tube and much longer funnelform throat, the short delkoid teeth sparingly bristly: achenes setulose; pappus somewhat tawny, scarcely even barbellulate.

Collected on the Shelland Ranch, mountains of northern Colorado, 12 July, 1896, by C. F. Baker. The plant was formely referred by me to my *A. subplannosa*, with much hesitancy. But its pappas is at the opposite extreme from subplannee, and the strong leafmense, with this texture, very thin and obtuse involuces bracts, all are characters demanding its separation.

A surgraynors. Sevend-stemmed from the rootstock, not sender, a foot high, the smallish head's 10 12 : lowest leaves from elliptical to ovate-lancolate, 1 to 2 inches long; on flattened periodics whose a long, the broadest caute at base, the longer subcordate, all with a few salient serrate testh, scalerolican shows, glabrons lencedt, the margin sebrous-clikiet; the lowest cauline oval, abrophy tapering is a broadly wriged and basely much dilated petiolo, the uppermost pair ovate-lanceolate, sessile by a broad base: involucers about jinch high, broadly turbinsta, their bracts biserial and the outer series longer, glandular-puberalent: rays short and broad, broadly and not deeply notehed at spezi: achenes glandular-scalerolous; pappas white, barbellate.

Woods about Lake Pend d'Oreille, Idaho, J. B. Leiberg, Juna 1891, n. 2244. Alse apparently the same, in a reduced form, from Mt. Steele of the Olympic Range, Washington, C. V. Fiper, Aug. 1885, n. 2203. And again ; specimeus quile like the originals by Leiberg are in the U. S. Herbarium, collected near Columbia Falis, Montana, 14 June, 1984, by R. S. Williams, these bearing the label n. 1049. The species is notable on account of its profusion of smallish heeds.

#### A FASCICLE OF NEW ARNICAS.

A. RIVULARIS. A foot or two in height, rather slender. with about 3 pairs of leaves and 3 heads; leaves thin, ascending, the lowest nearly 5 inches long including the petiole, oblanceolate, obtuse, denticulate ; the middle nair nearly as long, but narrower, spatulately tapering but sessile : the uppermost much smaller, ovate-lanceolate, entire, sessile; all sparsely pubescent on both faces and with scattered minute sessile glands above : upper part of stem, as also the peduncles and involucres, sparsely hirsute, most of the hairs minutely gland-tipped : all the peduncles slender, the lateral two much longer than the terminal one : involucres campanulate, their lanceolate acuminate bracts mostly uniserial: rays 10 to 12, deep yellow, not large, as often bidentate as tridentate : disk-corollas short, funnelform, pubescent: achenes sparsely hirtellous, and with scattered sessile glands near the summit: pappus fuscous, subplumose.

Subalpine stream-banks of the Powder River Mountains, at 5,000 feet altitude, eastern Oragon, W. C. Cusick, 1897 (n. 1795 in my set). Related to A. subplemess of Coloradd and Wyoming, yet thoroughly distinct, and as far removed as that from any specific connection with A. Chamisonia, which name is printed on Mr. Cusick's labels.

A. REPORTED AT THE ADDA STATE AND A STATE ADDA STATE A

or acuminate, pubescent: rays 7-nerved, truncate and 3-dentate: disk-corollas somewhat granular-puberulent, and with some fine bristly hairs on the teth outside: aclences glabrous except a few scattered hairs at summit; pappus fine, white, burbellulate.

At 9,000. to 7,000 feet on slopes of Mt. Steele of the Olympic Montaina, Weshington, Aug., 1895, C. V. Fiper, n. 2002. Also at timber line on Mt. Hood, Oregon, Dr. C. H. Merriam, 1896, in U. S. Herbarium. Somewhat related to the Alaskan *Laiplich*, though of different habit, and with excellent characters over and above the reduced size of the plant.

A. LONGTOPPITLA. About a foot high, with 3 or 4 pairs of small lanceolute leaves much horter than the intermodes, and about 3 short-peduncked beads: radical laaves ellipticlanceolate, seesile, denticulate, with only the midderev prominent, all, as well as the stem, sparingly hirstute and somewhat glandular: small involuces turbinate, their bracking states and the state of the state of the state brack black of the state of the state of the state of the state state of the state state of the state of the state of the state of the state state of the state of the state of the state of the state state of the state of the state of the state of the state state of the state of the state of the state of the state state of the state of the state of the state of the state state of the state state of the state state of the state state of the state state of the s

On the Athabasca River, 25 June, 1898, W. Spreadborough; n. 19,647 of Canadian Geol. Survey, communicated by Mr. Macoun.

A. TEUCRIFOLLA. Stems apparently tuffed, 6 to 10 inches high, its leaves in about 3 pairs, the solitary head longpeduncled: root-leaves from ovate and 1 inch long to elliptic-lanceolate and 2½ inches, none as long as their sender peticles, evenly serrate-todhet; the cauline all seenile, oval to ovate-lanceolate, It o 2 inches long, remotely and slightly servate, both faces spranely pubseseriat and more densely glandular, the minute glands only subsessile ; pounde findly villoss and glandular: bracts of the involuces broadly hanceolate, acuminate, glandular-viseid and glandular-eilolate; may deepyslow, 9-nerved; disk-comblas very narrow, with small distinction of tube and throat, only the lower portion and the test villous: a chesnes almost villous at summit, otherwise glabrous; pappus fine, white barbellolate.

On grasy slopes of the mountains between St. Joseph's River and the Clearwater, Idaho, 10 July, 1895, J. B. Leiberg, n. 1229 of his collections, as represented in the U. S. Herbarium. In its foliage, both as to form, pubesonee, and general bearing, this small *Arvica* recalls *Teucrium Conadense*, or *Stachys apere*.

A. SCAREERINA. Sout stems 2 feet high, with only 2 pairs of leaves over and above the small and hard-like ones subanding the several long naked stout pedmoles: lowest leaves 6 inches long, spatialtecholancoshter, rather closely dentate, the upper pair as long and as saliently dentate but of oblong-hanceloate outline and sessile, both faces of all stongly sachous: stem and peinneles rough with short stiff, mostly gland-tipped, hairs: involvers campanilate, hirsuitous: rays deep-yellow, not large in proportion to the heads, disk-corollas should en only the hirstet: abenes hirstet and with some sessile glands; pappus fuscous, subplumese.

One of the largest species, and the most robust of all; apparently peculiar to subalpine districts in the mountains of southern California. The specimens seen by me are in the U.S. Herbarium; one by C. A. Purpus, from Little

Kern River, at an altitude of 9,000 to 10,000 feet, the label bearing the collector's number 5,260. The other is by J. G. Lemmon, the locality not given, but only the year 1876; but I recall that in that year Mr. Lemmon collected chieffy in the mountains of southern California.

A. ARNOUTOSA. Stems a foot high or more, somewhat tortuous, strike leafty to the middle, a pair of large bracts estbending the 1 to 3 short-peduncied heads: lowest leaves outclanceoids, acute, 2 or 3 inches long, tapening to a broad or even distinctly winged petiole, the middle callies along, more lanceoiate and apatulata, all remotely serute-toothed, or dentate, or sententire, of very firm exture, deepgreen above, pale benacht, paraely seathous on both faces, and with 5 strong parallel nerves very provinient beneath: pedarolice and involuces glandlar-puberulent, devoid of haritness: rays 8-nerved, sharply and rather deeply 3-dentate a discorollan anrow, pube-cent except the testh; achenes hirsute; papus while, rigid, serutate.

Black Hills of South Dakota, near Fort Meade, W. H. Forwood, 1887. Species perhaps somewhat local; certainly of very pronounced character; the leaves os strongly parallelnerved as to recall those of certain species of *Plantago*. Type specimens in U. S. Herbarium.

A. TOMENTELA. Two feet high, stoutish, pale and eineroous, the folinge finely and closely tomentalose on both faces, the peduncles glandular-puberulent: leaves oral to elliptical and elliptic-leareeloate, the largest 3 inches long, on getoles still longer, even the lowest eatline pair on elongated selender petioles, all remuledy denitorialist, the bracklike floral pairs lanceolate, sessile: heads about 5, largo, no long maked pediencels: bracks of involuce biserial, broadly oblanceolate, acute, glandular-pubescent, the margins white-woolly, the outer series concave, partly enfolding the ray-achenes: rays ample, yellow, not distinctly nerved; disk-corollas narrow, hirsute throughout, the tube and the teath most so; achenes sparsely hirsute; pappus dull-white, subplumese.

Open woods of the middle Tule River in southestern California, at an altitude of about 6,000 feet, C. A. Purpus, 1897; the specimens in the U.S. Mierbarium. The species is particularly remarkable on account of a certain approach which it makes to the genus Whéngu in the character of its pubscence, firm nerveless rays, and concave involucral bracks.

A. LESSINGII. A. alpina, less., not Olin. A. angustifolia var. Lessingii, Torr & Gray, Fl. ii, 449. Larger plants a foot high or more, leafy to the middle, the leaves in about 3 pairs, smaller plants 6 inches, more or less, the pairs of leaves all crowded at base of stem and the long peduncle scapiform: stem more or less villous-hirsute with reddish hairs ; leaves from almost glabrous to scabrous-pubescent, the margins more strongly and softly pubescent, the largest 3 inches long, oblong-lanceolate, some spatulately tapering to the broad short petiole, all rather remotely serratetoothed and 3-nerved: head solitary, large, nodding: bracts of the involucre biserial, herbaceous, lanceolate, acute, pubescent, often purplish : rays 8 to 12, more than an inch long, 8-nerved, deeply notched or 3-dentate, light-yellow: diskcorollas with short villous tube and much longer, broadly subcylindric glabrous tube, the teeth naked, erect: achenes strongly striate-glabrous or scabrellous; pappus, dull-white or tawny, barbellate.

A common and beautiful species of Alaskan shores and islands.

A. OVALTIONIA. Stems several, a foot high or more simple, leafy from the middle, he solitary head long-pedureled: leaves in 2 or 3 pairs, oblong-ovata and oval, 1 jt or 21 inches long, abruptly cursate at base and sessile, sharply serate or dentice, sparsely strigalose and densely though minutely glandular-punctate on both faces: upper part of peduncle and base of involueve villuou-hisrate; bracks of involuere uniserial, broadly linear-lanceolate, acuminate, parsely hirstel and visidly glandular: acheenes sparsely hirstellous, the hairs all gland-tipped; pappus white, barbillulate.

Big Horn Mountains, Wyoming, at 9,000 to 10,000 feet, 17 July, 1890, Mr. Blankinship. Resembles a small and simple-stemmed *A. latifolia*, but the foliage is of thicker and firmer texture, and the glandular indument of leaves and achones are very characteristic.

\* \* Allies of A. FOLIOSA; leaves numerous, rather long and narrow; herbage more or less hoary-lomentose.

A. routesroas, J. M. Macoun in Herb. Dwarf, the densely turbed stems 2 to 4 inches high, mealy monocephiloux, rarely with two or more heads: radical leaves oblanceolate, obtaw, 5-nerved, 1 to 11 inches long, the single cauline prir inerted nart the base of the stem, increolate, sessile, entire, somewhat antichnoid-somentose and obscuryly glandular: brate sublending the short peducinel heads small, inaccolate, sessile: upper part of stem, the peducie and involuce white with a dense villoux tomentum: bracks of the involuce uniserial, hanceolate, obtasish: rays bright-yallow, 7-merved, hand glabroux almost eyilndric throat; achenes densely silky-tilous; peopus white, barellate.

## A FASCICLE OF NEW ARNICAS.

British American Rocky Mountains, near the Athabasca River, 30 June, 1808, collected by Mr. W. Spradborough, and communicated under the above approprinte name, by Mr. Macoun. It is not easy to suggest any near affinity for a species so strongly marked, especially in the peculiar indument of its achenes.

A. INCASA. A. follow, var. means, Gray, in part only, Much stoater than the last, with a considerable tith of long erect basal leaves, the three more distinctly calline pairs much reduced and all shorter than the intermodes, the whole harbage whilish with a dense floccose tomentum: leaves all lancolate, only the very lovest deniculant, the rest entire: heads twice as large as in the last, the numerous lanceolate biserial brack lease would than other parts: rays lossly villous externally; disk-corollas with long hiraute tube and narrow glabrous throat, the test sometimes bristly at tip; achenes short-settlose and minutely glandular; pappus subfasous, subplanose.

Dr. Gray, in defining this as a variety of A, follows mole mention of only one of its several good distinguishing characteristics. Quite as remarkable as its pabescence, it has peculiarity of its large tant of enduring basal leaves and the forwand reduced caulino ones, these features investing the plant with an aspect most unlike that of A, follow; and again, this stort stem and large bunch of leaves are supported by a strong tinf of long coarse roots, nothing like which is seen in A, follow, where the slight and slightly leafy stems seem to require no support other than that of the roots scattered along the length of the rhitome.

The best type of A. incana occurs in the high mountains of middle California, about Lake Tahoe. Other plants, intermediate between the two, occur further northward in same range, and were referred by Gray to this variety. No

doubt among such will ultimately be found the types of two or three other species, when they become better known. It appears that some plants quite equivalent to my A. denudata Yar. conseems were also included in Gray's var. incana.

A. BERNARDYA. Nearly allied to the last, and with similarly bunched coarse, even alsoy-fibrous roots, tuffed basal leaves, etc., but only cincrosons with a fine tomentous gracehnoid hairs, especially the leaves beneath; foliage larger, more elliptical-naroolsk, and more complexionary deuticulate or dentate; heads still larger, nearly  $\frac{1}{2}$  indo high and an inch broad; involvent larger, hosenty  $\frac{1}{2}$  long, obtuse, much aborter than the disk: rays relatively larger than in either of the last two, somewhat villous on the outside, 8-merved, 3-boothed; disk-corollas with long villous tube and much aborter broad and and most campanulase plabrous throw: achemes only sparsely abort-setulose, not glandular; papros long, duil-whitish, barbellata.

This local subspecies, several times distributed by Mr. Parish, from Bear Valley of the San Bernardino Moutains, southern California, under the name of A., biokao, is marked by large and long acute leaves along with which go the most short and obtuse of involueral bracts seen in this genus.

A ATTENTAL A foot high, sparingly somewhat villours pubeesent, most so upon the stem and the margins and veins of the marrow leaves, the latter in mostly 3 or 4 pairs, morewly lanceodate-accuminate and linear-accuminate, entire, 3-mervel; the two upper pairs much reduced, the longest of the lower 3 or 3 induces long: heads 3 to 5, the latteral ones later than the terminal and their pedancles bibmetsette: breaks of the campanulate involuces narrow-lanceoloko,
densely villous below the middle: rays clongated, deepyellow, 9-nerved, 3-toothed, the teeth short: disk-corollas short, the villous tube and glabrous short-cylindric throat about equal: achenes canescently villous; pappus white, barbelluiate.

An Alaskan species, collected on Lewis River, 13 June, 1899, by Mr. M. W. Gorman.

\* \* \* Allies of A. CORDIPOLIA; the radical leaves broad, cordate or subcordate; the cauline though in few pairs usually as broad; stems low.

A DIVERSIGULA. Shown a foot high, with 2 or 3 pairs of leaves and 1 to 3 heads: lower leaves round-ovate or subremitorm-ovate, 2 inches in length and breadth, transate or subcordate, on petioles of 1 or 2 inches; middle pair of ovate or lance-ovate outline, short-petioled and the petioles winged; the floral pair reduced, triangular; all saliently and often coarsely serartic-toothed; glabrous beneath, the upper face sparingly pubsecent and glandular, the stem and peducucles glandular-pubsecent, their thin braces lanceolate, accuminate: rays few, light-pulos, 3-dentate; dike-cordina framelform, glabrous: achenes hirtellous on the angles; papus dullwhite, barbellutate.

On northward slopes of the highest Powder River Mountains, eastern Oregon, at 8,000 to 9,000 feet, W. C. Cusick, 1897 (n. 1810); referred to A. bitjoila, though with no reason; for the plant is of that group to which A. cordifoliabelongs, rather than an ally of <math>A. latifolia.

A CHIONOPHILA. Dwarf, usually 5 to 10 inches high, monocephalous, and with but a single pair of cauline leaves, these inserted toward the base of the long naked peduncles; whole herbage thinly tomentulose, and with abundance of small sessile resinous glands on both faces of the leaves; the lowest of these round-orate, acute, nearly entire, 14 inches long and almost as broad, not cordate, their petioles as long, stoutish and flattened; cauline pair, subcordateeldoid, on winged petioles dilated at hass; pedunche not slender, notably strate, viscidly glanduhar and villous under the involuer; this 1 inch high, broadly turbinate, its brate uniserial, lanceolate, glanduhar and puberulent: rays mether numerous nor large, arbite pale, 5 to 7-nerved, not notably toothed or notched; achenes glandular-seaberulous; papuse conjous, white, barreblate.

Near the summits of the Ruby Mountains, Nevada, in the vicinity of perpetual snow, 20 July, 1896, collected only by the writer.

A. GRANDIFOLIA. A foot high or more with about 3 pairs of cauline leaves, and a solitary rather long-peduncled head of middle size; whole plant glabrous to the unaided eye, except for a scanty villous hairiness at base of involucre: lowest leaves 3 inches long, on petioles as long, ovate-cordate, coarsely serrate-toothed : lowest cauline pair more than twice as large (5 or 6 inches long and nearly 3 in breadth), oblong-ovate or elliptic-oblong, coarsely and doubly serratetoothed, the blade decurrent on the short petiole, a lens disclosing a hirsute-ciliate margin, the uppermost pair triangular-lanceolate, sessile, simply and sharply serratetoothed : involucre more than a half-inch high, its thin bracts lanceolate, almost uniserial, ciliolate : rays faintly 5 to 7-nerved, scarcely toothed at apex; disk-corollas with teeth pubescent externally : achenes hirsutulous above the middle; pappus white, barbellate,

The type thus defined is from near Bridger Pass, Montana, being n. 896 of Flodman's collection as represented in my

### A FASCICLE OF NEW ARNICAS.

set of Flodman's plants. It has been mistaken for a form of *A. cordifolia*, from which species it recedes in its very large cauline and small radical leaves, the absence of all pubseones, relatively small and always solitary bead, and in some minor points. In a large-leaved plant like this, and from that region, one would like to recognize the long suppressed *A. mecrophylla*, Nutt. But our plant is far from answering the description of that species; which after all is perhaps a mere synonym of *A. cordifolia*. Hock, a species which, howover, neither Natial nor any one else could ever identify from Hocker's character of it.

A. surcompara. Less than a foot high, the elongated monocephalous pedinadic longer than the less them; both stem and peduncie strongly striate, and, with the petioles of the leaves, aparingly villous-birrast: leaves ownte and ovate-ordate, coarsely serrate or toothed, the largest 14 inches long, on petiolos as long, both faces rathere sparingly and minutely publescent; the reduced uppermost part deliolic-vate, cunsate at hase and assells, entire involucers larges for the plant, fully 1 inch high, the lance-linear asuminate bureca equation and public-barlay and minutely glandular: rays light-yellow, long and narow, 3 to 5-nerved, apparently acute and usually quite entire at the is achenes hirsuitolous and puncticulate; pappus very fine and white, merely surrulate-subroux.

An exceedingly well marked small species, allied to A. cordificia, obtained in 1898, by Mr. W. Spreadborough, on the Athabasen River. It is in the Canadian Survey Horbarium, and in that of the Catholic University, under the number 19.644.

A. VENTORUM. Size and habit of A. cordifolia, more slender, with thin and delicate glabrous foliage: radical

leaves from almost orbicular to cordate-ovate, 2 or 3 inches long, on petiods as long; caultine ovato or obloarg-ovate, meatly in two pairs only, sessile; all repand-deuticulate, delisately ciliodate, otherwise glubrous: heads 1 to 3, longpeduncled; involucers narrow and somewhat turbinate, of about 10 thin and green elliptic-langeolate acommate ciliolate and slightly glandular-puberalent bracts: rays rather for, decy-pulor, Tarverd, 3-dentats, the middle tooth notably larger than the other two: achenes glandularsabrellou; rooms fine, white

Wind River Mountains, Wyoming, 11 Aug., 1894, A. Nelson; distributed for A. latifolia, for which it has no affinity.

## SOME RUDBECKIA SEGREGATES.

### By THOMAS V. MOORE, C. S. P.

An examination of the copious material of "Rublexis Kata" preserved in the Herbarium of the Caholic University made a year since, led me to doubt that all the different forms labelled with that name couplet to be included under that specific name; and subsequent study of this same material augmented by the numerous sheets contained in the U.S. Herbarium, has led me to propose as new a number of segregates.

The typical *R* hink can be identified easily, by reference to the figure and full description given by Dillenius, on which figure and description Linneus founded the speciery and I offst at the outset the following new description of this type; a description drawn from that common plant of Maryland and the District of Columbia which answers to the figure and diagnosis made by Dillenius in 1732, under the name *Obclicholes interplica*, etc.

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R. mara, Linn. Sp. Pl. p. 907. Permnial, 1 to 2 feed high, stoutish, erect, branching: stem, striate, hirsute: basal leaves oblong-spatulate, 23 to 4 inches long; tapering to margined petioles about 11 to 2 inches long; cauline leaves lanceolate-spatulate sessile by a dilated and haff clasping base; all 3-nerved obtase, entire or remotly strate-toolhed, atrigoschingli, pedindles 6 to 8 inches long, hirsute: involucral bracts about 1 inch long, oblonginear, hirsute, in age thickened and prominently pustulate: rays, 12 to 15, oblong, orange-yellow: disk conical, dark upple, style lips leader-sublate: achenes quadrangular: chaff with hispidulous summits, glabrous below: pappas none.

The stout branching plant best answering to the description and figure of Dillenius in common in the District of Columbia and elsewhere both eastward and westward; and I found it plentful, last summer, near Lake George in northern New York. It is sometimes nearly simple and quite slender, with narrow leaves. Stuch forms were collected at Green's Parma, Conn., by C. L. Pollard in 1894; in Minnesota by W. D. Frost in 1892: in 1600a by B. Fink (No. 285) in 1894; and in Backhannon, W. Va. by W. M. Pollock in 1896.

Messrs. Britton and Brown in their Illustrated Flora (ii), 410 give the following data concerning the habitat of this plant: "In fields, Quebec to western Ontario and the Nortiwest Territory, South Florida, Carolina and Texas. Naive only on the western prairies. Wildly distributed in the East, as a weed." Now, as regards this last statement, which is certainly very erroreous, it is to be noted that, in the year 1732, when Dillenius published this species, he said that its habitat was America, especially Maryland, Virginia and Carolina. And it seems incumbent 886-2 on Messes. Britton and Brown to tell how it was, that this plant was introduced from the prairies into the southeastern United States almost a century before the prairies were knows, or any of the plants peculiar to them. There seems no reason whatsoever for saying that R. *kitte* is "native only on the western pairies," rather than of those localities in which Dillenius know that it grew when describing it; and that so long before the prairie botany began to be known, or prairie plants had any means by which to migrate eastward.

(R. FLORIDANA. Percunial, erect, with striate, hispid stems fastigiately branched: cantine leaves scatter-oblipidulous, oblong or lanceolate-oblong, rather conspicuously serrate-toothed, acute, the lower tapering to narrowly winged peolos; the upper sessile and seminaplexicaul; peduncles from hispid to glabrous, 8 to 12 inches long; involuced bracts oblong or linear-oblong, nearly à inch long; rays 10 to 12, linear-oblong, an inch long or more: disk hemispherieal.

Specimena collected by Geo. V. Nash (No. 2272) at Sanford, Orange Co., Fla., in 1895, and labelled *R. bicolor*, Nutt. Us short stiff pubsecence, short involucre and hemispherical disk clearly distinguish this from *R. hirta*, Linn.; while the perennial root allogether forbids its classification with the bicolor of Nuttall, which is an annual.

"Var. ANOUSTIPULA. Simple or branched from near the base, more slender than the type; and sometimes monocephalous: basal leaves narrowly spatialate-lanceolate, remotely serrulate, about 2 inches long; cauline 1-nerved, linear to linear-lanceolate or oblong.

Specimens collected by Rev. A. B. Langlois at Manderville, La., in 1893. <sup>17</sup>B. AUPLENTESS. A slender perennial about 18 inches high with simple, sparingly bingdidous steer: the lower easiline leaves innecolate-spatialate, entire or ramolely denticulate; the upper oblong, subordate, clasping; all 3nerved, somewhat reficultate-venulose, appressed/pubsecut and actitub: pelunoles about 6 inches long; involuenal breats runnerous in several series with appressed bases and the herbaceous free portion about 2 inches long, alnacolateololong, reflexed, strigose-hispidulous; rays 8 to 9 linearolanceolate, inch long; risk, low, conical.

Specimens collected by Mr. G. McCarthy (No. 28), near Rome, Ga., in 1888; preserved in the United States National Herbarium under the name *R. hirta*.

Quite unlike any other species of this group. Possibly nearest to R. transda, mail, of which as specimens have been seen by me; but it has not the prominently 3-nerved, linear-oblong to linear leaves a tributed to that. Besides, list involucral bracts are broader, longer and more foliaccous. This plant may be identical with one Mr. Small has seen in the Columbian University (Chapman Herbarium), "collected many years ago at Romo, Ga.," but it is certainly distinct from his R. transata. (Cf. Small. Bull. Torr. Club, xxx. 478.)

(R. DUVERGUESS. Percunial, with divergently branching stem, about 5 feet high, sparingly best with a fine, white, hirrate pubsecnes: basal leaves oblanceolate, on slonder petioles, the lower cauline spatialat-lanceolate, remotely serate-denticulate; the upper linear-oblang, entire or remotely serate-denticulate; all faintly 3-nerved and striges with fine white hairs; polumels forthous, about 12 inches long, glabrate: involuced bracks about 6 lines long, oblong, linear or linear-lanceolate, hispdi : rays 8 to 12 linear-oblong, light yellow, fading greenish: disk depressedglobes of a light brown.

Specimen collected by Mr. A. H. Curtiss (No. 4,759) in the pine barrens near Jacksonville, Fla, and observed in the United States National Herbarium under the name of R bioslor, Nutt. The light brown disk alone would distinetly separate this plant from all other members of this group.

(R. LONGTPES. Percunial, siender, about 2 or 3 feet high, with several sparingly hispid stars, from the same root: basal lavres, lanceolate, tapering equably at both ends, acatish, remotely demicialato; petioles very siender, 4 to 8 inches long, hispid; lower cauline lanceolate, subsatire, about 3 inches long, with margined petioles about 14 inch long; the upper oblanceolate, entire, sessil; al 3.-nerved, strigges: involuend brates oblong-linear, hispid; rays 12 to 13 light vallow, linear: disk short, conical.

Specimens collected by Geo. G. Grower at Laberg, N. Y. in 1884; by J. B. Brinton et B'Ita Reck, Penna. in 1888; by L. H. Pammel (No. 55), at Ames, Iowa. It was labeled R. hirfst; but its more shearder and simpler habit, the very long petioles of its root-lavers; its longer and narrower involucral bracts and rays do not allow of its being classed with the R. hirfst of Linnuxs.

• R. SHITER. Probably perennial: simple, erect, sparlight high is basel leaves on tese: catulue linear-lanceolate, remotely toothed, obtuse, about 3 or 4 inches long. Sharwed, the veins being while bolow but above inconspicators of themselves, yet their direction is plainly marked by the sliky canescent pubscence, which is especially heavy at each vein; the lower gradually taper to margined petioles: involuend lanced is find long. lanceolate subulate, pustdiose-hispid: rays about 12, linear oblanceolate, more than 14 inch long; disk rounded conical. Specimen collected by R. F. Bush (No. 137), in Shannon Contry, Mo.; and deposited in the United States National Herbarium. It was labelled *R. hirts*; but its leaves are remarkably different from all others in this group, both in outline and publescence. The long and narrow involuced bracts and the differently shaped and larger heads also distinguish this plant from *R. hirts*.

R. FLAVA. Possibly annual: simple, hirsto, the gloug whithis stems, 12 to 18 inches high, purple-duted: baal leaves about 3-inches long, colong-lanceolate, tapering spatulately to a peticle about 2 inches long, remotely deuticulate or entire, obtums, 3-nerved, strigors; the lower catline lancolate, tapering spatialately to a broadly margined petiole, that is plainly marked by a sharply defined more or less broad, white vering, submitter, findly strigors; pediumcles 3 to 8 inches long, hierate; involuent bracts oblong-linear, 8 to 10 lines long, hierate; involuent bracts oblong-linear, 8 to 10 lines long, hierate; involuent bracts oblong-linear, so to 10 lines long, hierate involuence line with chairs; may conteoblong 1 inch long, of a very light-gellow in comparison with those of the eastern species.

Specimens collected by Aren Nelson (No. 600) near the Big Muddy, Wyoming, in 1894: by Dr. Greenen near Bear Creek, Col., on his journey of 1889, and by Crandall and Cowen (No. 277) in the Foot Hills of northern Colorado. The light-green leaves and straw-colored glossy stems give this plant an aspect which is wholly unlike that of its eastern analogues.

R BICOLOB, Nutt. Jour. Acad. Philad., vii, 81. Annual, 12 to 14 inches high, stoutish, erect, simple or sometimes branched: stem strite, high's basel levels anecolate-oxide, spatulate, cauline leaves lanceolate, oblong, sessile; all triple-nerved, obtuse, subentire, strigose-hispid: peduncles short, 2 to 3 inches long, hispid or hispid: involuced

bracts oblong-lanceolate, hispid, pustulate: rays 10 to 14, oblong, short, less than 1 inch long, glossy and purplishblack below, yellow above: disk hemispherical, dark purple, style tips: achenes and chaff as in *R. hirda*.

Found by Nuttall in Arkansas and near the Red River.

R. FURXYONA. Probably an annual or biannial, with a stoutish, flexcous stem about 15 inches high, divergently branched from near the base, hipidulous: basal lawre oral, strigoschipidulou, obuse, on marginal petioles; the lower caultine oval with a short, spatulate base, remotely remate-touched; the upper lance-ovate, sensile; all obutes, 3-merved and strigoschipidulous: involucral bracts oratelancelate, § inche long or more: rays about 8, linear-oblong; fittle longer than the involueral bracts: disk shortegiladraceous.

Specimen collected by A. A. Heller, (No. 1731) near Grayory, San Patricio County, Texas ; deposited in the United States Herioatium and labelled *R. biolor.* The divergently branched, flexnous stem and the very broad leaves are characters which do not belong to *R. biolory*, which is of simple habit and has much narrower leaves. Then, too, the pubsences O Nutall's plant is longer than in this one and the short-cylindraceous disk of *R. flexnoss* makes it alogether unique in this group of Radbeckias.

# A DECADE OF NEW GENTIANACE Æ.

Among Rocky Mountain representatives of the genus GENTIANA, the following species hitherto unrecognized require definition:

G. BRACTEOSA. Akin to G. Parryi, more erect, more

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than twice as large, usually more than a fost high, leaves more ascending, much narrows, never of ovate but always elliptic or lanceolate outline, the uppermostones, cloudy subtending the flowers, much larger than the others and appearing as thin subscarious bracts of orate-lanceolate outline, often § as long as the corollar: cally s-tube thin, almost cylinrifet, t.e., little dilated, the test relatively small and short, not § the length of the tube: deep-purple corolla 1§ incless long, its lobes outes, acutish, the short folds biplied and also somewhat lacerate or incise-serrate: seeds of variable outline but mostly bolong, wingod the base and often along one side, the wing narrow, sometimes continued also across the sammit.

This excellent, large and beautiful species I judge to have been imperfectly known to Dr. Englemann, whose "narrow-leaved form" of G. Parryi appears to have been this; and the specimens of that species given me by Dr. Parry himself twenty years ago out of his original material are partly this. But I confess I can not understand how a botanist of Dr. Engelmann's attainments, noticing the narrow foliage, could have overlooked the conspicuous large thin bracts which mark even the smallest specimens of this as wholly distinct from G. Parryi. And the lobes of the corolla, oboyate and cuspidately acute in G. Parryi, are here about as nearly ovate as possible, with never a trace of the cusp or abrupt apical point. G. bracteosa belongs properly to southern Colorado, as G. Parryi to the northern portion of the State. My typical specimens are of my own collecting, at Marshall Pass in 1896, supplemented by most excellent ones by C. F. Baker, from near Pagosa Peak, 28 Aug., 1899. Mr. Theo. Holm brought it the same year from Mt. Massive, near Leadville, at an altitude of 11,000 feet.

•G. INTERRETA. Alliels to G. affinis, tabler, erect, 1 to 14 feet high, glabous, rather density leafy near the base, otherwise with scanty foliage, the upper pairs of leaves of less than half the length of the internoles; lowest leaves oblow or ellipticeblong, the others oblong-linear, all somewhat widely spreading, rather small, the longest barly 1 ineb long; inflorescence sparse and elongated, the more or less ranota upper nodes barling each a pair of erest peduncles 1 to 2 inches long; brated at summit and with 1 to 3 flowers: ealyx with narrowly truthinat tube subscarious below the sinuses, and short unequal herbacoons testh, these linear or subulat-linear; purple-blue corolls small and narrow, the largest barely 1 inch long; short lobes wats, seatish; lolds very about, stancouly eleft.

In meadows along streams at Pagosa Springs, southern Colorado, 30 Aug., 1859, C. F. Baker. Remarkable among gentians of this group for the long and notably interrupled inforescence.

<sup>4</sup> G. RMOTA. Size and habit of the last, with similar foliage and almost equally interrupted inflavesness, but the flowers few, solitary both terminally and as to the axillary pednonesis: early-tub terminate, herbaceous, as also the oblong equal tech or segments, these almost as long as the tube: coroli, expanding and famul-form, with very short, broadly obcvate abruptly acute lobes and very short incernets folds.

Meadows of the Humboldt River at Deeth, Nevada, scarce; collected only by the writer, 5 August, 1895.

<sup>6</sup> G. DISTEGIA. Annual, from a few inches to more than a foot high, mostly simple, with few pairs of leaves and long internodes and flowers in all the axils except the very basal ones, these either solitary and very long-peduncled, or else with one or more very short-peduaded ones from the same sail, the terminal flower quite as often solitary, but not as long-peduaded as the main lateral ones, herbage glabrous: leaves oblong or oblong-lanceolate, 1 to 14 inches long, obtuse, sessile, the very lowest more usually oborate and narrowed to a not very short peduide. Howers nearly 4 inch long: culyx with 2 greatly enlarged and bract-like sepals of orate outline, apparently opposite, and complexity enfolding the 3 shorter linear lanceolate ones, these larger more than equalling the tube of the corolla; this from deep blacpurple to larid and greenish-purple; only the rotate linb exserted.

High mountains about Pagoan Peak, southern Colorado, C. F. Baker, August, 1890. A member of the *Amardia* group of gentians, most related to *G. hetersopala*, but the calyx, as well as the habit and indivescence of the plant, very different I am not sure that the large bracilike organs below the flower are not a real involucer, and that the three segments within them alone represent the calyx.

The spectraors have been distributed from different altitudes under two manes. The plant from the greater elevation, 12,000 fest, smaller and otherwise peculiar in color of flowers and general aspect in the one which, in Mr. Baker's distribution, bears the name *G. distors*, the larger one, with lurid corollas, from an altitude of 9,000 fest, was named *G. anomata*; but I do not now find characters for two species. But the names may stand according to the tickets, with the small plant for true *distors*, should two species hereafter be well made out:

I have long doubted that our North American representation of the genus SWERTIA is rationally to be accepted as constituting but a single species, and that the whole or any

part of the material is properly referable to the Old Wold S peremix. The only specie often collected with us, and common in herbaria under the name of S, peremis, is a Rocky Montain plant, subalpine or even alpine as to its habitat, and very unlike the real S, peremis, both in habit and foral characters. The European plant has a somewhat loose and panieled inflorescence, with putamerous flowers, while in ours the inflorescence is very strict and thyreflorm and the flowers tetramerous. The nectarizes in the former are fringed with copies long and quite capillary appendages, while in ours they are hordered by only a few short dilated and broady molate ones. These are specific haracters of the first class; and the discovery of them necessitates the recognition of a new species which I name:

S. SCOULINA. From a few inches to nearly two feet high: inforesences very strict: broadly oblancoids to spatialteoblancoids radical taxwa very large, often of more than half the length of the subscapiform stem, usually all, even the lowest and largest earline ones alternate, with broad winged petioles and half-clasping: flowers 4-mercus: septial lancoiate-subluck, often 3-mercuid and three-fourths as long as the corolla-lokes, these fully one-half inch long, dark bluepurple: glandssublate/finged: seeds round-boards winged on one, two or three ides, the tests winkled.

Common in the subalpine districts of middle and southern Colorado; the best specimens, those of my own collecting on Little Ouray Mountain, near Marshall Pass, 3 Sept., 1896. I think all the Rocky Mountain Sweria may belong here; yet am not positive of that.

S. OCCIDENTALIS. Commonly a foot and a half high: leaves all opposite, the lowest pair oblong, obtuse, 3 to 4 inches long including the broad petiole of an inch or more, the proper caultion cose much reduced, sessile, data in 3 or 4 pairs: flowers 4-merous, 1 to 3 on each of a half-dozen peduncles axillary to the bracks: sepais lanceolate, broad, scarcely acute: segments of the corolla oblogy, very oblutes, of a paie lurid purplish color, the glands bordered by few and advaluteseacous appendances.

Wet banks and bars of Hurricane Creek, eastern Oregon, W. C. Cusick, 25 Aug., 1898 (under n. 2100 in my set). A species remarkably well characterized by its very obtuse corolla-lobes, and very coarse fringe of the glands.

- S. OVALIFOLIA. About a foot high; leaves small, opposite, the oval or often elliptical acutish blades 1 to 2 inches long, on petioles somewhat shorter: flowers 5-merous: sepals triangular-lanceolate, acute; corolla of a light bluepurple, its segments oblong, acutish, the glands bordred with a dense sienderly selaceous rather than capillary fringe.

Alpine bogs in the Blue Mountains, Oregon, collected by W. C. Cosick, the date not indicated in so far as I have seen. Beautifully distinct by a small ophioglossaceous foliage and rather large pentamerous flowers.

The following species of FRASERA seem to deserve recognition.

F. VENOSA. Solitary stem and elongated informescnee about a yard high; herbage pale-green, retrossly hirtellouspuberulent throughout: lowest leaves 8 to 14 inches long, elliptic-lanceolate, acute, very strongly 5-veined or almost ribbed from base to apex, the midrib and parallel veins very prominent beneath and whithish: lance-linear sepals not equalling the corolla: lobes of the corolla obovate, cuspidately acute; gland concealed by the long dense fringe; divisions of the crown quadrate, setaceously cleft to near the middle.

Species collected by myself on hills near Santa Rita del Cobre, New Mexico, in 1880, and distributed for *P. speciese*, from which its peculiarly almost ribbed and narrowly elliptic foliage no less than the floral characters well distinguish it.

<sup>1</sup> F. ANPLA. Plant 5 feet high or more and with a narrow and subcylindic inflorescence: herbags not palled, but minutely hirellous-scaberolous: lowest lawses 12 to 13 inches long including the narrow and distinct peticle, the blade oboxteelliptic, acette, 5 inches bread, with a midvein and abott 6 somewhat divergent lateral vains, none prominent: linear-laneolate sepais only about two-thirds the length of the corolla: lobes of the corolla is lobes of the corol and the gland rather coarse; divisions of the eway class threaqually and almost to the base.

Common in the mountains of northern Arizona; here described from specimens obtained by myself on Mt. Bill Williams, 4 July, 1889.

• F. MARGOWITLA. As tall as the last, or taller, the inflorscence nore losse and open, the folings much larger; herbage deepgreen, glabrous: lowest lawes 16 to 20 inches long, thinnish, broadly oblanceolate, obtrase or only abruphly and cuspidately acute, distinctly about 9-nerved, but no nerves or veins prominent: sepals equalling or exceeding the oblong-obvine petals; copoins cillation selender and long; divisions of the ervow, cleft to near the base, the segments colored at tip like the corolla harid-purplish.

Rich hillsides about Pagosa Springs, Colorado, 25 July, 1899, C. F. Baker.

## STUDIES IN THE CRUCIFER.E.-III.

1. Certain species of ARABIS.

I have made repeated careful and laborious efforts to ascertain to what extent genuine Arabie Holbaulii, a Greenland plant as to the original, is indigenous to British America and the United States. And while the results attained can not be considered final, I think it well to put them upon record.

And for one thing, I am coavined that A. Holdenii does not occurs, of ar as known, noor United States territory; nor have I yet met with satisfactory evidence of its occurrence on this continent; though it is to be expected from very far northward, along the shores of the Arctic seas. Our Rocky Mountain and other far western and northwestern plants that have been ao referred must, it seems to may be treated as fair subspecies at the least. A number of such segregates have already been proposed, and I shall here present the characters of several more.

But first of all, I shall attempt, what seems never yet to have been given, a real diagnosis of the original of this group, which has hitherto been recognizable only by means of the plate in the *Flora Danica*.

A. HOLDGLILI, HORMEN. Stem solutish, simple, 6 inches high or more, very leafy below; leaves about \$\employ\$ inches high or more, very leafy below; leaves about \$\employ\$ inches hold a lancoalate, acutish, entire, the whole canescent with a minute stellate pubescence; cauline leaves few, oblong, sessile and auriculate- or subsignitate-lasping, either wholly glabroas, or the

auricles with a few marginal forked hairs; stoms and also pedicels of the flowers glabroux: flowers ratheromer than § inch long (much larger than in the U.S. segregates); esplatsarious margin; petals twice the length of the seplat and with broad round-obovate somewhat spreading limb, apparently while, acquiring a blabs of rose in drying; anthers segittatic ovaries and young pods glabrous: pods somewhat deflexed.

This description is drawn up from Greenland material in the herbarium of Mr. Theo. Holm collected by himself; and I have seen no even high-northern continental specimens that match them. The nearest approach to them is made by Canadian specimens which, as I suppose, fairly represent the following:

A. RETROTACTA, Graham. While closely resembling A. Hollworldii in hadin, and the pubsecnes of the leaves, the stem is more hirautulous than stellate-hairy; the radical leaves are not entire but dentate; the flowers are of only half the size, much more numerous, and with rose-colored petals which are spatialteobilong, with little distinction of claw and limb, and the exserted pottoin is stellate-troughened up and down the middle of the back; and lastly, the pods are longer and marrower, on shorter policels, and distinctly refracted,  $i, c_h$ , holding a position almost parallel to the axis of the raceme.

This plant is well illustrated in the Canadian. Sorvey Herbarium at Ottawa, under n. 10,204, from Wood Mountian Post, Asimiboia, 10 June, 1887, abdue, al. 18,110, from Crow Nest Pass, Alberta, Aug., 1887, both collected by Mr. John Macoun. I note that Mr. Howell, in his Northesstern Fora, has taken up the name A. retrofracta, but, as it appears from the description, for a plant uver different from this

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A. RUDGANTRA, Greene, Pitt, iii, 155. While differing from A. Hobbdivi very markelly in its long loose reaceme of small rows-red flowers, as well as in its short-pedicelled refracted pods, this Colorado plant has no simple hairs, its stem, glabrous above, exhibits only the usual very fine stellate pubecence on its lower part. As a species, it is about equally removed from the two preceding; and the three are near allies.

A. SECURDA, Howell, Eryth. iii, 33. An excellent species, with better characters than Mr. Howell assigned. The stellate pubescence is both more scanty and more soft than in any of the foregoing, and is novehere more processomed than on the pedicols, and it recurs, though sparingly, on the porfedly matter pools; and the values of these are singularly almost carinate-nerved, while between this milderee and the margins the space is occupied by a system on narrow almost linear reticulation, or series of interrupted atriations, as the lines might perhaps better be called.

A. TENTIS. Perennial, the younger plants simple and with a simple racenes, the older with branched and lignescent but slender cander; flowering stem and recent nody about a foot high, very elender, eret and strict: lowest leaves oblance-late, patiolate, entire, the whole about it inch long, both faces. Finely selfalex-censees(n, the indument extending to stem and cauline leaves, and even to peicles), olygy, and growing oursy: cauline leaves linear, braadset at the slightly auricled base: flowers very small, the spatiate while or pinkish petaks about twice the length of the sepalat: pols very marrowly linear, about 2 inches long, straight, coolsy defaced on short and slender pedicels, obluse or acutish: seeds uniserial, orbicular, wingless, though with a kight searious magin.

Mountains of eastern Washington, collected by Suksdorf, in 1884 and 1885, and also in northeastern California, Mrs. Austin, 1894. Species well marked in character, and with the narrowest of pols; the whole plant being very slender.

A. CONSANGUINEA. Stems solitary, or several from as many branches of the caudex, erect, simple or somewhat branched as to the inflorescence, 10 to 16 inches high, stoutish, lowest leaves about an inch long including the oblanceolate serrate-toothed blade and narrow petiole, canescently stellate-tomentose without other pubescence, the lower cauline nearly as long, spatulate-lanceolate, dentate, sessile but scarcely auricled, the uppermost oblong, often entire, auriculate-clasping, these stellate-hairy only beneath, all the lower equally so on both faces: racemes rather short, the rachis occasionally and the pedicels usually stellatepubescent: flowers about 11 lines long: sepals stellatehispidulous, also usually the young ovaries; petals crect, oblong, pinkish: anthers oblong-linear, auriculate at base but not sagittate: pods narrow, nearly straight, moderately deflexed on curved pedicels, but not refracted; the valves 1-nerved : seeds distinctly biserial.

Obtained at Los Pinos, southern Colorado, 18 May, 1899, by C. F. Baker.

A. ARDA. Perennial, the several stoulish rigid stoms about a foot high, the whole plant even to the pole houry with a white pubbecence chiefly low and stellate, but in part consisting of longer and divariately forted hairs' lowest leaves oblancelota, petiolate, dentatic audine oblong, entire, sessile by an auricled base: flowers not known: nods deflected no very short pedicels, purplish but rather densely stellate-tomestudose, rather broad and obtuse, the stigma sessile: useds in one you. Collected at Moor's Station among the dry hills of eastern Nevada, 16 July, 1886, in fruit only. Allied to A. subpinnatifida, but the leaves different and pods very characteristic, being obtuse, the vacant apex broad and flat.

A. RECENSIVA. Rigidly ereck, simple and rather slender, 14 to 18 inches high, very glaucous shroughout, glabrous except as to the basal leaves, these spatialate-lanceolate, an inch long or somewhat less, loosely eiloitade, with abort, rigid, meaty simple, hiris, both faces sparsely settloss-hiigh, the hairs commonly forked: caulto leaves nearly glabrous, their few settlose hairs usually simple: fruiting racene often a foct long; robs 2 to 3 inches long. I line wide, very straight, strongly refracted on short pedicels, activ: raives interved: seeds univerial, marrowy winged.

Known only from middle elevations in the mountains of Fresno County, California; collected by Mrs. Peckinpah in 1890.

A DURINGULA. Suffrateseent, rather slender, 2 feet bligh, the naked woody atem below the leafy and floriferous branches often 6 to 10 inches high; the clustered leaves subending these oblancedate, arente, entire, about § inch long, thickiah, glancons, very minutely pubseent with short hars divariately forked or branched at summit; scattered cauline leaves § inch long, oblong, esselle by a broad but sternely anrield base, glabrous and glancons, as also the stem and pods; flowers 10 to 15, very small, the reddish petals little surgassing the calyx and erect: pods defaced, about 2 inches long and a line wide, the valves 1-nerved and reunios: seeds in two rows, small, winged.

Known to me only from the vicinity of Donner Lake, in the Sierra Nevada of middle California, where it was collected by Miss Michener in 1893; and Mr. Sonne distributed 8866-3 it from the same vicinity as early as 1882, supposing it to represent *A. suffratescens*, to which it is truly related, but is a many times larger plant, with long racemes of pods; and it has not at all the notably ligneous stem of that species.

While all the foregoing are characterized, as a group, by their deflected or refracted pods, those next encoding exhibit siliques borne more or less horizontally on usually stout and divariate pedials. They are largely segregates of the so-called *A* arcuada, Gray, which name is not tenable for any American Aroids, being percocapied for an European species, or subspecies of *A* alpatria, published much earlief by Shuttleworth.

A. MAXIMA. Stephendbus arcuatus, Nitt. T. & G. Fl. 1, 77. Arabis arcuala, Gray, in part. Stems stoutish and tall (2 feet high or more), numerous, one from each branch of a multicipitous woody candex: basal leaves numerous and tufted, commonly 14 to 3 inches long, oblanceolate, often very narrow, compeleously tochhod or substitutis, marked with a strong while midvein, cansesent on both faces with short branched hairs; cauline 1 to 14 ji nelse long, lanceolate, aeuminate, sagittatc-lasping, with the usual pubecence, this extending to the stem, pedicelas and calyx: flowers large (about § inch long); calyx purplish, corolla deep red-purple.

Mountains of southern California, from Santa Barbara and Maripose Councies southward to the penirsula. The long pols are distinctly curved, though less notably so than in some of the succeeding species which were erroneously referred here by A. Gray.

A. CAMPYLOLOBA. Perennial, but lacking the freely

branching lignons caudes, the stems usually few or solitary often 2 for high, the reasense both in flower and fruit longer and lonser thankin A. marine, the pale flowers not half as large: tuffed basal leaves breadly oblanceoids, scute, with for and course testh or none, the midnerw ent conapicouos, the whole leaf 1 to 1<sup>2</sup> inches long, the pubsence dense on both faces and more nearly stellate: lower canline leaves spatialate, with dilated petiols and strongly serrate toothed blade, the upper oblong, sugitated-lagging and revolute: stem sparsely hispid with nearly or quite simple dilators, more than a stellate hairiness: petials rose-color: pode glabrous, more than 3 inches long, strongly curved downwards on very short (2 or 3 lines long) exactly divariate rigid pedicelis.

Very common in the middle mountains of the northern parts of California and adjacent Oregon and Nevada. An excellent type is my own "*A. areauto*, forsy," from near Yreka, 1876. As the fruit is more strongly areaate than in Nutually *S. areautas*, Thave applied here the Greek equivalent of that hermonym.

A. GRACHIPER. Size and habit of the last, less pubsecent, more pronouncelly glacous: laves more ample and of thinner texture, the dentate basal cones aspertlous with imites stallate hairs; cauline glabous, oxtet-lanceolato, sessile by a broad but only slightly arricled base, not revobasal part of sterm hispitalous with simple hairs, all buperiore glabous and very glaucous: sepals narrow, denpolicies glabous and very glaucous: sepals narrow, deditichairy at the tips; petals narrow, far surgassing the ealys, ross-colored; filaments all elongated, those of vern the short staments surgassing the ealys; an titters unusually

short, ovate-oblong: pods about 2½ inches long, acutish, curving downwards on slender spreading or recurved pedicels of an inch or more : seeds very distinctly biserial.

Mountain districts of northern Arizona about Flagstaff. This might perhaps include the *A. arcutata var. longipes* of Watson; but that varietal name is not available for the species, there being an European *A. longipes* of recent date

A. GRACILENTA. Perennial, with a number of slender erect or ascending stems from the root, and several short leaf-bearing shoots intermixed, the tallest stems scarcely exceeding a foot in height: herbage nale and glaucescent as well as subcinereous with a minute branched pubescence which, under a strong lens, is seen to be dendroid rather than stellate: lowest leaves (on sterile shoots) narrowly oblanceolate, entire; cauline oblong-linear, sessile and with somewhat hastately divergent auricles; racemes slender and few-flowered; sepals thin and with purple-scarious margins; petals also thin, of more than twice the length of the sepals, with rather broadly spatulate and delicately venulose rosepurple limb: pods glabrous, about two inches long, narrow, straight or nearly so, on filiform slightly decurved almost divaricate pedicels: seeds in two very closely contiguous TOWS.

An elegant and most distinct new member of this group, known to me only in Mr. Haller's collection from the vicinity of Santa Fe, New Maxico; the label reading, more Helleriano, "Arabie Fendleri, Heller. Authentic specimen, from type-locality." Nevertheless, nothing like the Fendlerian plant on which A. Fendler's should be based is in Mr. Heller's collection!

A. EREMOPHILA. General habit of the last, but caudex more loosely branched, the sterile shoots longer and more

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locesty leafy: leaf-blades oblong-lanceolate, milently dentate: branched pubescence more dense and less notably dendroid, i.e., the branched portion more shortly stalked and subsessile: caalline leaves sparse, linear, with very short and inconspirous matricles: reserved petals small, not venulose: very narrow poist 14 inches long, their policies almost or quite half as long, spreading: seeks in one row.

Common about Peach Springs, northern Arizona; flowering and fruiting in April. Also at Aztec, New Mexico, C. F. Baker, 3 May, 1899.

A. RECONDIT. General habit, inforescence and small poles of the last two, but smaller, the foliage thinner, greener, with a sparse and minute stallate pubescence: leaves obvork, denote, abrophy narrowed to a rather long and slender peticle, the base of this more or less motably forked at the very summit: filliorm peticles glabrous, but enlyx stellateprosecurit; petisk conceptrely: poly glabrous, 1 to 11 inches long, spreading, slightly curved: seeds imperfectly biserial.

Diamond Creek Cañon, a tributary of the Colorado, in northern Arizona, N. C. Wilson, April, 1893. Also, in larger form, less pubescent, and with narrower leaves, from Glenwood Springs, Colorado, Geo. E. Osterhout, 1899, labelled by him as A. Lyadii.

•A. ONTLOWERA. Low, apparently suffratesent, the skender stems only 5 inches high, shortly and locely racemose at summit: tufted basal leaves about an inch long, narrowly oblanceolate, acute, entire, the skender petiolate base sparingly high-id-link, otherwise glabrous, not at all glaucous; the 2 or 3 cauline oblanceolate, § inch long, sessie, not arrientate: post short 6, hinese, straight, about # inch long, acute, spreading or a little deflexed on short fillform pedicels; valves with a distinct midnerve: seeds imperfectly biserial.

Glenwood Springs, Colorado, 18 June, 1899, Geo. E. Osterhout. An elegant little species, somewhat allied to A. Lyallii but with excellent characters.

The next three are segregates of A. Drummondii, in so far as relates to material not of recent collection and to be found in various herbaria under that name. The pods in all are erect, and the pubescence of the group is peculiar, consisting of hairs split to the base, so to speak, and divaricately appressed.

<sup>1</sup> A. ALBRENTMA. Stems rather low (6 to 7 inches high at flowering); rather numerous from a much branched thick and rather woody caudex, all very erect and strict; herbage of a vivid green, wholly glabrone scept nome traces of a deeply forked pubescence on the margins of the basal lancelate leaves and their petioles: caulta leaves oblogs, artiish, distinctly narrowed above the subsogitate-auriculate base: iflowers few, about 4 lines long; caby about, less than half the length of the obovate-illated petals, these with spreading line); fruit not seen.

Elbow River, in the Rocky Mountains of Alberta, John Macoun, 1897; Canad. Surv. n. 18,101. Easily distinct from *A. Drummondii* by its low stature and multicipital caudex.

<sup>4</sup> A. OXFITYLLA. Perennial, the 3 to 6 or 7 branches of the caudex each bearing a strictly erect stem 8 or 10 incless high at flowering time, much taller in fruit, the whole plant pale and glaucous, nearly glabrous, only the clustered lanceolate acute entire basal leaves with some of the divaricately, appressed binate hairs of this group: caultie leaves very erect, appressed to the stem, lanceolate, acuminate, strongly auricled at the base: sessile raceme short, few flowered: flowers not small (about 4 lines long); sepala purplish; petals white or pinkish, the limb spreading; pods about 3 inches long, hardly a line wide, very erect; seed in 2 rows.

Frequent in the mountains of Montana, Wyoming, and Colorado; in the southerly localities occurring at altitudes of 8,000 to 10,000 feet. Excellent specimens of my own collecting at Empire, Colorado, 1876, are before me, as well as a fine series of fruiding specimens from about Pagosa Peak, at 10,000 feet, by C. F. Baker, 1899. Its perennial root, glaucous hue, and long-pointed caultine lawes completely distinguish this from *A. Drummondii*; and the plant is less than half as large as *A. Drummondii*;

-A. CONNEXA. Perennial, the stems solitary, or occasionally several, the caudes being branched, all very ereet, 1 to 14 feet high; basal leaves green, in no degree glaucous, mostly with a few of binat divariately appressed hairs, oblanceolate, entire, acente, sienderly petiolate; upper part of the plant wholly glabrous and glaucescent: cauline leaves oblong-lanceolate, very erect, sensile and sigitate-clasping, the auricles broadly somewhat faduet: flowers not seen: pods few, very erect, commonly 4 inches long (2) to 4 jin.), J lines broad, the valves with a distinct indivisit traversing an equally distinct, but tahallow groove between the two rows of ovid strongly winged seeds.

Mountains about Pagess Peak, southern Colorado, at an altitude of 10,500 feet, growing in moist ground along with Veratrum, collected by C. F. Baker, 18 A uguest, 1899. Manifestly a southern subalpine homologue of A. Drummondii, and very distinct by the character of its pods, as well as by the glaucescent stem and stem-leaves.

Of the two species concluding this fascicle, the first is a segregate of the well known *A. platysperma*; the other a remarkable new species whose affinities can not now be designated for want of mature fruit.

<sup>1</sup>A. PLATZDDA. Stems several, 6 to 10 inches high from a branchei and suffruscent base: herviage glabroos, sarrely glancescent: basal leaves oblanceolate, acute, entire; cauline oblong, sessile by a broad but scarcely anriculate base; meems mostly to 4-flowered; jobs: nodes longly retices 24 lines broad; valves not nerred, rather strongly retices late, the meshes elongated; seeds broadly winged.

Lake Solfaterro, Lassens Peak, July, 1896, Mrs. Austin. Related to *A. platyperma*, but wholly destitute of the stellate pubescence of that species, and with broader leaves and pods, larger seeds, etc.

<sup>1</sup> A. FORNORA. Perennial, the one or several very over tand simple stems a foot high from a subliguous base; whole plant, even to the pods, canescent with a mixtur stellate indument: lowest leaves narrowly oblanceolate, 14 indees long including the long rigid peiole, entire; cauline rather copions, as long as the others, sessile by a transate but not auricle base: necessile long and loosy, the fieldeolored flowers rather more than 3 inch long, at length defictexi: sepais findy and densely stallate; petals with spatialta-bolong spreading limb: pods (immature) pendulons.

Hills about Aztec, New Mexico, 28 April, 1899, C. F. Baker. A handsome and singular-looking Arabis, bearing some marks both of Streptanthus and of Thelypodium.

### 2. Miscellaneous New Species.

CHEIRANTHUS ARIDUS. Biennial and occasionally perennial, stoutish, rather rigidly erect, the strongly striate stem about 10 to 16 inches high, simple, shortly racemose at summit: leaves cancesent with a dense indument of the usual forked and appressed hairs, the tufted basal ones with erect petioles and spreading oblancedate runcinatetoothed or entire blade, these next succeeding more conspicuously and pinnately runcinate, the teeth large and triangular, the upper easilie gradually shorter, linear, entire: flowers rather large, yellow; sepals pubesent, obviously seased: posh on teen.

On dry hills among nut pines and celars at Arke, New Waxio, 27 April, 1899, C. F. Baker, Related to C. argillona of the hillfs of the upper Arkansas, but taller, much less publesent, and with a different foliage. The leaves are peculiarly rigid and fragile; nothing remaining of the basal tirk at flowering time except the petioles, the blades apparently having been broken off and swept sawy by the winds of winter. Most of the specimens are simple and seem to be biennial, but others have a branched candex, as if sarrying the biennial period.

-Sourna puncture. Annual, erset, 3 to 6 fest high simple to above the middle, the whole unper portion forming a narrow and rather strict paniele of subsessile racenses: berbage appearing allogether green and glabrons to the unsided eye, but the stem and growing parts sparsely puberulent with minute forked or somewhat stellate hairs: leaves sealle, pinnate, the pinne pinnatida, of lanceolate outline, acute: fruiting raceness mostly 3 to 6 inches long and strict, the pedicels sheater, erect or merely seconding, about the length of the linear very acute 6 to 12-seeded pods, these 4 or 5 lines long.

Common in open pine woods of the Colorado Rocky Mountains, at 8,000 or 9,000 feet altitude. Excellent specimens are in Mr. C. F. Baker's collection of 1899, from the high mountains about Fagora Beak, southern Colorado. Thirty years ago, when I first saw and collected this subalgine wooldand species, Dr. Gray considered it to be the Old World Signatorium Sophie, but he alterwards referred it to S. Hartwogianaw, which is a Californian plant most unlike this in habit, and character of reneemes and pods. It is by far the largest species of its genus, and does not flower until Jaly or August.

"TRETFORTUR SERVICE. Stem solitary from a biomial or perenail root, stota, creet can attrict, 5 for binds or more, leafy to about the middle, thence racences to the summitthe greaty leotagated meanse strict, but not dense; the whole plant glabrous and very glaucous; the tuffed beal leaves oblanceotale entire, scarcely occceding an inch in length; easiline as long, lancolate, sngittate-clasping, very evert: lowers white or fish-clored, 1 inch long; calvy saccate; petals nearly erect but well exserted, with broad claw and narrowly spatulate strongly cremutate limb; anthers sagittate: pols 2 inches long, nearly erect, slender, acute.

Subsaline meadows, Dixey Valley, Lassen County, California, 6 July, 1894, M. S. Baker.

Threase cancer structures. Slender, branched from near the base and all the branches racomouse: herbage scarce glausescent, deepgreen: leaves of the stem (the lowest not seen) hancolate, acuminate, seesile by a subhatta base: racentes deuse: pods round-oborate,  $\frac{1}{2}$  inch long, onfiliorm pedicels of  $\frac{1}{2}$  by inch, the whole body of the fruit very minutely hirtellous, only obscurely venulose, the rays about 12, for the most part united near the summit and forming elliptic

### STUDIES IN THE CRUCIFERE.

infra-marginal perforations, the crenate diaphanous margin purplish: stigma included within a deep terminal notch. Near Clifton, Arizona, Dr. Anstruther Davidson, 1899.

<sup>•</sup>DEARM INTEGRATIONLA D. counciples, var. indegrifelia, Nats. Proc. Am. Acad. xxiii, 256-6. It was the one or two least important of the many psculiarities of this plant, numely, the entire leaves and the glabrous poles, which Mr. Watson had detected when he received it as a new variety of D. cuncificia. Its obvious characters as compared with the real D. cuncificiant of the largest polecines, and the largest pole-ciness, (2) targited poles (3) somewhat inclined to be falcate (4) not only glabrous, but ordably recticulates, and (3) pointed by a stigma much more prominent than in any other member of this particular group of species.

CARDARINE FOLLACE. Personnal alliel to C. Brower, but tabler and quite seret, enceredy lendy at haves, but the stem above bearing numerous and ample very thin leaves, the fruiting macme elongated and narrow: leaves commonly 3 inches long including the peticlo, the terminal leaflet nearly 2 inches long, oval or round-ovate, coarsely but not deeply lobed, the lobes very obtaines or even almost truncate and mucronate, the 1 or 2 lateral pairs of less than onefourth the size of the terminal, otherwise similar: fruiting receme 4 to 10 inches long; pods subsreet on slender pedicols, very narrow, alender-pointed.

Species apparently common in the lake region of northern Idaho, thence easiward into Montana. Excellent Idaho specimens are in my herbarium from Leiberg (n. 171), Heller (n. 856) and J. H. Sandberg; and the species scenas well represented in Flodman's n. 491 from the Spanish

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Basin in central Montana. It is the most notably leady of all our species, and the foliage readily suggests that of the common celandine. Its pods are very narrow, and only an inch long. By this and the leaf characters, as well as the purplich halt and long racemes, it must be regarded distinct from the almost strictly Californian C. Breveri to which the specimens have been referred.

"CARDARNE ORBUCLARS. Ferenzial, with copious rather fine fibrous roots from about the summit of a short perpendicular rootstock: stem strictly erect, 1 to 1] feet bligh, very thick, appearelity somewhat fleshy, only very sparsely leafy, the follage chiefly near the bass: terminal leaflet an inch broad more cless, orbicular, the rounded basel lobes overhapping, thus completely closing the sinus, entire or highdy reparad, retures; the single listent pair on-chird as large, round-tenform, subsessile; the few leaves of the upper tem with more elengated and somewhat irregularly toothed leaflets: racentes several, short, narrow: pod suberect, i held how good subsets.

In swamps at the mouth of the Columbia River, Oregon, May, 1887, Thomas Howell; the specimers labelled *C*. *Brevers*, but the plant of very different root-growth and peculiar orbicular and subreniform leaflets, with also characteristic backless pods.

\*CARDARTME MEDELEPOLLA. Shems several from a short branching and somewhat tuberfersous rhizome, sont, ever from a decumbent base, a foot high more or less not leady a base, only sparsely so above and the leaves comparatively small, rather fleshy, simple or trifoliolate, the terminal (dene the only) leaftet about an inch wist and § inch long, more or less angularly 5-lobed but not deeply so, the latent pair when present small and about 3-blobed; flowers white, rather large, forming a short, broad subcorymbose cluster; fruiting raceme short, the pods 2 inches long, slender, erect on pedicels of  $\frac{1}{2}$  inch or more.

Along streams at the castern base of the Cascade Mountains in southeastern Oregon, Mrs. R. M. Austin, 1893.

CARDANNE MODOCESSE. Size and habit of the last, but sinder rather than robust, much more leafy, the herbage deep-green and not succulent: leaves mostly simple, oval to rhomble-orate, an inch long, ‡ inch wide, irregularly and actually 5 to 7-toothed: flowers rather few, white; fruiting raceme short; pods slender, 1¼ inches long on ascending pedicels leas than half as long.

Plains of Modoc County, northeastern California, on Lassen Creek, Mrs. Austin, August, 1894, and on Davis Creek, Miss Black, in the same year; at the time referred by me to *C. Breveri*, but it is very distinct.

## 3. Type of the Genus DRABA.

The name DRABA was originally, and very anciently, associated with a plant which, since Linnews' time, has been treated as a species of the genus Lepidium. The Lepidium Drabe of that author is the type which, according to the law of priority should, along with its true congeners, constitute the genus DRABA.

However, as the har of priority is with most botanists of the present a mere name, being allowed to prevail only this side of a comparatively recent date, the question here answered is, what is the type of the modern so-called genus DRAM T in order to assertian its type-species, one must consult always the original publication of a genus; not upon the matter of the authorship of the modern *Drobo* we find contradiction between the most pretentious of recent taxononic standards. In the Specifical Prior example,

it is credited to Dillenius. In the Illustrated Flora it is attributed to Linnæus. Consulting Linnæus we find the authors of the last-named work in error, and those of the former correct. Linnæus neither proposed nor claimed as his the genus in question. He simply adopted it from Dillenius, and he distinctly credits it wholly to that celebrated cotemporary of his. To Dillenius, therefore, we are obliged to appeal, if we are to learn what is the type of the modern Draba. Consulting his pages in the Nova Plantarum Genera, published in 1819, we perceive that he established it upon four species, all taken out of the Alyssum of Tournefort: the essential generic character being found in the rosaceous or alsinaceous aspect of the corolla, each petal of which is bifid, so that the flower is not obviously cruciform as it is in Alyssum, but rather resembles that of a Stellaria or a Cerastium. Had this author gone no further, we should have been able to make out his type, or types, from Tournefort alone. But he saved posterity that labor, by enumerating four species as certainly of this genus, adding as doubtful a number 5.

I have not deemed it worth while to identify his fifth and doubtful *Draba*. I leave that to the advocates of the absurdest of all nomenclatorial subterfuges, the doctrine of "residuess" The four which he enumerates as positive *Draba* species are, in modern binary nomenclature, these :

- 1. Erophila verna, DC,
- 2. Draba Caroliniana, Walt.
- 3. Petrocallis Pyrenæica, R. Br.
- 4. Berteroa incana, DC.

This represents the Dillenian succession and numbering of Draba species; and not only does D. verna stand first;

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it is the type which he specifically discusses in his argument for the segregation of all these plants from the genus Masam. His argument is this: Aloine and Spergula are distinguished as genera by the bind petals of the former and the entire ones of the latter. Therefore, he says, Parmychia vulgaria (i. e., Draba verna) should be excluded from Alysaum.

The fact that Exp(k) are as is the type of Dillenic-Linmean Drado-and the fact is simply incontroverbillon-may interest such of our botanists as would like to accept the plant in the rank of a genus, but who shrink from adopling it under Adamson's ridiculous appellation of Gaublam; though there is no need of heeding that appellation since it is in violation of a higher law than that the of priority, the law that botanical nonenclature must be Latin, at least in form.

# 4. A Proposed New Genus ABDRA.

This is a segregate from that, as it always seems to ma, forced and empirical consolation of natural incoherents which passes with most people for a genus called *Draba*. It is apparently a monotype, and is known as *Draba* bracklyeorpa, Nutt; a small annual, of rather wide discumination southwestward and northwestward in the United States. It wars an aspect thoroughly multile that of any other socalled *Draba*, more resembling, superficially at least, some possible *Cropelan*, or *Thaspin*, of *Hatchinsis*; and there is nothing but the form of its pods to suggest an alliance with *Draba* gargengte, while from no section of the couventional *Draba* is it farther removed in its real nature than from that typiced by *D. Corrolinane* with which authors have, I believe, invariably associated it in their books. Sir William Hooker, by the way, who was one of the first botanists to see the plant, disposed of it as a proposed new species, not of *Draba*, but of *Alyssum*.

The suggestions of Thlaspi in this type lie in certain peculiarities of the foliage, which is of the same cut, the same nale hue, inclining to be nurple underneath, and also in the fact that the sepals are thin and also purplish. But the pale hue of the Thlaspi herbage is owing to the presence of a more or less pronounced bloom, the plants being altogether glabrous, whereas in our plant the paleness is owing to a minute and peculiar appressed pubescence, in the characteristics of which it is most unlike that of any other so-called Draba. The whole genus is, by authors in general, credited with a stellate pubescence; but this is not very accurate: for a stellate pubescence properly consists of hairs that are both sessile and possessed of as many as five radiating branches. In most Drabas, at least the American species, the hairs are branched above the middle, or else not far below it, with branches most usually from two to five or more. Such a pubescence ought never to be described as stellate, but only as branched, or perhaps stellate-branched when the branches are numerous enough and sufficiently horizontal to form the conventional figure of a star.

In our plant, however, the pubescence is unlike that of any other so-called *Draba* in that while the hairs are closely assile they consist of four rays and are exactly cruciform. There is probably no other cruciferous type which can be described as having a pubescence of sessile cruciform hairs.

Another remarkable characteristic of the present type is found in the existence, on almost all specimens not too old to show the foliage, of from two to four pairs of exactly opposite leaves at or near the base of the stem. I know of no other American crucifer that exhibits even in part an opposite phyllotaxy. The purple calyces and white or pinksho petakon suggestive of *Prode*, but of occation other

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genera already named. The pods are approximately those of some *Drabas* or of certain other siliculose genera. And on the whole, no longer content to call this thing a *Draba*, I propose to designate it as

 ABDRA BRACHYCARPA. Draba brachycarpa, Nutt. in Torr. & Gray, Fl. i, 108.

### NEGLECTED GENERIC TYPES .- II.

### HALERPESTES.

The North American specific type, the study of which has brought me to the point of proposing a new genus under the name given above, is Pursh's *Remuentus Cymbolenic*. The relation which the plants station to *Remuentus* well be compared to that subsisting between *Progeria* and *Potentilla*. In *Relexpests and Proparia* the plants are what we call stemlass, and propagation is secured by a system of long articulated runners which ultimately strike root and produce a new plant at each joint. The only fruit characters by which the group is distinguishable from *Reamentus* are those of the thim texture and the striated surface of the achenes.

The type has, by several authors, been seen to be too strongly divergent from true Reanondus to be retuined within that genus; but the attempts to place it elsewhere seem to me to have been most irrational. The proposal to place it under Cogyraphis must surely have been made in great innocence of the real characteristics of that genus. Cogyraphis beams not the least resemblance to these plants. Is whole aspect is that of Califa, from which its peristent sepals and one-seded carpels distinguish it. And if the attempt to place it under Cystorhynche is less objectionable  $\frac{896-4}{1000}$ . on the whole, it is only because the acheens are striated; but in hakin, in texture of the acheens, and the important characters of the style, there is the widest divergence between them, while hakinally they are totally different. My judgment is that either one of the propositions thus alluded to is worse than leaving the plants where they were under *Renouncidus*.

I think that the species of HALERPESTES are at least three; though the opinion that they are all geographical variations of one has its advocates.

H. SALSUGINGA. Ranunculus salsuginosus, Pallas, Reise, iii. 213 (1778). An Asiatic plant, much smaller than the rest of the genus, with small entire or 3-dentate leaves and 1-flowerd scapes.

H. CYMBALARLA. Remunchedu Cymbelarda, Purah, P.T. ii 392 (1814). Orgynephic (Appaloatra, Parat), (1819). Oyrtorhymola Cymbelaria, Britton (1884). Very common in western North America throughout the mountainous and alkaline districts; the lawse subcordate-vate and create all acound the margin; scapes often 6 inches high and usually with several flowers; the heads of achenes oval or ohlong.

H. TRIDENTATA. Ranunculus tridentatus, HBK. ex DC. Syst. i, 252 (1818). Plant of Mexico and southward, said to be distinguished from the last by 3-dentate leaves, and scapes mostly 1-flowered.

### PERITOMA.

DC. Prodr. i, 237 (1824). Atalanta, Nutt. Gen. ii, 73 (1818), not of Correa (1805). Cleame species of more recent authors. How clearly distinct from true Clowne our far-western allies of that genus are, was well enough shown by Nattall in 1818; and the point was again emphasized by him in 1834. Meanwhile, in 1824 the older De Candollo, certainly to be ranked as one of the great masters of botanical taronomy, had adopted the genus beartily, at the same time assigning it a tenable name, in place of the original but bomorymous Atlontar of Nattall.

The characters of the genus are so numerous that I can only excuse thoses of our botanists who have ignored it, on the ground of the paueity of our expandis on the whole, together with the fact that the *Periomas*, occupying their own distinct section of our territory, are never same growing along side the *Cleomes*, and so their differences, even of general habit and aspect, have not drawn the attention of those without field experience both southward where *Cloome* occurs, and far-westward in the region of *Perioma*.

The most obvious character of Periform as compared with the older genus is its synspapous calyx. Equally striking, and also even more notably characteristic, are its essells petals; those of Clowne being long-nuguiculate. And again, while in Clowne the four petals on their long scheder stalks are turned to one side, so as to stand in a row (as in Gaure when compared with Chardword, those of Periodom andiate as from the center, as seallo petals in such flowers are almost obliged to radiust. So that, on the whole, even the corollas of these two genera differ, those of each from those of the other, with the difference which distinguishes regular and irregular corollas. The name Periform itself, however, calls attention to the strong character of the ealyx, which, consisting of a tube and tech or segments; is decidouss by a sort of circumession of the three near its base.

The species of this genus are not numerous, and are named as follows:

#### PITTONIA.

P. SHRETLATUM, DC. Prodr. i, 237. Clowne serrulata, Pursh, Fl. ii, 441. Atalanta serrulata, Nutt. Gen. ii, 73. A common large and showy species, of the Rocky Mountain plains and foothills originally, but of late years extending its range eastward to Illinois and Wisconsin.

P. INDENATUM. Cleame inornata, Greene, Pitt. iv, 16. A small species of southwestern Colorado, at present little known.

P. ATARUM, Nutt. Journ. Philad. Acad. vij, 15. From the plains of the Platte to those of Lawis River, according to Nuttall. The species has not been recognized latterly, nor do I kows it, yet have I more faith in Nuttall's knowledge and judgment of western plants than I have in these who suppress his species. Many have confused this with the next.

P. LUTEUM, Raf. Sylv. Tellur. 112. Cleome butea, Hook. Fl. i, 70, t. 25. Of wide dissemination on alkaline desert plains beyond the Rocky Mountains.

### CELOME.

In the Closure platgarpa of Torrey we are furnished with another decidely good if not strongly characterized generic type. Here we have a calyx at the opposite extreme from that of the synsepalous genus Perione; for its sepals are not only distinct, but almost filtorm, and widely spreading from their very base. The corolia, however, is as far from that of *Oleone* acean well be. The petiah, though spatialito, are not the least inclined to one side, but are radiant as in *Periorma*, though apparently move spreading. The fruit is altogether peculiar among those of our capparids in that it is very broad and fat, presenting the seeds in two perfectly distinct rows. The filaments are excessively elongated and tortuous; and the torus of the flower is glandless; that in all other *Cleome* allies exhibiting one or more large nectarylike glands.

The genus must be considered monotypic.

C. PLATYCARPA. Cleome platycarpa, Torr. Bot. Wilkes Exped. 235, t. 2.

### CARSONIA.

I assign this name to the most remarkably distinct of all those diverse types that have been negligently referred to Cleome; the desert plant which Mr. Watson named C. sparsifolia. It is totally a thing apart from all near allies of Cleome even as to its inflorescence; for, instead of being gathered into long and dense racemes, the flowers are largely solitary, that is, scattered all over the bushy plant, one in a place at the end of each short leafy branchlet; though the main branches bear at their ends from three to a half-dozen loosely collected in what may be called a short raceme or subumbellate cluster. The calyx is chorisepalous, though in a way most unlike what is seen in either Cleome or Celome : for the sepals are broad and short, and do not at all spread away from the petals. The petals have the posture of those of Peritoma, not of Cleome, but they have a distinct 2-lobed nectariferous scale at base, nothing like which is otherwise known among our capparids. The stamens in this type are also exceedingly characteristic, being short, stiff and straight, the whole stamens scarcely equalling the petals in length, whereas in all allied genera the filaments are slender, and so elongated as to be protruded far beyond the petals. Not many genera in this or any other choripetalous alliance are established upon so many and such strong characters

### PITTONIA.

C. SPARSIFOLIA. Cleome sparsifolia, Wats. Bot. King Exp., 32, t. 5.

### ALDENELLA.

The type here proposed is also of the Capparidex, but belongs not to the West, but to the sandy shores of the Gulf of Mexico. It is the Cleome tenuifolia of Le Conte, referred to Polanisia by later authorities. It is equally out of place in either genus. It has neither the corolla of Cleame nor the fruit of Polanisia. The pod of the last named is indehiscent except at apex, where the ends of the valves separate and curve outward to emit the seeds, the valves being actually persistent. In ALDENELLA the valves are, in the first place, marked by a peculiar and very notable reticulation; but they are promptly deciduous quite as in *Cleome* and its nearer allies. But in Polanisia the petals are unguiculate and stand in a line quite as in Cleome, whereas in our proposed new genus they do not, but radiate around the central axis; but the corolla here is remarkably irregular, two of the petals being of thrice the size of the other two; and all of them in shape are unlike those of either genus to which the species has been referred.

A. TENUIFOLIA. Polanisia tenuifolia, Torr. & Gray, Fl. i, 123. Cleome tenuifolia, Le Conte, I. c.

## SOME ROCKY MOUNTAIN ASTERS.

It will be seen that the Aster species described in this paper are largely of my own collecting during the last decade in various sections of Colorado and Nevada, most of them having come from special localities not visited by other botanists; or at least visited by none who have given particular attention to this genus. But the several species attributed to Wyoming are based on material assiduously collected by Professor Nelson, and submitted to me for study.

The Asters of those far-western regions are doubtless not as numerous as the eastern representives of the genus, yet their number will prove considerable, and perhaps as difficult of definition as the eastern.

I believe that all, or nearly all, the following will be found valid species; and it is likely to be long before several of them will be better known; for I have obtained them in places not easily accessible; but they are excellently represented in my herbarium.

A. DEFICIO-DYPLICS. Low, with many event leafy and usually monocephalons stems rising separately from a system of branching horizontal rootstocks: leaves from oblonglancelate to spatial-tel-linear, thickly clothing the simple stem and diminishing in size upward, all of firm texture, ple and glaucesent, also on both faces sparsely and stilly strigose, the entire margins scaheralous, the lower and subpetiolate one with half-clapping base: stem commonly reddish and with an appressed whitish pubesence: head hemispherical, i sinch high and i nob frond: involucre comparatively small, is firm erect bracts in about 3 not very unequal series, the outer spatial-tecololog, obtus, herbaceous, the inner more linear, acute, and with narrow green tips, all more or less cilolate: ruys 40 or more, purplish.

On clayay banks below Marshall Pass, southern Colorado, 4 Sept, 1896, collected only by the writer. A peculiar dwarf monocephalous very leafy apecies, with the numerous leaves often appearing in two ranks by a sort of polarity. The tallest specimens are hardly six incluse high.

A. VIOLACEUS. With the subterranean vegetative system

of the last, the much taller and more slender less large stems strongly decumbent, usually a fost high or more, the herbage of a brighter green, the stems red-purple: lowest leaves very narrowity oblanceolate, 4 or 5 inches long including the peticle, the caulton half as long, linear, incurred, and with a fascicle of small ones in their axis, all of firm texture, quite entire sparsely stripulose and the margins rough with a short incurved ciliation: heads solitary, or more commonly 3 to 5 and corymose, mearly in oth high almost hemispherical: involucer of about 3 series of unequal ad sistincity individes the state all with purples herbaccous erset tips, the outer obtuse, all pubseent externally and more or less cilicate: rays violet.

Dry ground at base of Little Ouray Mountain east of Marshall Pass, Colorado, 4 Sept., 1896; collected by the writer. An elegant species, with involucer red-purple as in some Macharanthera species; but a most genuine Aster.

A. ANMULTATIONES. Beems several, less than a foot high subscaptform and cozymbose from a branching crown bearing tuffs of so-called radical leaves; these erect 3 to 5 inches long, oblauceolate, petiolds, emire, actus, deep green and glabroux, reticulate-remains, the few and scattered culluor form purple stems glabrous except for traces of the usual pubsecent-lines; heads rarely solitary, commonly 3 to 10, nearly i lach bligh, involuters almost hemispherical, their spatialse-linear bracts in about 3 series, all herbacceus almost throughout, obtuse, the outer very distinctly though finely cllinte at least to above the middle, all traversed from more, violet: achenes moderately compressed, with 4 or 5 unequally distributed but very obvirous angles, the side sparsely pubescent; pappus whitish, fragile and deciduous. Borders of marshy meadows below Marshall Pass, Colorado, 4 Sept., 1896.

A. PRATINCOL. Stems arising, as in the last, from a crown bearing many leaves, but not subscriptionr, nuther freely branching and fautigately panields, often 3 feet highlowest leaves upright, 5 to 7 inches long, oblong-lanceolate to narrowly oblanceolate, entire, obtase or acuitals, rather firm, somewhat 3-merved but not venulose, glabrous except as to the scabrous margin; it has calluse much reduced, all sessile: involuerse  $\frac{1}{2}$  inch high, camparulate, their brants in 3 or 4 series, well imbrietated, none wholly herbicacous, all with oblong green tips and more or less clinate: rays 25 to 35, purples achenes with an appressed pubscence and 5 very prominent ribs of unequal distribution; pappus sordid, rather deciduous.

A fine and conspicuous species of meadow lands along the Gunnison River at Gunnison, Colorado, 1 Sept., 1896, collected by the writer.

A. surrecornes. Erect, stort, 1 to 2 feetbigh, with abondant large foliage and for large heads either somewhat freely panicled or subracemose: leaves of sterile basal shoots oval to apathacheoblong, 2 to 4 inches long, escently petiolate, ascending or depressed, the copions cauline ones similarly large, often even larger, more spatiatela, apmeletianal, commonly with fuscicles of smaller ones in their axils, all from nearly entries to notably connate, rarely ceracitasements, of moderately firm texture, deep grees and glabroson both faces, even the margins hardly sendorus; sendorus petioles or floral branches often with small spreading breites and the whole inforcemone rather amply leavy: the two rather numerous heads  $\frac{1}{2}$  inch high; bracts of the campanulate involuces in 3 series, none herbaceous, spatulate, with cartilaginous base and erect acute green tips: rays about 30, broad and showy, flesh-color or purplish.

A Insuriantly leafy species with large heads, both heads and foliage in some way recalling *A*. frontdes, though as to both the habit and inflorescence as well as the bracks, thoroughly distinct from that and all others known. It was obtained by myself in September, 1896, among the woods mountain summits above Gimerron, Colorado, where it adorns open and rather moist places among the woods and thickets.

A. ADRUADESS. Stams low, forming loose but somewhat sctensive masses through a system of branching hixomes, the longest stams seldom a foot long, decumbent, or merely sarregts, loosely racemose or accentence-panieled above the middle: stam and branches notably pubseent, the foliage scaredy stall so: leaves of short storile basal shoots crowdel, oblanceslate, with dillated and parily sheating base, very entity, acute, 3 to 4 inches long. 1-nerved or less distinctly aberevel; these of the flowering branches linear, often . somewhat falcate-curved, the margins scatterous: heads campanulate, j inch high; braset of involuers imbriested in about 4 series, the few outer ones berbaceous, oblong, obtase, the obtes chartaceous in the main and white, but with ervet, acute green tips: rays 25 to 30, rather short, white or with a more or less deep violet tinge.

Common in open grass lands along dry runs among the foothills about Cimaron, Colorado, 30 Aug., 1896, collected by myself. The species, notwithstanding its low stature and depressed habit, with loose inflorescence and large heads, is strictly an ally of d. *multiform*, especially of its

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### SOME ROCKY MOUNTAIN ASTERS.

far-western homologue, A. commutatus, Gray, though the bracts in our plant are in no wise spreading.

A. STITALAERS. Stems several, 5 to 8 inches high, from horizontai rootsoks, erect, rigit, rather densely leady up to the fastigiate-corymbose inflorescence of 3 to 7 above middesized heads, both stems and foliage firm and even rigid; all the leaves oblancedate, acute, entire, sharply scabrous diffuse-acubrous, the lower glabrous: involverse campunulate,  $\frac{1}{2}$  inch high, their bracks strongly imbricated in about 4 series, mainly cartiligations and colorise except as to the elliptic green tips, all acute, sparsely stripose on the back and marginally clicklaster, rays 20 or more, deep purple; central flowers of the head sterile, achenes of the several fertile series red-purple, compressed but rather prominently 5-angled, the whole surface with a sparse appressed white pubsecence.

A fine species, known only in specimens collected by myself on a dry mountain side above Gunnison, Colorado, 10 Sept., 1890. I at the time mistook it for a *Macharomthera*, misled by its rigid leafiness, much imbricated involuce and rich purple rays; but it is a very genuine *Aster*.

A. FULCEATCS. Stems low, sheader, decumbent, numerons, from a loose but extensive system of sheader horizontal rootsdocks and partly subteranean stolons, the leaves terminating the latter small and from obovate to spatialize oblong; those of the red-purple, while-puberlished proper stems linear and lance-linear, 2 to 4 inches long. 1-nervad, all entire and glabrous: heads large, solitary at the ends of the smaller stems, few and racenose or subcorymbose on the lailer ones, but these only a foot high: involuters turbinate but broadly so, their bracts few and little imbricated, almost wholly herbaceous, the outer from  $\frac{1}{2}$  to 1 inch long, linear, entire, eactue, wholly glabrous as are also the short statulatelinear ones: rays 15 to 20,  $\frac{1}{2}$  inch long, of a rich rose-purple or paler and roseate-likae: achenes not known: pappus lightcolored.

Rocky ravines in the mountains of southern Colorado near Pagess Peak, at 9,000 fest, C. F. Baker, 12 Aug., 1899. A most beautiful and very distinct new Aster, rather allifed to such eastern species as *A. paniculatus* and *Novi-Belgü*, the western group of which *A. adacendens* is typical. The outer involvement bracts often surpass the rays.

A. GLASTIFOLIUS. Stems a foot high or more, closely and amply leafy up to the terminal and somewhat dichotomously cymose inflorescence; herbage pale-green and glaucous, nearly glabrous, some lines of white pubescence marking the stem, the leaf-margins scabrous, the lower face of the foliage sometimes very sparingly so: lowest leaves broadly oblanceolate, the others spatulate-lanceolate, all entire, acute, 2 to 5 inches long, sessile by a broad clasping base; pedicels of the 5 to 12 heads subtended by conspicuous oblonglinear leafy bracts: involucres broadly campanulate, nearly 1 inch high, their bracts in 2 or 3 series but subequal, especially in the terminal head, where they are almost wholly herbaceous, lance-linear, acute and more or less ciliolate, those of the lateral heads more imbricated and with more evident colorless margin toward the base, all strictly erect: rays 20 to 30, long and showy, purple,

Known to me from but two stations, both in Wyoming, namely, Prof. A. Nelson's n. 3,555, from North Vermillion Creek, 17 July, 1897, and one from Pass Creek, in the Big Horn Mountains, 16 July, 1890. A very satisfactory species

### SOME ROCKY MOUNTAIN ASTERS.

remarkable for its leafiness, and the peculiarly almost dichotomous open cyme of heads.

A. NERASNI: Stems slender, wiry, about 2 feet high from branching and only seperfidially seated subligencess rootstocks, simple, leafy throughout and raceucaely or subcorymobely floriferous above the middle: catilla leaves (the basal not seen) about 3 inches long, firm, narroevy linear, entire, acute, sessile and half-chasping. 1-arever, glabrous on both faces, the margin sabrelloux: involuces brasely turbinato, 3 lines high, their backs individual lancelate or linear, acute, pubescent on the back and marginally elita, mostly wall differentiated into lanceolate green the part marginally colories linear base: rays about 20, violet or paler, rather parcy and proves quoties.

The type specimens are in my berbarium from Fishers Ranch, Albany County, Wyoning, and were cellested by A. Nelson, 13 Sept. 1989, and the label bars the number 5,326. The same collector's n, 6,686, from the Laramie Hills, Sept. 1899, seems to be a larger and less simple state of the same, though with rather more numerous and broader involucent bracts. Again, his n. 1,758, from Centennia Valley, is nearly tryincil: only rather more amply leady.

A. LATRVIERS. Stems vary creet, 1 to 2 feet high, glabrous except as marked by lines of pubsecone decurrent from the leaves, commonly red or purple, otherwise pale and glaucescent, leafy, and somewhat equably so, even to the narrow and fastigate or broader and subcorputable pairiele: leaves lanceolate, or oblog-lanceolate, seelie by a broad and almost anriculate-leasing hose, thinkink, lightgreen or glaucescent, entire or obscurely and remotely serrate toothed, marked by a white indyen and some fane less obvious reticulation: involuces turbinate or subcampanulae, their bracks anrowly lance-linear, year acate, the narrow light-green herbaceous tips pervaded by a fuse but distinct white minherve, the margins remotely serrulatelliolate: rays many, usually long and showy, pinkish to rose-purpliab.

This is a rather neat and attractive lowland meadow Aster probably common in Wyoming and adjacent Colorado along streams in mountain parks. My specimens are nearly all from Mr. A. Nelson: and I give his numbers in the order of the excellence of their character as types. No. 5,293, from Hutton's Lake, Albany County, 1898; n. 6,870, from Laramie, Sept., 1899; n. 1.151, from Laramie City Park, 30 Sept., 1894; n. 964, from the Gros Ventres River, 23 Aug., 1894; n. 1,118, from "East Fork," 25 Aug., 1894. I have also one fairly typical specimen from along the Platte in North Park, Colorado, 10 Sept., 1899, collected by Mr. Osterhout; but on the sheet are two other specimens which I should not refer here. Another by Blankinship, from Pass Creek, Big Horn Mountains, Wyoming, may be the same, though its involucre is very foliaceous, the outer bracts as long as the inner.

A. PROXIME. With regetative characteristics of the last, but of a deeper green, the foliage more amplitud and spreading, all the leaves quite entire; inforescence more truly paniculate and oper: involuces campanulate, the outer bracts wholly berbaceous and spreading, the green tips of even the innermost also spreading, all cuspidately acute: may 35 or more, large and showy, flesh-color to rosepurple.

### SOME ROCKY MOUNTAIN ASTERS.

Represented with me by Mr. Nelson's n. 6,788, from Madison River, Yellowstone Park, and n. 2,478, from Pass Creek, Wyoming. Necessarily separated from A. *Lateviewa*, to which it is next of kin, on account of its loose panieled inflorescence and thinner greener involueral bracts with recurred tips.

A. xxur. With the red stems and light-green glancescent herbage of A. Lebeirena, but stouter and low, less than a foot high : haves larger in proportion, of a thick, firm texture and veinless, gataltalc-hanceolath, asselle by a cordate-clasping base, sharply scabrons-serralate, otherwise glabroux: inflorescence rencomes-ganicled, but short and rather dense: involucers small, their firm erset bracks almost linear, acute, with marrow and erren tim : revalent 28. bluich.

On stream banks of the Humboldt River meadows at Deeth, Nevada, 5 August, 1895, collected by myself only.

A. VALUCUL. Signale, evect, 1 to 21 fest high, simple up to the last corymbose parcialitie inforescence; only the pedicale of the fwr heads and their brates heary-puberlead, the main stem and few branches glabrous: leaves mostly subradical, hanceolate or oblanceolate, only 3 or 4 inches long including the sheader hirsta-teilitae petiole, glabrous, the entire or faintly serrate-tothed margins delicately scathering areas fow, reduced and sessile, Varying from lance-linear-to linear, but always with a widened and hilf-classing bases involvers small, almost hemispherical, their linear-hanceolate brates in about 3 series, almost wholly green-the-acceous and not very unequal, their narrow whitish margins below obscurely cilicitae or quite nakel; rays 35 to 40, pate purplish.

Abundant in moist meadows of Pine Valley, above Palisade, Nevada, collected by the writer, 25 July, 1896. A. LINGNITFOLTES. Near the last, equally slender and with a similar corynhoss-paniels inforcescence, but the stem much more equally leafy, the lowest leaves bradly oblancosites, tobuse, entire, the black secredy if a these long, the periods much longer and strongly hirsute-tilinate, thuse of the middle and upper portions of the stam successively oblanceoiate and spatialite-lanceolate, neurorandely acute, all the foliage pale green or glaucescent, indistinctly veload, perfectly entire, glabous exceept the rather sharply eilolottsenbrous margins: peduncles of the small heads appressedimbriended in about 3 notably unequal series, only the short outer series hereacous, the others with herbaceous tips, all acute and distinctly eilolate all around: rays 30 or more, rather narrow and short, flesh-color.

Habitat of the last, and collected at the same time.

A. LINGUES. Stems very erect from a borizontal rookscok, green and glabros at base, otherwise marked with pubseent lines, especially the branching portion, commonly and high left throughout and paniculate above the middle: lower lawses with linear-lancoalate serrate blade and a narrowed peticlar base, the whole 4 to 7 inches long, the upper linear and sessils, serrate or autice, all glabrous to both faces but the margin servalate-scabrous; heads in a rather narrow and strict more or less corymbose panicles: involuers campanulate, about 14 lines high, their bracts in 2 or 3 subequal series, all linear or spatialate-linear, the outer often wholly herbaceous, accessive (rinks, though with some minute assending hairs along the margin: rays about 30, rather narrow, rather pair line ley logit.

Collected only by the writer, near Palisade, Nevada, 24 Aug., 1896. It is an inhabitant wet reedy margins of

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### SOME ROCKY MOUNTAIN ASTERS.

stagnant ponds and pools along the Humboldt River; a tall but not showy species, with few and remote, though excessively elongated cauline leaves, the subterranean parts lying just below the surface of the elayer mud.

A. OXYLETES. Erect rigid stems, several from the root, simple up to the memone or somewhat pauled inforcescence, commonly 2 feet high, sparsely and minutely scalroots below, the upper portion more notably and somewhat strigosely pubsescni: lower leaves marrowly oblauceolate, 3 inclues long, entire, acutisit; the upper linear, the barets of the pedicels sublate-linear, all seabertlous at least marginally: involucere 3 or 4 lines, high, broadly turbinate or somewhat companulate, their barets distinctly imbriated in about 4 series, the short our ones mostly herebaceous, the others with obovate green tips ending in a sharp setacous point, all clinite except the innermost, these being linear and with a more contral herebaceous line: rays 15 to 20, broad and ruber short.

On dry and rather sandy banks and terraces along the Humboldt River, bleve Paliade, Nevada, 24 Aug. 1896, collected by the writer. Species suggestive of the Californian *A. Manizoisi* by its narrow and memore inforescence, yet not infimitantly related to it, nor very obviously to any other. The setaceous-pointed involuent bracts recall the *Macharonalherus*, but the plant is otherwise far from forming even a connecting link between that genus and the Asters.

To the foregoing species of the Rocky Mountains and regions adjacent, I append the following one peculiar to southern California.

A. ENSATUS. Tall, very leafy, rather closely panicled 8856-5 above, the numerous short-policellate heads rather large: stem glabrous blow, the branches of the inflorescence coarsely pubsecent in lines: leaves linear-lanceolate, acute, of firm texture, algibily curved, the lowest 3 or 4 inches long, venily and sharply serrate, those of the branches and branchless perfectly surity, very closely stiffy and sharply setose-cilicate: campanulate involuces 4 inch high, their linear bracts in 2 or 3 series but nearly equal, the outer sometimes wholly berbaceous, the inner with dark-green tip and midnery: arws about 30, pale-purplish or field-bolor.

Meadows about San Bernardino, California, S. B. Parish, n. 3,818. Confused with his *A. heperius*, by Asa Gray, but very distinct from that Rocky Mountain type by its rigid sword-shaped and sharply edged leaves, the lowest of which are sharply serrate. It is a Pacific Coast homologue of the eastern *A. paniculatus*.

### CORRECTIONS IN NOMENCLATURE .--- III.

The name Oreatrum, employed by me on pages 146 and 147 of the third volume of this series to designed a genus, I find to have been practically prescupied; for it can not be maintained as different from the Oriestrum of Deoppig & Endlicher. I therefore propose Orgoarizanta as a convenient substitute for my former and untenable Oreatrum; the species to be named thus:

O. ALPIGENUM. Aster alpigenus, Gray.

O. HAYDENI. Aster Haydeni, Porter. A. pulchellus, D. C., Eaton.

O. ANDERSONII. Aster Andersonii, Gray. O. ELATUM. Oreastrum datum, Greene.

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An equally unfortunate attempt to establish a substitute for the homorymous Groggie of Asa Gray, was made by me five years ago. The PARLASIA (Eryth. v. 75) then proposed was discovered to be a homorym scon after the appearance of the third volume of the *hidz* Excessis, and I have too long delayed the correction. For this latest Groggie I now Offer the name NEXEVERX. The species are:

N. CAMPORUM. Greggia camporum, Gray.

N. LINEARIFOLIA. Greggia linearifolia, Wats.

The generic name Grayia, as now long employed in A merican botany, dates from 1841 only: while another genus by the same name was published a year or two earlier. Our subclaceous shrules of the far-western deserts need, therefore, a mane that shall not be revertible, and I offer for this purpose the new name EREMONSTRUM. The species are two only:

E. SPINOSUM. Chenopodium (1) spinosum, Hook., Fl. ii, 127, or Grayia polygaloides, H. & A. Bot. Buch. 387.

E. BRANDEGEL. Grayia Brandegei, Gray, Proc. Am. Acad. xi, 101.

GEUM AUCKLANDICUM may replace G. sericeum, Kirk, Students, Flora of New Zealand, 129, (1899) which is a homonym by reason of my own North American G. sericeum, Pitt. iii, 172 (1897).

TRELASEL FULLA. Zebrind () pumils, Greene, Pitt. 1 157. This plant, which I, twelve years since, was strongly inclined to make the type of a new geous, certainly falls into Mr. Rose's genus *Trietasan* newly established. It may even be identical with one or the other of the two species recognized by Mr. Rose. But my specimen is not now to be found, nulses at the University of California. SENECIO DENSUS. S. compactus, Rydb. in Mem. Torr. Club. v. 342, long antedated by the S. compactus of Kirk in Trans. New Zealand Inst., xii. 395 (1879).

HIERACIUM TRAILLI. H. Greenii, Britton, Bull. Torr. Club, xx. 120. The eastern H. Greenii, Gray. Dr. Britton probably knew all this; but I think no other botanist will be found of the opinion that Greenii and Greenii are different names.

ABRONIA AMMOPHILA. A. arenaria, Rydb. Fl. Montana, 137 (1900), a name precluded by A. arenaria, Menzies.



Vol. IV.

Part 24.

# PITTONIA.

# A SERIES OF BOTANICAL PAPERS

# EDWARD L. GREENE,

Professor of Bolany in the Catholic University of America,

# WASHINGTON, D. C.

JANUARY, 1901.

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### TARAXACUM IN NORTH AMERICA.

The Dandelions of our vast and varied regions have hitherto received but little attention from botanists. In Gray's Sympotical Flow North America is credited with T. officined, the most common of Old World species and the type of the genus, in five varieties, only one of which was supposed by that author to be peculiar to North America.

At present T. officinale typical is well known to have become naturalized in almost all, even the newly settled portions of our country, while it is a fact more recently recognized, that another fine and well marked Old World species, T. stythrospermum, is thoroughly established all along the Atlantic slope from eastern Canada to Virginia.

Indigenous species will probably be found anticiently numerous, though perhaps only upon western mountain territory; but the herbarium material is at present poor, on the whole, and insufficient for anything more than a tentative elucidation of the genus. Many shocts of specimens exhibit no fruit at all, but only leaves and flowers; and while the outer or adjuvalate involucers seems to present the best array of constant characters for species, the fruit is always necessary.

In my own more recent pergrinations on Tarazacum territory, I have been careful—as every collector of these plants should always be—to obtain the perfectly ripe achenes; and some of the most indisputable of the species here proposed are based on this complete material of my own collecting.

It is greatly to be wished that certain northeast American forms, Nova Scotian, Labradorian, and from the Hudson's

PITTONIA, Vol. IV. Pages 227-242, issued 5 Jan., 1901.

### PITTONIA.

Bay district, several of which are in the Canadian Survey collection in flower only, might be obtained in fruit. At present I dare not attempt a classification of the incomplete, though by no means seanty, material from these parts, as it exists in the great Canadian Herbarium referred to.

From the far northwest the specimens are all more mature, and therefore more successfully dealt with; and from the number of new species which I am already rable to define from not only the northern, but the middle Rocky Mountain regions, it seems that this long articht of elevated country is the center of distribution for *Thrunceum* as indigenous to our continent.

T. CHAMISSONIS. Glabrous throughout, or the scapes tomentose or villous under the involucre: leaves large, of obovate-oblong or broadly oblanceolate outline, obtuse, or mucronately or cuspidately acute, and from lightly runcinate-toothed to more deeply cut into triangular usually entire or sometimes saliently dentate lobes: scapes few, stout, erect, sometimes more than a foot long: involucres of a very dark green, the outer set of bracts in about 3 series, erect and imbricated, from broadly and deltoidly ovate to ovate-lanceolate, commonly abruptly aniculate, rarely some of the inner developing a horn; inner linear-lanceolate not rarely corniculate: achenes of a rather greenish brown, spinulose about the summit, the 3 or 4 angles smooth below the summit, the intervening ribs more or less distinctly low-tuberculate; the beak twice or thrice the length of the achene.

This is the most common Tarazarum of Alaskan and Bering Sea shores and islands. Its most constant peouliarity is that of a very dark-colored, almost blackish, involucro, of which the outer scales are very broad, strictly erect and imbracked.

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### TARAXACUM IN NORTH AMERICA.

 $^{-1}$ T. RUPETER: Small and slender, the seques 4 to 6 inches high and surpressing the rather narrow foliage, herbage glabrous: leaves narrowly oblanceolate in general outlins, actus, from saliently runcinate-toolhed to runcinste-pinnatifid: rather narrow involuces, dark green as in the last, but of very few bracks, those of the calvenites et sacredy biewrid, ovate, ereci, of the inner lance-linear, the innermost with bravd accounts and the low, some of them more or less plaintly corniculate at tip: achenes of notably caneform outline and (transée at the prively summit, the ribs below somewhat distinctly toothed or serrated; stips of pappus a trifle longer than the achenes.

An exclusively British Columbian mountain species, as far as known, the best type, Mr. Macoun's n. 13,111, from an altitude 6,000 feet on Mr. Quoest, where it was found occupying the crevies of rocks. It is n. 15,110 from Kicking Horse Lake is quite the same; and also other excellent specimens by bin were taken at an altitude of 8,000 feet on Mr. Avalanche of the Schlirk Mountains. Distinct from A. *Chamisonis* the ytis avery atopic involucers and alcott pappusatipe, as it is from the next by its dark involucer and slender habit.

< T. OWERN. Dwarf, apparently alpino or subalpine, with large deep root and small leaves and easips, the latter only 2 or 3 inches long and bardy equaling the leaves, tomentoes leaves oblanceolate, obtrue, occasionally quite entire, or at least only obscurely denticulate, more usually quite plainly uncinate-toohde or even coarsely so is bract of involuers for and all remarkably broad, those of the outer and ealyculate double series ovards, with sections, margins and an abrupt short truncets a picelation, those of the inner series alternately lance and outer and ealyculate for the section of the inner series alternately lance the series alternately lance for the source leaves of the outer and easier ones and the section of the source of the sourc

#### PITTONIA.

(the very inmost set) ovate at base by virtue of a broad scarious margin, this usually concelled by the alternating exterior narrower and marginoless bract : achenes muricate at summit, tuberculate along the ribs, the beak or stipe of the pappus short, of less than twice the length of the achene.

On Sheep Mountain, Waterton Lake, Alberta, July, 1895, collected by Mr. John Macoun, n. 11,711. Very distinct from all other alpine species, and approaching European types in the shortness of the stipe of the pappus.

\*/T. LOKERUM. Rather alender, the scapes erect, 4 to 6 inches high af lowering, and even then notably surpassing the foliage; scapes floculent, all other parts glabron: leaves 2 to 4 inches long, consisting of a linear rachislike body and a few pairs of divariants or retrores subulate-linear or falcate lobes; outer brasts of involucre biserial, lanceolate, with dilated tips, erect, the longes three-fourths as long as the innor, these also dilated and corribute: achenes sharply spinulose at the very apace, the sides month, striate or ribbed; sipe of pappus only twice the length of the achene.

Cafion of the Upper Liard, in lat. 60°, north of British Columbia, collected by Mr. Dawson, 26 June, 1887, and numbered 15,116 in the Geol. Surv. Herb. This is all the material seen by me of what is a new species of very peculiar aspect, and pronounced characters of leaf and involuces.

✓ T. DOMETORUM. Large, the crown of the root, or each of its several branches, bearing mostly one stout erect scape a foot high or more, and several upright leaves, some more than a foot long: herbage glabrous, except some traces of arachnoid hairiness along the mildvein benesth in young and growing

### TARAXACUM IN NORTH AMERICA.

foliage: leaves oblancedate, often very broadly so, actith, the margin not deeply but very uncendy and lacinitatly cut, the teeth spreading, seldom at all runcinate: same under the involucer anachoid-homentour: outer bracts in about three series, very large, pale and thin, before the flowering almost equaliting the inner and nearly concealing them, under the mature fruit relativaly shorter, oblong, lancolate, narrowed toward the summit, then again dilated into an ovate (ip: inner bracts narrowly linear-lanceolate, with a dilated no life dip: achieved site of the south of the colate or somewhat muricate; beak thrice the length of the achene.

Common in the northern Rocky Mountain districts from Wyoming to British America, either in open thickets or by streams along their borders, or sometimes in open but moist meadow lands.

The most typical specimens are those of my own collecting along Dale Creck, Wyoning, July 1896. Essentially the same, though much larger plants, are two sheets in the Conadian Survey, both collected by Mr. John Macoun, numely, n. 12,737, from Moose Jaw, Assimiboia, and n. 5,097. from the Cypress Hills, N. W. T. I should also free here Rydberg & Bessey's n. 5,295 (as it is in my set), from the Bridger Mis, Montana, distributed for *I*. letitodown, D.C., though it is not al itypical; its leaves baing too deeply and evenly lobed, its scapes not erect, its outer involuced late. But a plant from Highwood Ms, Montana, by R. S. Williams (n. 434 of my set) is again quite typical *I. dumdram*, though in his *Plora of Montana* Mr. Rydberg has catalogued it as *creatophorum*. But judging from the original and very

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full description by Ledebour, of that Old World type, this Rocky Mountain plant makes no manner of approach to that.

(T. SUTLER. Polings and involuces nearly or quite glabors, the scapes anchoidvillous: leaves narrow, simply and deeply runcinate-pinnatifat, the lobes narrow and actets: scapes many, erect from the very base; outer involucal barels hancolate and obloug-lanceolate, narrowed above, thence widening to a triangular cleft tip; inter ones lanceolate, but with a long linear tip, this occasionally bicorniculate, but more commonly with one of the two horns obselet: achenes muricate at summit, the angles below somewhat serrate or tuberculate; the back barely twice the length of the achene.

Johnson River, Alaska, 27 June, 1899, Capt. E. F. Glenn; the type specimens in the herbarium of the Missouri Botanic Garden.

• T. ANCENTROLING. Glabrous throughout; crown of the root usually much branched and the laws and sagres numerous: leaves depressed, of oblong-linnar outline, 4 to 6 incbes long, 4 b 6 inch wide, obtuses or monetonately sente, from sharply and remotely denticulate to carsely dentate, the testh all simple, opposite, solidor runcinste: seapse rather sender, slightly decumbent, in maturity twice the length of the lawse: involucers rather narrow and fewfowered, their outle bracks few and small, in a single series, or at least searcely biserial, broadly lanceolate to oblong, exect: acheene scheattubeway, neglulossemulicate at summit, smooth and obtusely costate from above the middle to the base; beak about thrive the length of the elenene.

Open subalpine meadows along Dale Creek, Wyoming, 1 July, 1896, collected only by the writer. \* T. ANNOPHICM. A. Nelson in Herb. Stontish, but multicipitous and depresed, the lower and numerous decumbent scapes only 2 or 3 inches long; herbage wholly glabrous: lawas oblong, or spathlate-oblong, acutish, evenly but not strongly runchinate-toolhed; outer involueral bracts in a single and even seanty series, thin and pale, oval to ovade lanceloate, erect; the inner narrowly lanceloate, their tips slightly and somewhat scariously dilated; achenes ditinely though not strongly compressed, of a dark redbrown, muricate at the acute summit, the four principal angles tubervalue below, the intervening ones similar accept as being less prominent; stipe of pappus nearly thrise the lenarth of the achenes.

Collected in the moist grassy valleys of Sand Creak, Wyoming, in good flower and fruit, 31 May, 1900, by Prof. Nelson, and distributed by him under n. 6,987. The species is an oxcellent one, and differs from all other American forms known to me in its dark-red achenes; a point of seeming contact with the Old World *T. explraspermum*, which, now naturalized on the Atlantic coast, is otherwise of very different clamateter.

# NEW OR NOTEWORTHY SPECIES .- XXVIII.

\*Trainternux resux. Two feet high, alender but rigid, lady up to the rather narrow panicle, herbage altogether puberulent and glandular-dotted even to the flowers and achene, except the mostly glandbross and glanduless upper face of the leaflets; these of somewhat triangular outlines, often deeply 3-parted and the divisions trifield, or some almost suppinnately cleft into 5 to 7 obtuse or acutish segments: segals not seen: achenes straight, of meetly elliptic outline, scarcely compressed, very saliently 8 to 10-ribbed and deeply channeled between the ribs, the persistent style and stigma little curved, rather short, barely (or scarcely) on-third the length of the achene.

Type from Stein's Mountain, Oregon, at the head of Wild Horse Creek, by W. C. Cusick, 14 July, 1898; but a sheet of specimens from near Colby, Butte Co., California, by Mrs. Austin, 1896, appears to be the same. Species with peculiarly and beautifully cut foliage; an ally of *T. Fendleri*, though with very different achenes.

\*Runxr miniprices Allied to R alliarismon, not as tail, the elliptic foliage more elongated, the panicle more ample, all the verticils erowded; policels jointed at the very base: railwes of the fruiting ealty: larger, of more rounded outline (from round-ovaite to round-feliold) and obtase, none grainbearing, all reticulate-renulose, the veins becoming obsolved toward the thin margin.

In fields and along river banks at Roswell, New Mexico, 5 August, 1900, F. S. Earle. The real *R. altissimus* has always one valve with a large full grain, one with a rule mentary grain, and the third with no trace of a grain.

<sup>1</sup> RUNK INSPERTS. Allied to R. allieming, but low and sender, very leady, the paricle small, small-function like sender even almost crience of the sender sender sender sender sender of the furthing edgy from quite exactly and sharply deladd to subremiform-delixed, as bread at base as long, and sharply deladd bearing, all distinctly though not strongly renulose, soldom obviously reflectate.

Bottom lands near Bingen, Washington, 31 Oct., 1893, W. N. Suksdorf; the specimens distributed for *R. allissimus*, but the species very distinct.

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### NEW OR NOTEWORTHY SPECIES.

<sup>4</sup> CHEIRANTHUS BAKERI is offered as a substitute name for *C. aridus* of page 198 preceding, the latter being precluded by *C. aridus*, A. Nelson, Bull. Torr. Club, xxvi. 351.

- LAFFULA INFELS. Low, elender, simple or with a few loosely racemose often torious branches, the leaves and leafy bracks of the raceme pilose, no rostet of radical leaves produced: all four nutlets alike, more or less deeply cupulate, the cup surmounted by 6 or 8 larger academ and some smaller ones intervening; ventral portion of nutlet outside the cup muricats, the back plane smooth, or with a few tubercles forming a more or less distinct ridge up and down the middle.

Collected on the Malheur River, eastern Oregon, 20 June, 1898, by Mr. Cusick, and distributed for L oxidentalia, some specimens of which are mixed with the new one in the distribution; on which account the label number (1,945) is useless, and not to be cited as certainly representing Linfelia.

\*ALDCARYA ORTPOCARYA. Low and small, but stottish and somewhat succulant, only 3 or 4 inches high, simple or with one or more ascending branchas from the bass, glabrous: leaves elongated and linear: spikes strict: calyx-segments linear, erect, more than twice the length of the nutlets; these fixed by the bass, erect and straight, of broadly lancolate form, transversely rugose, or the rugge disposed to run together and form meshes, the intervening spaces finely tubereniats.

Cache Valley, Utah, 17 June, 1898, Miss Mulford. Species closely allied to A. stipitata and A. stricta of California, but with good characters.

ALLOCARYA COGNATA. Very slender and reclining, not

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succulent, notably strigose-pubsecent, especially the inflorsecence; lower lawers long and lightlet: recent loose, the fruiting calyces spreading; on short and slender pedicels: nutlets minute, broadly ovate, more or less abruptly acuminate, strongly and irregularly wrichled on the back, in no degree tuberculate, the insertion lateral just above the base.

By the same collector and from the same locality with the preceding, both having been sent me by Miss Mulford on one sheet under the same number (147). This one is an ally of *A. Californica* and *A. scopulorum*.

× SOLDAGO AUROLA. Skems erect, a foot high or more, sparingly leady below, the upper one-half with an interrupted or continuous narrowly thyraiform more or less leady-barced inforescence: bercharge green and glabrous, only the inforescence sparingly scahrous-puberduct; lowest leaves from spatulate-oborate to oblanceolate, and from lightly created to subserrate, the cauline lanceolate, acute, entire, all of comparatively thin texture: bracks of the middle-sized and rather short involucer in about 3 series, from ovate-oblong to oblong and spatulate-oblong, all oblues, carinate-naved, and with thickend green-threadencous tips; corollas of both disk and ray golden-yellow: acheese (immaney appressed-pubseent; pappus fine, hardballac-scabroux.

El Capitan Monntains, southern New Mexico, at about 8,000 feet, in the pine belt, 28 July, 1900, F. S. Earle. A southern homologue of *S. decumbeus*, Greene; differing by its thin foliage, narrow and dense elongated inflorescence, and golden-yellow rather than light-vellow flowers.

COLEOSANTHUS MODESTUS. Stems rigid and subligneous, perhaps suffrutescent, a foot high or more, leafy up to the abot cyrnose paniele of nodding heads: leaves mostly alternate deloid-abucoratas, i to 25 inches long, short-petioled, avenaly crenate-serrate, of firm texture, somewhat soabreilous-puberulent on both faces, the somewhat prominent veins as also the stem densely and more or less glandularpaberulent or pubscent: involvers about 41 lines high, subcompanulate; breate from ovate-oblong and acute to oblong and obluse, sacrious-margined about the summit, strongly 3-nervel; achenes with about 10 seabrellous angles, but these unequally prominent and uneventy distributed, some closely approximate in pairs or threes, others rather widely separated.

Gray's Peak, Lincoln Co., New Mexico, at 6,500 feet, F. S. Earle, 25 July, 1900. A species to be compared with *C. ambigens*, Greene, and *C. Feedleri*, Gray; this last now referred to *Eupatorium*.

<sup>2</sup>OCDORASTING SUPERATION. More herbaceous and less right than the last, also taller, quite as large, the lawrest twice as large, thin, subcordate, acuminate, crenate-serrate, on slender patioles an inch long, variously alternate or opposito or in imperfect whole of three: stem, patioles and value of leaves hirst-pubsecent and visid-glandular: heads in a rather ample large paniele involuces erect, 3 or 4 lines high, short-cylindric; brates from ovate, acute, to oblong, obtas, the innermost linesr, all more or less hirst-celliate; achenes either quite uniformly 10-ribbed or the alternate ribe less prominent.

Salado Cañon, near Gray, New Mexico, 2 Sept., 1900. A species perhaps akin to *C. floribundus* rather than near the last.

<sup>v</sup> COLEOSANTHUS GRACHLIPES. Herbaceous perennial near C. grandiflorus, but less leafy and with much larger slender-

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pedunclel somewhat dropping heads: laves subcordatediolici, 2 inches long, serrate-torohed except at the slender and attennate apical accumination, the petioles less than  $\frac{1}{2}$  inche long; terminal cynose panicle rather naked, the heads solitary or in pairs on elongated slender peduncles and mostly dropping, fully  $\frac{1}{2}$  inch long, the outer ovate bracks andatescuminate, the inner very numerous, thin, lance-linear, acute: achenes slender, subclarate, the ribs setulose-publescuir, pappus deviduous.

Common in the middle Sierra Nevada, California; well represented in Bolander's n. 5000, from Clark's Ranch. The true  $C_{grandifform}$  seems to cear in northern California, and is type from still farther north differs gravity from  $C_{grandifier}$  in having large often subhastate-orate 3-nerrod and doubly servels leaves, together with far more numerous much smaller short-potunded and erect heads. Its achemes are short, quite eviluative, and nuch more settlose.

COLDORARTING FORCINGLING, Herbaccons and allied to generalizona, but the thin long-periodel levels broadly deloid, abrupt's acuminate, exactly creates though coarsely ess, minutely glandular-doted expecially beneath, but glabrous, the stem puberulent: heads in subumbellate clusters of 3 to 7 terminating leafy and suborymbose branches: involucers subcampanulate, less than i inch high, the thinnish brates oblogo-orate and oblogn-kneeolate all acutish, 4-nerved, eliolate: achenes cylindric, pubesecut; pappus deciduous (ss in all near allies of C grandiforma).

Eagle Rock, Barry Co., Missouri, 21 Sept., 1896, B. F. Bush, the specimens distributed for *C. grandiflorus*, from which its deltoid and crenate foliage completely distinguishes it.

\* COLEOSANTHUS UMBELLATUS. Akin to C. grandiflorus.

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equally herbaccous but more rigid and brittle, widdy branching above, schoros-publiculent throughout: laves twice the length of their petioles, 2 to 4 inches long, from subcorlate-licked and long-scenninate to triangular-lancoclate, corresly creants-dentate except at the subtrancate base and the acumination, of firm texture, beneath scabrouspublescent along the veins and minutely resinous-glandular between them, the upper face wholly subcellous and without glands or resin-dost, heads fully § inch high, in umbellate or subumbeliate clusters of 5 to 10 terminating the long and somewhat naked rigid ascending branches: bracts of the involucer thin, all acutish, o-nerved, sardious-mangind, very lightly ciliolate: acheenes rather slender, cylindrie, setulose along the sharp ribs.

Rather common in the mountain districts of northern Arizona; and well marked by its notably subumbellate inflorescence, firm texture, rough pubescence, etc.

CORDORES ANGURATA. Perennial, erect, 2 feet high or more, very elaced, with a terminal corymbose panicle of few and long-peduncich hada: whole plant glabrous: leaves few, opposite, long-peticled, and with one or two pairs of elongated and remote almost fillform entire segments: outer involucer much reduced, of a few ovate or deloid-ovate preading breats; inner of about 8 large ovate-lancolate ones: rays as many, large and aboux, golden-yellow, cuncate-olovate, 3-lobed above the middle, the terminal lobe much larger than the two latent ones: out-line of achenes including the wings (these as broad as the body quadrate-orbicular; rappus a pair of even taked bristles of about one-third the length of the achene, this and its wing as a whole distinct incurved.

Dry pine barrens at Palma Sola, Florida, 16 May, 1900, S. M. Tracy. My label bears the number 6,921. \*Parementry Stransorms. Shrub 5 to 12 feet high stout, much branched: leaves orate-lanceolate, subcordate, acts, from almost entire to repand-dentate, green and only slightly valvety above, hie lower face and the petioles white with a fine and close tomentum: coryrnbose parallel rather dense and many-flowered, its peduncle and pedicels slender, the whole nodding in age.

No. 333 of Townsend & Barber' Chihnahua collection of 1899; also Hartman's No. 248 from Scnora, this distributed as *P. iomentonom*, which is a plant with much broader and orizecous folinge which is coarsaly dentate, and on the lower face reticulatorrogoes. Its panicle is also stortpedmeled and pright. In our plant the leaves in form, venation, and arrangement strongly auggest those of some species of *Dautra*.

PICRADENIA DAVIRGENT. Biennial, exect, modyly less than a foot high, somewhat taskigately branching, the naked pedunclea 7 to 18, and 2 to 4 inches long, these and the branchesstriate, hardly at all pubseent: leaves pinnately cut into 3 to 7 fillorm segments (the basal onces, i.e., these of the first year, not known): heads of middle size for the goung involucentionally unparallate, their ornet-lanceolate outer bracts with notably thickened and indurated base, the inner ones longer, thinner, broadly ovate, pubsecut: achenes densely silky; palaes of the pappus ovate, slenderly acuminate but not aristate.

Clifton, Arizona, June, 1900, Dr. A. Davidson.

ZYGADENUS LONGUS. Slender, scarcely glaucescent, 2 feet high or more, the few and very broadly linear thin leaves almost as long as the loosely racemose scape, marked by about 11 prominent parallel nerves and as many faint intervening lines and marginally faintly scabrous-dentienlate: slender pedicals about 1 to  $1\frac{1}{2}$  inches long, their lanceolate and somewhat green-brakecous bracts not half as long, perianth-segments with round-ovate obtase limb and broad very short claw, the whole greenish-white except as to the white margin.

Banks of streams in the mountains of eastern Oregon, at an altitude of 4,000 to 7,000 feet, collected by W. C. Cusick, and distributed (0. 2,060 with me) as Z. elegans, though of wholly different aspect, and with remarkably broad as well as elongated and thin foliage of a rather bright green rather than glaucescent hue.

<sup>2</sup> Zrokonswa GAGUERYE. Sleeder, searcely glaucescent, a fort high or more, the lawre long, oblancedate-linear, abruptly calloux-pointed, marked by about 5 to 7 prominent nerves, the intervening lines 2 or 3 between each pair: raceme narrow, 10 to 15-6bowerd, the sleeder subserved pedicels 4 to 4 inch long, their bracts about half as long, subulate-lancedate, scarious: segments of the greenish perianth spatnilate-oblong in the justillate plant, broader and very obtase or commonly retures in the staminate, only the inner 3 at all unguienlate, the gland small and not well defined.

Slopes of the Sierra Madre, Chihuahua, Mexico, 1 Oct., 1887, C. G. Pringle (n. 1383 in my sel), labelled Z elegans, but of a perfectly distinct species, with oblanceolate foliage, the plants strictly dioicous as far as seen.
# STUDIES IN THE COMPOSIT A.- VIII.

1. Type of the Bidentideæ.

By the term Bidentidese I would designate a certain group of plants, to my mind a very natural one, of which the genus Bidens is typical. It embraces such other genera as Coreopsis, Cosmos, Thelesperma, Heterosperma and Dahlia; all these and as many more genera very closely allied, are admitted by the conservative Bentham as valid, and made to constitute his subtribe Coreonsideze of the Helianthoideze. I see no marks of real affinity between any of these plants and the true Helianthus allies. By the remarkable characteristics of their double involucre, as well as in important matters of floral structure, they stand entirely aloof, as it seems to me, from all helianthoids. That certain of the latter, Actinomeris and Verbesina for example, have flattened and two-armed achenes, no more necessarily connects the Bidentideze to the Helienthoideze than the same conformation and crowning of the achenes of Boltonia connects either of the aforenamed to the Asteroides. Such empirical taxonomy was in its prime a century and a half ago, when both Actinomeris and Verbesina were included in Bidens, as the asteraceous Boltonia also might have been, if that type had then been known.

The Bidentidee are a group so exceedingly natural that one of Mr. Bentham's most worthy contemporaries proposed to merge the whole group in one genus *Bidens*; a proposition which, as I shall presently show, is fully as logical as that of Mr. Bentham, who himself admits sever! genera for which, according to his criteria, no characters exist. With me the Bidentidee-or Coreopsideee, if one prefer the more usual name-consitute a distinct tribe or subfamily of the Composite.

Apparently the earliest plant of this tick-seed and dablia alliance to be honored with a mention by any botanical author was that homely weed of Europe now known as Bidens tripartita. And while as yet plants were grouped together according to habitat, or uses, or according to resemblances in foliage, this type was always associated with another aquatic herb of similarly three-parted opposite leaves, namely Eupatorium cannabinum, or the genus Cannabing as it was called by some. But as early as the year 1583 Cæsalpinus proposed to separate this aquatic tickseed from the genus Eupatorium and to make it the type of a new genus which he denominated BIDENS. This is the origin of Bidens as a generic proposition; as a genus established upon habit, along with certain characters of flower and fruit; and the type of the genus and of the subfamily is B. tripartita.

# 2. Sketch of the History of BIDENS.

During somewhat more than a half-century after Casalpinus this humble type which he had placed in segarate generic rank under the name of *Bideas* was still, by all the multitude of botanists and botanisel complexes, retained under *Expatorium* as before. Then, toward the end of the seventeenth century, it began to be folt that this was an odd type to be associated with *Expatorium* canadoinum, and its nearcr relation to *Chragenthemum* was suggested; a fitter whichs arggestica a considerable number of authors treated it, and lase some of its congeners then newly brought from America, as species of *Chragenthemum*.

PITTONIA, Vol. IV. Pages 243-284. Issued 26 Jan., 1901.

The worthiness of Cosalpinus to be ranked among the most illustrious of botanists is best attested by the fact that he published a beautiful book-setting forth new principles, and full of new deductions—which the botanical world was not ready to adopt until a hundred years afterwards; and his new genera had to wait from the year 1583 until 1694 before meeting with acceptance.

Tournefort's Eleman, though scarcely more than an enlarged and illustrated edition of Casalpinov modestlyentitled volume De Plantis of a hundred and eleven years before, converted the world almost at once to the true principles of plant classification, and, in its second edition, *Justitionous Rei Harbaria*, became the one great landmark in the history of botanical science. There has never been another book to equal it in its influence for the advancement of systematic botany; nor does it seem possible that its equal as an epoch making treatist can arise in the future.

In both the Elemons and the Institutions of Tournefort Bideas of Cesaphinus is given its place. The number of species included in it by this author is thirteen. Two of them are Cesaphinus' original onces. Five are transferred hither from other nominal genera, and six are proposed as were. But the Eleions of Tournefort embraces a number of species not naturally of this genus; the type species, for sample, of Perebasia and of Adismonria, toth bing technically at agreement with Bideas as to the external charseters of a flattened achore and a binistate pupus.

Vaillant, in 1720, revising the genus under the new and needless name of *Cerotocophalus*, excludes the *Actionmeris* and *Verbesina*, and still has twenty species, among which we recognize a part of the material upon which *Coropsis* was afterwards to be established.

Dillenius, a dozen years later, restored the name Bidens

to the group, and added to it under that name not only some new species now known as belonging to *Coreopsis*, but also the types of *Mélanktara*, which latter plants, it seems strange to say, were not excluded from *Bidess* until as late as the year 1803, by Richard, the author of Michauss' *Flora*,

In 1737 Linneus proposed a new genus Coreopsis, monotypical with him, then, and represented by the Bidens succissofolia of Dillenius, now called Coreopsis lanceolata.

When, however, in 1763 Linneau came to the distributing of the species, he practically abaudoned the original idea of *Goropsis*, and could only maintain the genus by relegating to it all the so-called *Bideau* species having more or less econspicuous ray-dowers, retaining in *Bideas* these which he had attributed discoid, or rayless, heads. In thus cutting the knot, he was undatured by the fact that by drawing the line at the presence of ray-flowers, he was obliged to place *Bideas exerus* that in *Bideas*, the other half in *Goropsis*, where the radiate state of the species is made to figure as *Corropsin Bideas*.

Before the end of the eighteenth century there were two proposals made to divide Bidma, one by Neecher in 1709, and another by Moench in 1794. Neeker retains the Vipical Bidma, i.e., the type having simple or tripartile leaves, flattened achenes and a two- to four-awned pappus, assigning it the new, and certainly more appropriate, name of Pioridons, while for the group having a more dissected foliage, tetragonal achenes, and an almost always fourawned pappus, he proposes the generic name Educaria. Moench's idea was the same jo the left the old type under the name of Bidma and Account and the same Same Same A about the same time, and upon a type sareardy different from that of Educaria and Kenere Cavanilles established Gemose; and this last has been excepted everywhere, while the equally good and perhaps too nearly equivalent Eduarsia has been as universally ignored.

To the consideration of this point in the history of the classification of the group I shall return later.

# 3. Identity of BIDENS FRONDOSA, Linn.

Introductorily to the discussion of this question must be given a sketch of the all important pre-Linnean bibliography of the species.

## B. FRONDOSA, Linn.

<sup>1</sup>Eupatorium Canadense, flore luteo, H. R. Par. (1661).

Chrysanthemum cannabinum Americanum, Moris. H. R. Bles. (1635).

C. cannabinum bidens Americanum caule erecto firmo subrubente, Moris. Hist. iii. 17 (1699).

Bidens Canadensis latifolia flore luteo, Tourn. Elem. 367 (1694), also Inst. 462 (1700).

Ceratocephalus tripteris et pentapteris folio, flore luteo discoide, Americanus, Vaill. Men. Acad. 327 (1720).

In the flors of North America, the nearest approach to B. rispariti, but type-paperies of the genus, is made in this familiar B. frondose. Equally with its Old World homologue does our plant typify the Candollean section or subgenus Platyarpae, of which the most salient characteristics are the flattened and more or less obovate acheenes, never either contracted or dilated at summit, and merely twoeloged and two-waved. But this B, frondosa, at least as to the definition given it by authors in general during almost the whole of the insideenth resultry, is an aggregate of at

<sup>1</sup>Neither the anonymous folio, Hortus Regius Parisiensis, nor Morison's Hortus Regius Elesensis has been seen by me, and the citations are here taken upon the authority of Tournefort,

### STUDIES IN THE COMPOSITÆ.

least two very distinct species. The most important segregate from it was proposed by myself in July, 1899, under the name of B. vulgata; while a few weeks later, Mr. Wiegand of Cornell University, having attempted the same segregation, gave out a good description of the true B. frondosa under the new name of B. melanocarpa, at the same time characterizing as B. frondosa what is almost if not precisely my new B. vulgata. The writer says : "" Considerable difficulty has been experienced in deciding whether Linnæus' plant was of this species or the preceding." And when Linnæus' account of the plant is referred to as being "the original description" we appreciate the difficulty; and from that initial point we judge it to be altogether insuperable. From that brief diagnosis which Linnaus constructed, there would be no deciding which of several species he had in view; and so we may be glad that it is not "the original description." But the earlier descriptions, to which his bibliography of the species gives a clew, may help us to a conclusion. Let us examine some of them. And the examination may illustrate some of the difficulties, not, however, insuperable, incident to a full interpretation of Linnæus and pre-Linnæan authors.

From that earliest appellation, "Expatorium Canadeness, fore luto," of the Horker Regime Parkinesis not much light seems likely, at first thought, to be gained as to what Bidms frondoes ought to be. It carries us back to the time when the three or four species of the genus known were all considered as Expatoriums; allies of Z. canadbium. Why was this one designated as yellow-flowered? I twas always placed next to B. trippartia, as nearly related to that; yet B. trippartia, though its minute disk-corollas are yelllowish, was nerve, either as Suppatorium or as Bidma,

<sup>1</sup> Bull. Torr. Club, xxvi, 409.

described as flore luteo. It is a fact, after all, very seriously to be considered, that when the predestined B. frondosa first appeared in European botanic gardens, and while as yet no other plant but the native B. tripartita was there with which to compare it, the American one was described as yellow-flowered, while the native one had never been so designated. Of course, the Bidens "flower," with not only the earlier authors, but with Linnæus as well, was the head, including the double involucre, the outer member of which was called the calyx. Now B. melanocarpa of Mr. Wiegand is admitted to exhibit vellow ravs, and those quite copiously at earliest flowering; and I have often observed that all through its flowering period, even when rayless, the bracts of the inner involucre almost glow with a coppery or brownish vellow. But B. tripartita is ravless, and its involucres are said to be of a dark, reddish brown. It would not, therefore, have been described as flore luteo. No more would my B. vulgata have been so designated, for its involucres are green, it has no rays, and even its diskcorollas are only "pale-yellow," as Mr. Wiegand himself says, in describing it as "B. frondosa."

Again: it was owing to the yellow coloring of the head yellow its ato involuces, yellow as to small rays and deepyellow disk—that the predentiand *B*, frondos was early transferred to *Chrayantheanam*, a fate which did not beful the rayless *B* trajentia until much later, and after it had been realized that all of them, radiate or rayless, belonged in the same genus, and naturel conservation prevented either the establishment of a new genus or the restoring of the then long forgotten *Bidens*.

It is in Morison's Plantarum Historia Oxoniensis that one meets with the earliest full and satisfactory descriptions of species of Bidens. They are still so few-only five in all-

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that in describing them he gives a very full diagnosis of the type-species, and then compares with it, in very few words, those nearest to it. They are all, with him, species of Chrysanthemum. The description of B. tripartita occupies twelve lines across a wide folio page. This is a type, even among groups of so-called Chrysanthemum. Next to it he places the American species in question, only briefly indicating the points wherein it differs from the others. It is said to be both taller and stouter, the stems more red. Its achenes, according to him, differ from those of the other only in being larger. He has, however, described those of B. tripartita as being black; therefore by the surest of inferences in the predestined B. frondosa he found them black; just the character which suggested the name for Mr. Wiegand's B. melanocarpa. It can not be believed, by one who has read this page by Morison, that if the plant then cultivated in Old World botanic gardeus had had the olivegreen or even vellowish-green achenes of my B. vulgata, (B. frondosa, Wiegand), this most discriminating student of plants would have failed to set this down as one of the characters by which it may be distinguished from B. tripartita, the "seeds" of which he says are black.

Again: no mention is made by Morison or any other early or late author of any disparity between B. triparita, and B fromdom as to the size of the heads. They are therefore to be concluded as quite alike, or at least apprortmatch so, in the two, as regardly size; and actually there is no appreciable average difference of size between the heads of *Lriparitia* and *B-melanoscorps*; for and so we have a third strong character for establishing identity between the original B. *Formloss* and B-melanoscorps; for in B-melanet here are constantly of twice or thrice the size of these of the other wor. One of the marks of B-melanet, as I midlated in the

diagnosis, is its fastigate branching, by virtue of which the full-grown plant is more or less approximately flat-topped, none of the branches being horizontally directed, but all strongly ascending. And I have not sought in vain for a mention of the mode of branching of *B. frondow* by early whites. Phillip Miller, in the year 1750, speaks of the plant familiarly, after having grown it for many years, as "sending out many horizontal branches", a mother most decided testimony in favor of the freely and wildly branches.

So then, the *B*, frondom of Linneura, according to the testimony of a long line of descriptive witnesses, had the following four clear marks of identity with what has now been called a new *B*. madmourps: (1) Its branching was periodically (2) Its heads were role notably larger than, nor different in appearance that it was early called a *Companife*mum; (3) Its heads were not notably larger than, nor different in form from, those of *B*. triperitia; (4) Its acheves were black, or nearly so. It none of these points is my *R*. wignat at agreement with this actual *B*, frondom of sevententh and eightenth century authors; therefore it must be that real segregate, which was so long awaiting recognition.

As to Mr. Wiegand's variety, which I may designate as N udgata are, puberda, I have seen and collected it more than once, as often wondering if it might not prove specifically distinct, but have not yet found characters to warrant the proposition. I can not but asspect, from the comparative searcity of B. udgata at the East, that it came originally from the prairie States, and is not indigenous with us here. Its habitat in the vicinity of Washington is cultivated ground almost or quite exclusively, which is far from being the case with true B. fromdow.

# 4. Sketch of the History of BIDENS CERNUA, Linn.

This is, typically at least, an Old World species; but it is commonly credited with a very extensive distribution in North America, where it has hitherto been uniformly accredited as indigenous. That anything properly referable to B. corvairs is rative on our Continent I shall by and by call in question. But let me first give some of the older bibliography of the species.

# B. CERNUA, Linn.

Bidens folio non dissecto, Cæsalp. De Plantis, 488, (1583). Eupatorium cannabinum chrysanthemum, Tabern. Ic. 117 (1590).

Cannabinæ aquaticæ similis capitulis nutantibus, C. Baub. Prodr. 138 (1620).

Cannabina acquatica folio non diviso, C. Bauh. Pinax, 321 (1623).

Bidens folio non dissecto, Tourn. Elem. 367 (1694) and Inst. 462 (1700).

Eupatorium cannabinum chrysanthemum, Barrelier, Ic. 1209 (1714).

Ceratocephalus persics foliis, flore luteo radiato, Vaill. Mem. Acad. 326 (1720).

Bidens foliis longe ellipticis, serratis, indivisis, Haller, Helv. 710 (1742).

The above is a mere selection of the more important references to this plant by authors from Casalpinus down to the time when Linnaus named it *Bideau cervus*, a period of about one hundred and seventy years. It was not until some time after Linnaus that any record was made of the occurrence of this species, or any cervuous *Bideau* at all, in Marcica. In so far as 1 can association, in 18003, makes the first mention of "*B. cernus*" as inhabiting North America as well as Europe. His account of the species in general concludes with the note that it is native to Europe and North America. Then in a subsequent note, namely, under the exclusively American species, *B. chrysonthemologe*, he says: "*Bidem cernus*, with its varieties, *I* also have from North America." Parsh a few years later confirms *B.* ermus as common in our country; and since then all our authors have accepted it. Before proceeding to discuss the question of our having *B. cernus* in America, I'wish to call attention to certain marked peculiarities of this particular type of *Bides*.

Habitally these species diverge from the most genuine Bides in that they are lower in starrs, storter and luckined to be succellent, as well as very leafy with undivided often connate leaves. Their zay-flowers when present are wrice as numerous as in the typical group; and their achenes are strictly considern outline, being widest, and even very emphatically so, just at the summit, thence tapering to the base. Such characters of flower and fruit would warrant the recognition of a genus if the habital peculiarity of the Bideas as to their achenes. In view of these so nearly perfect connecting links between the two groups, I should not venture to propose *B. errors* as the type of a genus.

# 5. American Analogues of BIDENS CERNUA, Linn.

After careful and repeated comparisons made between European and American specimens of so-called *B. cernus*, T acknowledge inability to detect any strong technical characters upon which to separate them. Nevertheless they are

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so different in aspect, even as seen in the herbarium, that I can no longer doubt that they are allogether distinct. This difference is so pronounced, even upon the face of dry material, that I imagine any botanist familiar with ours, on being introduces to the Oid World plant alive and fresh, would be forced to admit that he had never before seen *B*, erema. I shall not attempt an analysis here, of the several marks which combine to give its characteristic *facist* to the Old World plant; but any completent botanist who may care to investigate the case, may do this for himself, if the have access to an herbarium in which both are represented.

In studying our North American cernuous forms, I have become aware of the presence of characters not before observed or mentioned, but upon which it is necessary to propose new species. One of these is marked by singularly long and narrow ray-corollas. Others exhibit such characters of achene and awns as it is impossible not to interpret as of specific import; for example, the achenes in one are black and smooth, in another brown or greenish and strongly striate. While in some the achene is compressed and with only two of the angles prominent and retrorse-barbed, in others it is more evenly four-angled and with all the angles barbed. Again, the angles are suberous-thickened in some, in others not at all so; and the awns themselves, as to their relative, and also as to their absolute proportions, their texture and their color, are very different in plants of different habit and diverse geographical range.

The varieties proposed by Mr. Wiegand are such aggregates of true species, some of them most excellent, that I am obliged to decline attempting to perpetuate the varietal name in either case. And this I can do with the best of good conscience since I have always denield that there is any obligation to elevate varietal names to specific rank when the varieties themselves are thus promoted. • B. EXEMANS. Stems a foot high, elevder, sparingly branched from above the middle testes; glabrous; red-purple: leaves narrowly lanceolate, about 3 inches long and with seldom more than 3 pairs of test, hitses have that salient: hands of middle size, strongly cermions on slender and notably elongated pedindles: onter bracts of involvere greatly reduced, not as long as the inner, spreading or deficient in involvent larets and golden-yellow; 10-enverts! disk corollas with slender tube, short unceolate throat and long test for segments, the latter crect: achenes of the outer series 4-angled and -awned, of the inners 3-awned, the angles not cartifications. It is chosed, retrorsely accellent like the awns, the surface greenish brown and rather coarsely striate.

Known to me only as collected near Northwest, Norfolk Co., Va., 8 Nov., 1898, by Mr. T. H. Kearney, whose specimens are in the U.S. Herbarium. The species is beautifully marked by its singularly long golden-yellow rather narrow rays. The habit, the foliage, and the achenes are all characteristic.

(B. trouss. Two feet high, slender, fracly loady and an wirdly branching, the schwarzs star and branches green and stricture marrowly lanceolate leaves 3 to 5 inches long, widely apreading, highly and not very closely serrate toothed: heads slender-polenoided and notding: bracts of outer involuces apatulate, serrolate, exceeding these of the inner series but hardly equality the 7 to 10 large and bracat hrighly-glow rays: disk-corollas with long tube and much shorter limb, the latter much sarprased by the tube of long blackiah anthers: achenes blackiah, narrowly obovatezenniciform, marginies, all bot the outermest merely

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2-edged and -awned, the awns with soft and slender retrose aculeæ, the edges of the achene below them similarly retrorseciliate.

This is a stillingly handsome and rather large species, probably common in such marshes of Maryland and Virginia as skirt the estimaties of the Potemae River. The type of Marshall Hall, Md, 28 Sept, 1898. We both remarked at the time that this war quite a new aspect of *B. cornus*, as exhibiting a dark-boven disk, this being due to the longprotruded anther-tubes, in allusion to which peculiarity, as accompanying cermons heads. I have assigned the specific name. The rays are about twice as large as in those more northerly plants that exhibit notdling heads

VB. GRACILENTA. Slender, simple, 1 to 2 feet high, rather closely corymbose at summit: the stems purplish, scabrous, terete, not striate: leaves narrowly lanceolate, 2 or 3 inches long, about equalling the internodes, lightly and rather remotely servate : bracts of outer involucre small and reflexed. not as long as those of the broad inner set, these and the chaff of the receptacle more than usually yellow and petaloid: disk-corollas with long tube and short campanulate limb: achenes of very distinctly cuneiform outline, short, black and shining, compressed-trigonous and -tetragonous, none of the angles corky or cartilaginous, but the two principal ones when viewed from the side appearing obtusely somewhat repand-toothed, each hair or bristle of such margin arising from a tubercular elevation ; awns 3 or 4, very stout and rigid, not very unequal, the longest more than half as long as the achene.

Near Minneapolis, Minnesota, 23 Sept., 1891, Sandberg, n. 985. A species very well marked in habit, as well as in

the beautiful characters of the achene. Few if any American species are so much like B, cornua in mode of growth; yet it is perhaps one of the last which I should think of referring to that, in view of the difference in the achenes.

vB. CILGLATA. Stotish, erect, simple, a fost high, corymeboely oligoenhalosa at summit, the teret sem glabrous: leaves divaricately spreading, 3 inches long, narrowly hansa and the substitution of the sentence of the se

This species, exceedingly well marked both as to foliage and fruit, I have seen only in the U.S. Herbarium. The specimens were collected by A. H. Crozier at Graud Rapids, Michigan, 1 Sept., 1886.

4 B. PRONOVERTILL. Rather slender, a foot high or more, branching from the base, subjectus/pabecent: largest from almost linear to narrowly linear-lanceolate and elliptic-lanceolate, rather deeply and sharply serrato, 24 to 4 inches Iong, sessilo but searchy connates: heads on long and slender maked or bibracteato peduncies, hemispherical; bracts of other involvers spreading, small, sleddom surgrassing the raysy; these numerous, 10 to 15, rather short, lightrydlow; disk-corollas short, the tube and short subsyllaride in imb nearly equal: achenes narrowly obovate-cuneiform, greeniah, strongly striate, the angles elevated but not corky, sparsely awned with yellow aculcole; pappusawns 3 or 4, yellow and stout-prickly, not very unequal, the longest half as long as the achene.

This is another boreal plant, and one with foliage somewhat like that for true *R*. ensues, though much narrower, and the habit is quite different. The most typical specimeses are the Canadian Survey n. 12,055, from the River Moirs, Ontario, Macoun, 14 Sept. 1877, and n. 12,049, from Moskeg Fland, Lake Winninge, 11 Aug., 1884. Also 12,052, of Drummond's n. e23) seems the same.

(B. HYPERHONEA. Erect, slander, simple and monocephalos, only 4 to 7 inches high and with 3 or 4 pairs of laves these in general oblanceolate, nearly or quite entire: iteminal head on a slender poduncle about as long as the subtending pair of laves, campanolate, outer bracks oblong, rather few, not Writoly spreading, surpassing the lead: inner series yellow marked with many dark lines: mys none; chaff of receptacle remarkably large and petaloid, obtuse, surpassing the disk-corollan and even the awns of the achene; the achene itself narrowly linear-cunsiform, brownish, strongly strink, out suberours margined, the two pairs of awns notably unequal, the longer of rather more than half the length of the achene.

A small and simple subaquatic species, obtained by Mr J. M. Macoun at Rupert House, James' Bay, 5 Sept. 1885, n. 12,056. The plants might have passed for a possible depauperate state of some larger species, but that the chaff of the receptacle is developed in the petaloid direction quite beyond what is seen in any others, and the acheens have

also their marked characters. The specimens do not show cernuous heads; yet Mr. Macoun labelled them B. cernua.

-B antressens. Stort, often freely and widely branched, 10 & 21 fest high glabrox, the torets storn glucoscent, its intermodes short and foliage ample: leaves elliptic-lancedlate, the largest 4 to 6 inches long, closely striate-nerval between midnerve and margin and as closely serrate: heads large, hemispherical: outer involvers surpussing the avys; these many (cossionally wanning): disk-corollas exceeding the awas, their tube longer than the short cylindrie limb; acheems mostly 4 angled and 4-waved, the angles more or less corky, the main ones also tuberculate under each hairs.

In soft as I can recognize it in the harbarium this is peculiar to the western monatoni districts and the plains adjacent, but beginning in Kanasa, perhaps in Missouri. The following specimens may be cited. Kanasa, Saline Go, Mark White, 1898; Pratt Co, Carleton, 1891; Kiowa Co, L. F. Ward, 1897; Atchison Co, Holtchock, 1896 (n. 750). Colorado, H. G, Smith, 1888. Wyoming, A. Nelson, 1892 (in 101). Utah, Kingeton, M. E. Jones, 1894 (n. 5978). The species forms some part of Mr. Wiegand's *B. cernus*, *var. elliptica*.

<sup>4</sup> B. DOWGOUPTLLA. Taller than the last, often 3 or 4 feet high, less branches and the branches ascending; leaves larger, often 6 or 8 inches long, thinner, more exactly lanceolate, more remotely series and less notably striktveiny; stem green, not glancescent, sometimes a little subrous; bracts of outer involucer sumay, ollong, about as long as the rays, these golden-yellow; disk-corollas surpassing the awars: achenes mostly 4-awared, the principle angles slightly corky, not tuberculate, the lesser ones represented by a slight and even not hairy suberous line; awns of half the length of the achene, notably unequal.

Species inhabiling Oregon and Washington, and represented in the U.S. Herb. by Casick's n. 1,408, Elmers n. 1,247, Saksdorf's 932 and 1,592, and by n. 592 of Kirk Whited. Thus it will be seen to form also a part of *B. cernua elliptica*. Weigand; prechaps also bis *B. dentata*.

V B. CUSICKII. Seeming perennial from rather slender horizontal rootstocks, yet perhaps only annual: stems 2 feet high, glabrous or setulose-scabrous: thinnish lanceolate leaves widely spreading, slightly connate, coarsely and rather remotely serrate: heads solitary and long-peduncled one terminal and one in the axil of each leaf, the lower peduncles amply leafy-bracted in the middle, the others naked; only the fruiting head nodding, all erect at flowering time : outer involucre ample, spreading, its bracts far surpassing the rays, finely spinulose-serrulate : broad yellow rays 6 or 8, about # inch long, obtuse and with only an obscure suggestion of tridentation: disk-corollas with cylindric tube twice as long as the campanulate limb; achenes elongated and mostly linear-cuneiform, with narrow shortly aculeolate corky margins, and strongly striate between them; pappus of mostly 4 rather short and slender awns of a vellow color like the margins of the achene.

A fine species, known to me only from the eastern borders of Oregon, "Tales of the Grand Rond Valley," Cusick, n. 1,768. J. can not say whether or not this was meant to be included by Mr. Wiegand in his *B. cernua*, var. *elliptica*; but that is unimportant, the species being very distinct from any and all eastern allies.

V B. MACOUNII. Stout, rigidly erect; about 2 feet high, 9035-2

shortly branched from all the axils and of strict habit; terete stems of a quite dark red-purple, scabrous below, glabrous toward the summit; rather broadly lanceolate leaves ascending, sessile by an auriculate base, the auricles overlapping the pair thus appearing as if connate-perfoliate though actually quite distinct, the margins closely but somewhat irregularly serrate-toothed; heads large, short-peduncled, nodding even in flower, nearly hemispherical; outer involucre inconspicuous, the bracts hardly equalling those of the inner set: rays neither numerous nor large, though perhaps always present: disk-corollas with short and subglobose limb about a third as long as the tube, the anthers conspicuously exserted : achenes elongated and of linear-cuneiform outline, 4-angled and 4-awned, the retrorse aculeolæ, or rather hairs, all slender, about equally so upon the awns and down the four angles of the nevertheless much compressed chestnut-brown and striate achene ; the not very unequal and rather slender yellow awns of one-third the length of the achene.

Å species of quite peculiar aspect among the others, in some way suggestive of true B, cernar, but the pairs of ascending leaves with broad overlapping anrieles, and the ascending or subservet about monocephalous branches bring it also into strong contrast with that species. It is known to me only in n.457 of the Herb, Canad. Surv., and was collected by Mr. John Macoun, near New Westimmster, B. C., 28 Aug., 1893. Mr. Wiegand included it in his B. cernas aligning.

✓ B. LEFFORDA. Stems widely and dichotomously branching, probably at least 3 or 4 feet high, scabrous throughout though sparsely so: leaves lanceolate, servate with remote short rather salient teeth, acute or acuminate, 3 to 4 inches

long (only the upper calline known), sessile, not connaisheads solitary in the forks or potuneis 4 to 8 inches long, these naked, or with a pair of leaves below the middles outer involuers of oblong-linear oblates serialish bracks of twice or thrice the length of the brad low-benispherical head: rays 5 to 8, small for the head and inconspicuous, deep-ycilow futing whithis: I discorollas very short, the tube and limb of about equal length: nehenes also very hort, narrow-turinate, 4-angle and 4-award, less compressed than in related precise, the angles somewhat subersous-thickened, tuberculate under the retrores hairs; awras stout, of about half the length of the achene, more rigidly aculoalate.

In ditches at Brandon, Manitoba, 29 July, 1806, John Macoun, 1.2,180. A plant which, at first view, by its broad low head and small rays, suggested the north Eurone *B. platopola*, and D became suspicious of that as possibly introduced into Manitoba; but the further observation that the specimens in hand were mere branches of what must be a very large and mak ditch weed, and of remarkshyl dichotomous branching, removed all such apprechamion.

∨ B. RUPARLA, Low, simple or sparingly branched, only 4 to 6 inches high, the stars glabrons, striatic leaves lanceolate, 14 to 21 inches long, remotely appressed-extratic: brands large for the plant, campanulate: outer involucer foliaccoux, far aurpassing the inner and the flowers, the bracts elliptical, spinulose-serrate: rays none; disk-corollas minute, the shearder tube and short-gylabric or subclavate limb of equal length, the latter 4-toothed, greenish-yellow, marked for its whole length with 4 black lime: a dense successtre uncest, compressed-trigonous, the two margins cartilaginous-thickened and retroscely but remotely hispid, the two longer and metroscely but remotely hispid, the two longer and

stouter awns of more than half the length of the achene and slenderly retrorse aculeolate, the third awn, always present, two-thirds as long as the others.

On wet banks, in Jackson Co., Missouri, 30 Oct. 1893, E. F. Bash, n. 164. The species remarkable as combining almost the aspect of a dwarf simple-leaved *B. formdos*, with the character of the *B. corma group* as to the achiences. The bands, as seen in the dry, are not obviously nodding; but that they were so when living is evinced by the fact that Mr. Bush, who collected the specimens, distributed them for those of rayles *B. corma*.

<sup>4</sup> B. MARDINATA. Low and decumbent, branched from the bases, 8 to 6 inches high, glabrours below, parsety rough-pubescent aboves: leaves almost linear, 1 to 2 inches long, sessile but not connate, widely spreading, dightly serratetoothed: heads many, short-peduneled, strongly cernours, large for the plant, hemispherical; outer bracks exceeding the inner, oblong-linear, entire; inner dark-brown by many closely contiguous dark lines, but with conspicuous brightyellow margins: rays few and small; disk-corollas with tube and limb about equal; a leaves smooth, shing, and of a dark red-parple, compressed-quadrangular, none of the angles corky or it any wise thickened, the two principal ones delicately retross-cancelolate; awas 4, nearly equal, slender, yellow, delicately acutosita.

Near Salmon, Idaho, 31 Aug., 1895, L. F. Henderson (n. 3,855), distributed for *B. cernua*, and indeed very strictly of this group, though with beautiful specific characters.

6. Segregates of BIDENS CHRYSANTHEMOIDES, Michx.

This name, together with its synomym *B. lavis*, ill-advisedly made some years ago, embraces a considerable diversity

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of plants inhabiling each its own section of U. S. territory and of adjacent Canada and Mexico: but the segregates that may easily be established do not seem to be as numerous as in the case of the aggregate *B. cervas*; and in an attempt to make out the species, and assign them names, one encounters difficulty in ascertaining to what plants certain old names really belong. Where this kind of difficulty amounts to a problem that can not be solved, there is plainly outling to be done but to reject such name allegather, if one is to act rationally and philosophically. A name is not published, if it he ont accompanied by a diagnosis such as enables a competent master of descriptive terminology to identify the species by it.

And who will assort that Lineares' *Hidianthus lawie* can be determined, from the description, either as given by him or implied, to be identical with *Bidens chrysanthemoides*? The answer that there is one herbarium fragment extant beyond the sea that proves it, is but an evasion; for the placing of a specimen in an herbarium, with a name, does not constitute publication. The name *B. lewis* should be discontinued, and will be, by as many as regard reason and use good sense in such a matter.

With Walter (1785) there is found a *Coropsis perfoliate* which, the description itself being duly considered, must be understood as applying to some *Bidma* of this group. It is contact, and with a papus of two awas; it must therefore be some member of the *B. chystamlenoida* aggregate; but to none of the several segregates could it warrantably be applied ; therefore it should be permitted to remain at rest.

It is at best, like most of Walter's names, a nomen seminudum.

Just what one of the several segregates which I might

propose should bear the name B. chrysnuthenoide I can not yet determing, and therefore leave most of the northeastern and Virginian forms out of consideration for the present. The one which I name B. formose, by the fact that its heads are slightly notling in fruit, might have been placed in the B. corsus series, but that its achenes are those of the B.

The several far-western members of the group may be named and defined with less risk of creating synonyma. Yet even here Mr. Wiegand has created difficulties by unfortunate attempts to apply certain early varietal names.

<sup>4</sup> B. rozavoa. Manifestly several feet high, stort and with long interactions, glubrous: leaves elliptic-lanceouts, closely but alightly serate, 2 to 6 inches long: heads large, longpeduceled, erect in flower, slightly nodding in fruit; bracts of outer series far surpassing those of the inner: says 6 to 8, oral, very large and showy, more than an inch long and nearly a half-inch broad, obtuse though abruptly pointed by a small though obvious enspiritube of disk-corolla not slender, much longer than the campanulate limb; achemes fats, 2award, not margined, the fat face bearing seattered retoresly appressed short hairs, the two angles more closely acuelolate.

A remarkably handsome species, with large long-stalked almost dahlia-like heads, which, unless it be a rare plant, should have been better known. I know but a single sheet of specimens, this occurring in the U.S. Herbarium, accompanied by the very magre logend "Bidens chrysenthemoides ; Delaware Co. R."

"B. LEPTOMERIA. Slender and almost simple, 2 to 4 feet high, sparingly leafy, glabrous: leaves narrowly lanceolate,

3 to 6 inches long and about equalling the internoles, evenly and ruher coarsely somewhat appresed-serrate, sessile by a narrow base: pedencles about 5, very slender, mearly a foot long, with or without a pair of leaves in the middle: involuters excet both inflower and fruit, campanulate; onter bracts lanceolate, entire, an inch long and equalled by the broad deep-yellow abrupt scatte rays: disk corollas greatly elongated yet not as long as the 2 or 3 very slender yellow awns, these of more than half the length of the linear-cunsiform chestnut-brown achenes, the angles of the latter minutely and sparsely retrose-briefly.

Eastern Branch Marsh, near Washington, D. C., 7 July, 1878, L. F. Ward.

<sup>6</sup> B.Pannyr. Tall and slender: leaves havely equaling the intermodes, 4 to 6 inches long, lanceolate or subfalents, subservale/callou-denticulate, contracted at base and not connuc: heads in a merely leafy-bracted or even almost naked ferminal eyme, companulate, odding in furit; uotter involarer not equalling the 8 or 10 rays, these about an inchlong. Io-nerved and 3-dentate: tube of disk-corolla twice the length of the campanulate limb: achenes short-sumeithm haft the length or the average and and the short-sumeiand angles retrors-acculoate, the avera short, but of more than haft the length of the alene.

seems, by the geographical limits given by Mr. Wiegand, to form with him a part of *B. Nashii*, from the type of which it is assuredly most distinct.

✓ B. PRESCENCIA. A yard high or more, glabrous, the leaves 3 to 5 inches long and arrayssing the internodes, lancotate, acute, rather finally serrate, narrowed to a short almost petiolar base, not connato or even auricled: heads many, Harge, hemispherical; outer involucer searcely exceeding the inner: rays about 8, obloug, it includes the nerved: disk-corollas with stoutish tube little longer than the subcampanulate limb, the whole quite equalled by the long awas, these 2 only, closely but slenderly acuteolate: acheens not known.

Bradshaw Mountains, Arizona, 23 June, 1892, Mr. Toumey n. 680. Specimens in the U. S. Herbarium.

<sup>1</sup>B. IXPANSA. Stems (or branches?) several feet long, simple very leady, apparently weak and reclining or alleast strongly decumbent, terets, glabrous, glaucescent: leaves 26 v4 inches long, lanceclas and elliptic-lanceholte, very acute, sessile, not connate, cleady and evenly subscrate-deuticulate with small callous teeth, or if more nearly serrate, the teeth still callous-tipped, heads large, on maked or bractel peduncies 2 to 4 inches long: outer involuers inconspicuous, hardy equaling the inner: bracts of the inner copper-colored, lacking the usual close black lineation: rays about 10, goldenycllow, an inche long, 12nerved, very obtasely and lightly z-deutate at apex: diskmoth surpassing the awas, these 2 only, shortly and rigidly acutolate: achee sarely black.

Southern California about San Bernardino, Parish, and at

STUDIES IN THE COMPOSIT.M.

Colon, G. W. Dunn. Only what seem to be long decumbent or redining branches of this interesting plant are seen in the herbaria. The collectors, and botanical residents of southern California have not been intersteld in it, and their helle tall nohling of its habit or dimensions. The heads in size and aboviness of ray emulate those of *B. formosci* of the East. *Mr. Wiegand appears to have referred this to <i>B. Nohli*; through oversight of its peculiar habit and very decided characters. I suspect the root to be perennial.

\*B. KR.LOGOR. Stems several feet high, much branched, very leafy, the branches and pedundes sparsely eadrous or hirsute: lowest and largest leaves 5 to 8 inches long. Inacolate, consensity and somewhat remotely serrate, of notably thin texture, sometimes connate at base, otherwise aureled! heads large, on short leafy branches or peduncles; bracts of outer involuce oblong-linear, twice as long as the inner and widely spreading, the inner closely dark-lineate almost to the margin: mys less conspicuous than in its Pacific coast congener; disk-corollas short, the slender tube twice as long as the campanulate limb: selmes of livegreen, ruther strongly strate, Jasewed and 4-awned, the awas unequal, all slender and slendering actionals.

Plant formerly common along streamlets and margins of lakes in the immediate vicinity of San Francisco new if not wholly extinct, at least the earlier stations all oblierated by the eity's growth; always, until Mr. Wiegand took it up, catalogued as *B. chrogensthemoids*; though the heads are always notding in fruit; and Dr. Torrey, as the lacks of the specimens collected on the Wilke's Expedition, being in his handwriting show, more correctly referred them to *B. correa*, dissipating them as a variety "elatior," which, I suppose to have been a slip of the pen for var. elata, Torr. & Gray. But I do not consider it identical with what Torrey and Gray had in view under that name. Theirs was an Oregonian plant; apparently synonymous with Nuttall's *B. quadriarizata*, var. dentata.

The diagnosis is here drawn up mainly from Kellogg & Harford's n. 437, collected long ago, at Lake Merced, San Francisco.

B. AMPLISSIMA. Stems stout, obtusely angled, strongly striate, very leafy, apparently a yard high or more and dichotomously branched, at least above; leaves 5 to 10 inches long, all except the uppermost deeply and pinnately 3parted, the lateral segments of 1 the size of the terminal one, all of thinnish texture, elliptic-lanceolate and deeply incised or laciniate; the floral simple, somewhat hispid-ciliate at base: bracts of outer involucre 11 to 3 inches long, deeply incised like the foliage, spreading widely and many times surpassing the 10 or more comparatively small rays: diskcorollas very short, greatly surpassed by the awns, and the limb longer than the tube: achenes olive-green and striate, mostly 2-angled and much compressed, some 3-angled: pappus of 2 awns, or 1, or sometimes none at all, always when present retrorsely barbed, but the margins of the awnless achenes with aculeae taking both directions. This is a most remarkable Bidens, known to me only as

This is a most remarkable Bidens, known to me only as collected by Mr. John Maccoun on the Lomas River, Vancouver Island, 12 August, 1887, and distributed under the name B. bullate. I judge it to be gigantic among species of this group; and by its large divided leaves, its exagerated outer involuces, and by the peculiarities of its achenes, it seems to connect with other groups of Bidens, as also with with Corcepts.

### STUDIES IN THE COMPOSITÆ.

Mr. Wiegand's description of his B. dentata reads as if he had included this most remarkable plant under that. But it can not in any reasonable probability have formed a part of Nuttall's B. quadriaristata var. dentata; indeed Mr. Wiegand's diagnosis actually excludes Nutall's plant, the essential character of which is, according to Nuttall, its dentate leaf-margin. But the leaves of B. dentata, Wiegand, are to be either servate or incised or parted, a descriptive phrase which excludes the term dentate. Judging from plants extant in herbaria, such as Mr. Howell's from Sauvie's Island, which come from very near Nutall's station, the true dentata variety of that author is allied to B. cernua by its strongly nodding heads and quadriaristate achenes, and is by far smaller than any of the foregoing new species, and has its leaves commonly nearly dentate, though now and then exhibiting a margin that is between serrate and dentate. Such a plant, inhabiting as this does the seaward slope of Oregon, Washington and British Columbia, can rationally be accepted as in all probability identical with Nuttall's variety dentata ; and there is no other known that can.

This practice of adopting an antiquated varietal name for a proposed new species without taking any pains to make sure of the identity of the old variety and the new species is a most reprehensible one, as tending only to instability instead of stability in names.

I would remark further, that the assuming Nuttli<sup>13</sup> variety draths and Torrey & Gray's variety draths to be one and the same, as is done by Mr. Wiegund, seems quite gratuitous. I schould readily predicit that, if ever it is assertained just what the two plants of old so named are, they will be found to represent each a good species. Both names had much better been left numsel; for by such names nad nonchison would have been less confounded.

Nor, indeed, has any botanist a right to apply any old name where he can not determine from the description what the original plant was.

# 7. Generic Rank for BIDENS BECKH, Torr.

In some particulars nearest of kin to B. chrysanthemoides and its immediate allies stands what has hitherto been known as Bidens Beckii. It is singular, among not only Bidentidem but our American Composite as a whole, in being actually aquatic, as much so as Ranunculus aquatilis. The greater proportion of its foliage is submersed and capillaceously multifid, suggesting no other bidentideous foliage whatsoever, unless we should look upon that of Coreopsis verticillata as being analogous, which it scarcely is. But the few pairs of emersed leaves in this plant recall the foliage of B. chrysanthemoides and its near relatives; and the involucre is more like that of these than of other groups of Bidens species. But the flowers, whether of ray or of disk, have other characters. The rays here are both retuse and notched, instead of being obtuse and entire. In those specimens examined by me in which the rays are best preserved. I find the tip of the ray obcordate but with a distinct short cusp between the two lateral rounded lobes. It is a mode of apical tridentation not otherwise observed by me in this subfamily of composites. The disk-corollas are slender and clavate, as in the group to which B. frondosa belongs.

The achenes, with their not at all compressed or angled but almost terste body, surnounted by the several long stout persistent awns of very great size and prominence, in relation to the essential part of the fruit, are what I consider to be those of an very good genus; and I name it

## MEGALODONTA.

<sup>4</sup> M. BOCKII. Bidem Debili, Torr, PI, N. Y. i, t. 58; Gray, Syn. PI, 298; Britlon & Brown, III, PI, 140, fig. 3900. Solitary hand short-peduacled, the peduacle 1 inch long more or less: breats of outer involuces obouts to oblong, nearly creet, resembling the inner, only of more follaceous texture: rays broad and shorty, about 12.nerred, retuse or almost obcordate at apex and 3-toothed, the acute middle tooth short ethan the obtase interal anes.

Important as characters of the corolla must be they have been almost uterly disregardle here; probably not even investigated. In the original plate, in the New York State Flora, not the least intimation is given of the read of the original the rays of this plant. In the figure given by Briton & Brown, there is some approach made to the truth, for there the ray is shown as reture; but the draftsman, following the vagenet conventionalities as to the indicating of longitudinal nerves, has brought out thres, whereas in the object as it exists, either fresh or dry, there are plainly from elseven to thriteen, all being of transfer quark promisence.

M. NUDATA. Submessed foliage ampler, apparently from than in the last, issa gai to collapse when withdrawn from the water: heads smaller, on almost or quite naked sender polunoles 2 to 4 inches long, the 1 or 2 emersed leaves when present alternate and dediced, dissected or at least potentactoohdei: bracts of outer involucer much smaller than the inner, ligulate and spreading; these of the inner yellowisi: rays oblogationer, 7 to 9-mersed, narrowed and obserrely tridenate at apsc: styles more slender, and more elongeated than in the last: frait not seen.

Apparently altogether distinct from the type-species by

the several characters indicated. I know it only from specimens collected at Lake Saratoga, in the Adirondack Mountains, N. Y., Aug., 1894, by T. F. Allen.

 $^{\prime}$  M ansora. Smaller than either of the foregoing: submersed explications foliage less ample, very thin, promptly collapsing, the emersed leaves rather numerons, more slenderly and peetinately toothed: head small: rays somewhat constate-bolong, with 3 prominent nerves and 3 to 5 much less distinct intermediary ones, the apex acutich, 2 or 3 chotchet: styles short and their branches less acute: awas of the pappus nearly naked, showing only about 5 or 6 aculeolis at the very summit.

Far-western species, known only from Green Lake near Scattle, Washington, where it has been collected in flower by Prof. C. V. Piper.

# 8. Some New Eupatoriaceae.

Among the various geners that have been taken out of the Linnsan Equatorium, it seems to me difficult to name one which is better entitled to stand than De Candoll's Covecurstrux. Dr. Gray, in relation ghe group to Equatorium again, does a serious injustice to its merrite; for he says that, except as to the character of the receptock, which is conical, rather than plane as in all other Expatoria, it does not differ from that other groups of which E aroundiaum is typical. Now, along with the excellent character of the conical receptoches, it has two others all its own. The involance, through consisting of equal bracks, presents them in about three series, while in E aroundiaum and are unisorial. But they are different both in form and in texture, in these two groups; these of *Consolinium* being singularly accuminace, and also of a framess that does not recur in the other group. And there is an excellent character of the pappus witch, in so far as I can find, has been overlooked by vevrybody, even by De Caudolle. The members of the pappus are not expiliary. They are distingly, though alghdly and very gradually dilated at base, and also much firmer and more awn-like than in *Expiterium*. This peeniarity of the pappus, as well as the whole aspect and character of the involucer, and the general habit of all the species, forces upon us the conviction that we have here an assemblage of species much more nearly akin to *Ageratum* than to any phene whatsover of *Expaterium*.

The following species proposed as new are all from the far South and Southwest:

C. VENTLOARD. Evidently very tail, the longer floriferous branches alroset a yard long, the main stem suffratescent, the internotes of both stem and branches 4 to 6 inches long; terets, sparsely puber-lent under a lens, but to the unsided eye appearing glabroux; leaves thin, 2 to 3 or 4 inches long including the short petiod, evate to lanceolate-trigonous, truncate and subhastate at base, hardly acets at pays, rather closely creants-serate, deep green and scaberolous above, pale and white-veiny benesth, all the veins and valuets hairy with divaricately spreading hairs; heads in 1 to 8 peduncled compound cymes at the ends of all the branches: flowers apparently respective, scaberes with a fow resin-globolies at summit: pappus very fine, but the bristles thicker at base.

Species very well marked by its large size and peculiarly elongated very veiny foliage, resembling that of some Stachys. I have it only in Tracy's n. 4,734 from Biloxi, Mississippi, collected 19 Oct., 1898. From the specimens it appears to be a tall plant, with long slender branches that must be trailing, or at least reclining.

C racements. Tall like the last, more leafy, the intermodes shorter, the whole plant, swemingly glabrous, but stem and branches obscurely puberulent: leaves elongated+triangular, or the lower ovate-trigonous, either truncate at base or abrupply tapering to the short peilole, the largest 4 inches long including the peilole, all of very thin torture, not notably veiny, very lightly creases, glabrous beneath and rather copionaly gland-dotted, above glandless and very obscurity and sparsely strigulos: crysmes almost sessile: heads very small : flowers deep red-purple: acheenes sparsely resin-toted throughout.

River Junction, Gadsden Co., Florida, Geo. V. Nash, n. 2572. Very different from the last by its thin-membranaceous deep green veinless foliage which is devoid of indument, but very glandular beneath.

C. STRETATOLICM. Firmly creet, about 2 feet high brancheid almost from the base, a strong forifreuse branch from the axil of each leaf, both stem and branches rather strongly villous: leaves daloid orate, the larger 2 inches long, on petioles of one inch or less, all enacyly creante, the erematures about 12 on each margin, all of thin texture, the upper face green and thinly strigose pubsecant, beneath villous-lineations along the veins and sparsely so between them: heads in compate tymes; involuces brond-campanulate, the flowers short, reddish, or purplish: acheese also short, sharly angled and much olted with resignal brage more slender than usual, indistinctly broader at base, most of the briefles notably tortuons. Known to me only from Indian River, Merriki Jahand, Florida, where it was collected 31 July, 1896, by A. H. Curtiss, and distributed under n. 5,730. An exceedingly well marked species, with villous pubseence, and leaves closely simulating these of eatin pat only in outline and indentation, but also in their softness of texture and pubsecence.

An interesting though perplexing group of Eupatorium species exists in the herbaria under the name of E. ageratoides. the type of which, having been cultivated in Europe long before Linnæus, and more than once figured, is not of difficult identification. But as much can not be said of certain segregates proposed by different authors early in the nineteenth century. Among such are E. urticafolium, Michx., E. Fraseri, Poir., E. ceanothifolium, Ell., and probably also the still earlier E. cordatum and E. odoratum of Walter. In efforts to identify these, and also some like early segregates of E. aromaticum. I have expended much time and toil within the last three years, and I trust with some measure of success. The results of such study may be given at some future day; but at present I shall offer only some names and definitions of species such as I am confident have not hitherto been published, at least in this rank.

E. ELEVENTREFOLUE. Sim 2 to 4 feet high sparsely darkpherelaets, apply leafy to the summit, fordireous branched from the moldle, the branches with 1 or 2 pairs of reduced leaves; all the folinge thin, dark-green, the large leaves 3 to 5 inches long; on petioles of an inch, spreading or ascending, surpassing the intercodes, rulter narrowly subcordateorate, acuminate, mucronulately serrate-toothed, the testh  $\frac{900-3}{2}$ .

continuing half across the subcordate or subtraneate base and numbering about 20 on each side, venation not obvious except beneath, both faces nearly or quite glabrous: cymes lax and involucers narrow, their barcles about 10, thin and nearly glabrous, linear, lightly 2-nerved; flowers about 12; corollas with very slender tube and slightly shorter campanulate limb, segments with for hairs; styles well exserted; acheres oblong/inten, glabrous.

Rich woods about Knoxville, Tenn. A. Ruth, Oct, 1888, n. 715 of my set. Also in the U. S. Herbarium from the same place, 24 Sept., 1894, by S. M. Bain. Its affinities lie with *E ageratoides*. The foliage in this bears much likeness to that of some Asters of the *A. macrophyllus* group.

E. VIBURNIFOLIUM. Slender, 2 or 3 feet high, green and seeming glabrous, but stem and peduncles puberulent: leaves thin, about 2 inches long on slender petioles of 1 inch, the whole much shorter than the internodes, lamina narrowly ovate, usually somewhat rounded at base, evenly and coarsely dentate, the teeth about 7, or occasionally 5 only, to each side, prominently 3-nerved, the nerves and veinlets whitish in contrast with the deep green of the leaf, lower face paler and scaberulous, the upper face and the margins with some scattered stiff hairs : inflorescence borne above the leaves and somewhat naked-panicled : involucres long and narrow as in the last, about 7 to 10-bracted and with a similar number of flowers, the linear bracts somewhat strigose-pubescent, only obscurely striate : corolla-lobes notably hairy at tip; styles not much exserted: slender achenes linear, glabrous

Borders of woods near Knoxville, Tenn., Aug., 1898, collected by A. Ruth (n. 718 of my set), and distributed by him, at my instance, as *E. aromaticum*. Almost the same,

though with a more ample and lax paride of rather narrower heads, was distributed by A. H. Curtis from dry pine barros naer Jacksonville, Florida, (n. 5,339) under the same name; but it is constantly most unlike the true *E coronationa*, and very readily distinguished. The foliage, in outline and toothing, is much like that of *Viburnum dentatum*.

E. ANOUSTATUM. Several feet high, stoutish and rigid, freely and divariately branching from below the middle of the stem, this subtrates glabrons: leaves thinnish, 2t od inches long, orate-lanceolate, acuminate, often subfalence, remodely serrate except at the cunneate base, the not very slender petioles  $\frac{1}{4}$  to  $\frac{1}{4}$  inches long: heads subcorymbuse at the ends of all the branches, the pedicels puberulent; bracts of involucer very sparsely so, linear-spatialite: corollas with tube and funnel/form link of about equal length: styles well exserted: achieves slender, strongly 4 to 6-angled, the angles apt to be scabrons-cilolate.

My specimens of this are from western Louisiana, where they were collected by the late Rev. Father Langlois. They no doubt represent well the *E. ageratoids* ara. angustatum of Gray; but the plant is much more clearly distinct from *E. ageratoids* than that is from *E. ageratoids* than that is from *E. ageratoids* that the start of the start o

E. ADMONDENCE. Two feet high and with many ascending or somewhat spreading leady and forficeous branches, both stem and branches puberulent, the minute hairs white: leaves rather broadly oxts, each or aborphyl samminate, coarsely serrate except across the very abruphly tapering base, thin, de-pergenen with light-colored triple and branching veing, glabrous above, seaberulous beneath: cymes very aborthy peducold and their subtending leaves not much
reduced, the whole inflorescence thus appearing leafy: pedicels strongly puberulent: bracts of involucre more sparsely somewhat pubescent: proper tube of corolia shorter than the campanulate-funnelform limb: styles notably exserted and their tips slender: achenes rather short, black, strongly angled, galaroas.

Sapulpa, Indian Territory, 1 Oct., 1895, B. F. Bush, n. 1440 of my set; labelled *E. ageratoides*, but of different aspect altogether, being much more branching, leafy and floriferous, with firmer foliage and that of different cut

E. REMONALE. Stems 2 to 3 feet high, pubseent below, the flowering branches and pediumoles tomentions: leaves rather thin, delioid-ovate, truncate at base and short-petiolast, be largest 24 inches long by 14 inches brond near the base, coarsely create-serrate, the indentations about 10 to escence an ample and almost macked cymose paniel: braces of involvers conversive this and a alightly uncendual, spatulate-oblong, obtuse hirtellous and cilitate: corollas with sloler tube and campanuluke limb about equal, the tips of the lobes sparsely villous: style branches almost filform and little escented.

Along the borders of woods about Knoxville, Tenn., Aug., 1898, A. Ruth, n. 719, distributed as *E. verbendfolium*, and this by my own too hasty determination. I was miskel by the broad and obtase involueral bracts, and some other points at which it diverges from *E. aromaticam* to which it is nearly related, rather than to *E. verbangfolium*.

E. TRACYL. Rigidly erect, often stoutish, 2 to 4 feet high, amply corymbose-panicled sometimes from below the middle of the stem, this terete, scabro-puberulent, often minutely purple-dotted or streaked: leaves numerous, about equalling the internodes, 1 to 2 inches long, diversitately spreading or somewhat deflexed, of very firm texture, sabrous above, minutely rough pubescent along the veins beneath, generally coarsely but not deeply crenate-toothed: heads very many, rather loosely comes; involuces narrow, only about 10flowered, their linear bracts with long 2 striate body and short thin tips: corollas with lender tube and narrowcampanulate limb about equal: achenes glabrous, black; papus ever fine, eachrous.

Seemingly a very common analogue of *E. aromaticsus* along the coast of the Gulf of Mexiso from western Florida to Louisiana, abundant specimens having been distributed by the late Kev, Fr. Langlois, and by Ford S. M. Traxy; those of this collector being represented by his numbers 6,056, 6,447 and 6,448. It differs from *E. aromaticsus*, its correlative belonging to Virginia and regions northward, by its larger six, more branched and copionaly floriforous growth, but sepecially by its small rigid rough follarge, narrower and newer-flowered involuces, etc. I have duly considered the possibilities of its proving identical with *E.* cordentum Walter, a species to be restored.

E REMALCEN: E copertificition, var.? herbosom, Gray, Pl. Wright, ii: 74. Stems very leafy to the summit, the leaves large, thin, ovate-trigonous, 2 to 3 inches long, nearly 2 inches wide at base, acute, serrate-toolhed, not conspicously veiny: cornes terminal, nearly seale, partly embraced by the uppermost pair of leaves, these being searcly smaller than the others: breats of involver lancelate, in an almost double series, the outer shorter: corollas elongated, thubu-framelorm, searcedy exhibiting distinction

of tube and limb: some of the outer achenes 10-nerved, all setulose-pubescent.

Species apparently not collected except by Charles Wright; misaten by Dr. Gray latterly for the equivalent of his var. Arizonicum, from which it differs very much in general appearance, being much more herbaceous and leafly, and showing a different involucre as well as corollas of quite another form. It habitat is somewhere in eastern New Maxieo or adjacent Taxas. What are probably the original specimens exist in Wright's distribution under n. 1,147.

E ALIZONICUL Suffratescent, 2 feet high, rather widdy branching, the very minutely eacheroluous stem and branches striate-angled: Leaves all opposite, deltoid, 1 to 2 inches long, on petioles of 2 inch, serate-to-to-thed, venulose, eachrous beneath, especially on the veins, otherwise glabrous: gymes dense and short-pedandled: branches filled in 2 somewhat unequal series, rather strongly scaberulous: corolla white or pinkish, the tube shorter than the oblogs abeylindric limb: styles exerted, their branches fillform but with short thick tips: achenes setulose.

Common in the mountains of Arizona and adjacent New Mexico, and forming the chief part of Gray's *E. occidentale* var. *Arizonicum*, but wholly distinct from the real *E. occidentele* by many characters.

# 9. Certain Species of ANTENNARIA.

As the pioneer in research upon the identity of the Gnaphalium plantaginifolium of Linnaus, I have naturally read with interest Prof. Robinson's recent paper discussing some old specimens still preserved in London herbaria'; not, how

RHODORA, iii, II.

ever, as having anticipated that anything decisive about the identity of that plant would be likely to be obtained from such a source. During the whole course of my own studies I could not think of it as worth while to ask my obliging friends of the Linnæan Society, and of the British Museum, to make search and report to me what specimens might be extant there to throw light on the text of Linnæus and his contemporaries. It seemed to me that no specimens but those of Plukenet and of Clavton or Gronovius could be of importance, and even these, of no great moment; for Plukenet's figure is in itself sufficiently indicative of my A. decipiens. I have never doubted that, since I learned to distinguish A. arnoglossa, decipiens and fallaz. But Gronovius seemed to have included under his plantain-leaved species, what I at length named A. arnoglossa: for he has not only Plukenet's White Plantain, but also another which he confuses with it, the foliage of which is said to be "hoary-tomentose beneath." This I have naturally assumed to be my A. arnoglossa; and I should at any time have been curious to see the Claytonian n. 287. It is therefore very interesting to be told, as we are by Prof. Robinson, that the specimen in the British Museum representing Clayton's plant is A. solitaria. There is reason to wish that other specimens of this Claytonian number may be extant; for I can hardly believe the plant actually seen and described by Gronovius to have presented a solitary head. This man was too ardent a disciple of Linnæus, and too complete a master of the Linnæan system of terminology to have allowed himself to describe by the phrase "caule capitato" a plant of the composita which exhibited at the top of its stem only one head. All such composites were everywhere described by Linnæus and his followers, and that until the earlier part of the nineteenth century, as "caule unifloro." In trying to identify

these old composites it must never be forgotten that, in all the old synnaberology, what we of today cell a capitulum was called a flower; that our involuces of the composite was always with them a calvx. It is, therefore, contrary to all reason to suppose that Gronovius had any monocephalous stem in mind, or before his eye, when he wrote the descriptive phrase could capitate; and I am obliged to think that, under Claytor's n. 287 there must have been specimens of some other Antennaria besides that one which is suid to represent A. solitoria, and such as exhibited, along with the glabrous upper face of the lawae, a capitate cluster of beads; or planiby, m A. arconoloson.

As for specimens existing in the Linnaux Herbarium, it must be remarked that such much first be shown to have been type specimens, before any forceful inferences can be drawn from them. It is well known to many of the dissppointed people who have tried, during the last contary, to find in that herbarium evidence upon the identity of species, that the collection was continually being augmented during the quarter-century of Limmus' life after the publication of *k*-Specie Plenterms, that he again and again put into it specimens which he anypool to represent species which he had published on purely biblicarphic data.

That these Astemaric specimens are type specimens no one knows. That they are the identical cases which Linnarus said he had seen, no one knows. May be they are: we may even asy probably they are; but still they are hypothetical evidence in the case, and therefore no real evidence at all. Nor is it, in my view, of any importance that they should be verified, if they can be, as type specitions. Linneave Specie Paratemum is a classic piece of bibliography, and only partially, and often then very ambiguously, of the nature of a mineteenth century descrip-

tive flora based on type-specimens. The ability to identify his species is the ability to succeed in critical and often difficult bibliographic research.

In the case before us, there is nothing in what Prof. Robinson denominates "Linnaue" uncompiled portions of his description," and again, "his own technical description" to indicate anything more than some Antennaria with large ovata radical lawas. It applies equally to any one of a half-dezen species now recognized. His first-tited synonym, that of Gronovics, assures of the intended inclusion, on the part of Linneux, of both the White Plantain, which we may agree to have been A. decipiera, and also another with foliage tomentose only underneath; thin, from its capitateclustered heads, to have been A. aregiora, and an including also, though doubtless unconsciously and by accident, A. solitaria.

And so there are reasons for assuming A emoloses to be entitled to the name A, pleasing/infolia, though perhaps rather more cogent reasons for applying it to either A deépices or A, follar. Still, every one of those applications of that name will be hypothesical. And I, for my part should be willing to retain the name A, plantaging/folia as applied to A, decipient if only Fukenet, the real author of the specific name, were to be credited with i. But the specific name as applied by Linnucs, we call agree, covers a mixture.

Let m<sub>8</sub> in conclusion say, that I have given the name employa, depices and follow, with the ditution turprose of bereafter giving recognition to the name *plantignifolia* only in synonymy. It is a kind of procedure which has been approved in many another case by the best of botaniss, when dealing with such Linnsen aggregates as, like this, formiah no segregate which can be called typical except hypothetically.

I have long neglected to define a certain new Antennaria distributed from Montana by Mr. Rydberg as representing my A. foliacea. I may call this

A OXYMPTILA. Stolous short, densky lenfy with rather small spatial-cobrate and oblance-laite leaves, these densely silky-domentose benesh, less so above: flowering stema a foot high more or less, purplish underneaft a santy investiture of somewhat floceulent or annchnoid silky wool, and this ultimately more or less decidonous : stem-leaves many, as long as those of the stolons but narrow, marrowly oblanceolate to linear, cuspidately acute: corymbs in the pistillate plant rather dense, polycephalous: outer bracts of involucer brownish at base, their white tips short, obtaish, those of the several other series with more clongade tips successively ovate, ovate-lanceolate and linear-lanceolate, all acute and of a rather data white.

Spanish Basin, Gallatin Co., Montana, n. 5,148 of Rydberg & Bessey's 1897 collection. Plant very different from the real *A. foliacea*, the cauline leaves far less ample.



Vol. IV.

Part 25.

# PITTONIA.

# A SERIES OF BOTANICAL PAPERS

#### BY

# EDWARD L. GREENE.

Professor of Bolany in the Catholic University of America,

WASHINGTON, D. C.

OCTOBER, 1901.

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Price, Fifty Cents.

PAYOT, UPHAN & Co., San Francisco: WILLIAN WESLEY & Son, London.

## Some Neglected Violets.

A very considerable number of Canadian species of the division of purple-flowered candiscent violets have been in my herbarium, awaiting critical study, for a number of years. Nearly all of these have been farmished by Mr. J. M. Macoun. To these a few more have been added this season, by Dr. James Fletcher; and the endeavor to report to the latter the numes of the species he has seen, has been made the occasion of a critical survey of this whole group, the known forms of which have for years pash been allowed to be tracted as representing morely a few varieties of the 044 World V. comise; a violet which doubtles has no place in the North American floar; and most of the new ones herein defined, are established upon excellent characters.

V. TUTURATA. Low, stoulish, apparently glabrous, pale and glaucessend, only the margins of the laws and singular exhibiting a few short stiff hairs: leafy stems only two or three inches high, the few pedanceles about as long: lawse ovata, obtase, often with rounded basal lobes and closed sinus, the whole bang, in light but distinctly creates, the blade about an inch long, the petiols somewhat larger; stipules small, obloging-inncolate, inicialy strate, pedundes firmly creet, bibractolate below the middle, the bracelets almost opposite, notably brachescens, spatial-linear, commonly with several seriat testh: sepais broad and obtuse, not searcios margined, 3-nearcet: corolla an inte in length, petals all very broad and ample (for this group), the keel broadset of all, squalling the others in length, obsor-

PITTONIA, Vol. IV. Pages 285-320, issued 30 Sept. 1901.

date by an abrupt and rather deep apical noteh; spur almost as long as the limb, very thick, straight and obtoss. Corrichan River, Vancouver Island, J. R. Anderson, 2 June, 1898; communicated by Mr. Macoun. The species must be a very boastiful none, by its nearly cordate pale foliage, and large bread-patalled flowers. Its large almost lasty and distinctly toothed branetles, simuted low on the peduzele, are a very notable characteristic. My specimens bear the Canadion Survey named 19,912.

V. PETMOPHILA. Turbel stoms ascending, 3 inches high and slender, as are also the pictoles and petuncels; herbage glabrous except a scanty hirsutolous hairiness at and near the margins of the leaves and along the angles of the petidole; leaves subcortace-outs, seldom 7 inches hong, on almost fillform petidoles twice or thrice as long, creasely simples small, incerative-to-thetp petuncele solongate, almost fillform, slenderly bibracteolate near the flower; sepals sublitate-lancolate, corolla sarrowly 1 inch frond; petals narrow, but the keel broadest, equalling the others, obtuse; spor long, narcow, eured doynwards.

Crevices of Rocks, Shawnigan Lake, Vancouver Island, 9 May, 1997, J. R. Anderson, the spocimens communicated by Mr. Macoun. Like V. *twordsda* (Pitt. iii. 316) in habit and leaf-outline, but otherwise quite dissimilar, especially as to pubescence, the small size of the corolla, and the narrow downwardly curved spur.

V. COMPACTA. Dwarf and condensed, the entire plant including the large flowers only 1 or 2 inches high, in appearance acaulaecont, the turked leaves barely  $\frac{1}{2}$  inch long including the petiole, this and the blade of about equal length, the latter round-ovate, obtrase, cremate, sparingly

## SOME NEGLECTED VIOLETS.

hirtellous; peduades rather numerous, minutely hirtellouspoperulent, bibraceloate near (the flower, the bractlets opposite, herbaceous, spatulate-linear; sepala oblong-lancolate, obtuse, not searinous-margined, glabrous: corolla large for the plant, 7 or 8 lines broad; petals consimilar, all with rounded obsvate blade, the keel as large and as long as any; spur prominent but not elongated, thick and obtuse.

This curious dwarf, so perfectly resembling an acaulescent species, was obtained along with  $V_{\rm p}$  drophila, from crevices of rocks about Shawnigan Lake, Vancouver Ialand, by Mr, Anderson; and these two were distributed as if taken for representatives of the same species, under the Canadian Survey number 19:910. But an investigation of the characters renders it impossible to tract the present plait as a dwarf and condensed state, either of V. patrophila or any other species recognized.

V. ANDERDORT. Callescent, the short decumbent stema and elongated pecifies and polumeles stoutish and commonly glabrons, or nearly so: have broadly cordate, 11 inches long and quites sbroad, the earliest number and approaching reinform, all obviously creates, appressed briely-hairy along the veins above, marginally cillolate, nearly or quite glabrons beneath; stipules lanceolate, inclusely toothed: bibractate near the middle but the brates remote; sepala lanceolate, cillolate: cordin a not large for the plant, about § inch long, the petals subequal, or the pair next the keel exceeding it in size; sport shout and thick.

Thetis Lake, British Columbia, 28 April, 1900, collected by Mr. James R. Anderson. Very well marked, as a species of the *camina* group, by its broad-cordate leaves of large size,

and with an indentation more typically crenate than in any of its American allies. The corollas are nearly white in the dry, and may have been light-blue when fresh.

V. ORNOCALES. Size and mode of growth as in the lask, but pedmides and petioles more selender, the lavers thinner and the whole herbage puberulent: laves cordate-orate, obtuse, very lightly and almost obscurely create, not effate, truly puberulent above, beneath rather hirtellous along the veins; stipples small and marrow, sparingly incised; pedmodes bibractoalte at above the middle and the bractlets contiguous: sepais glabrous: corolla more than an inch in diameter, all the petas patulate-boven, the keel much the largest and longest; spur rather short, thick and obtuse.

Mill Hill, British Columbia, 29 April, 1900, J. R. Anderson. Differs altogether from V. Andersonis by its leafoutline and indument, as well as by its larger flowers, with petals of quite other proportions. The specimens both of this and the last preceding were communicated to me by Dr. Fletcher of Ottawa.

V. ALEMENTIKA. Shean low, 2 or 3 incises long, assembling, from a slender simple or banched fibro-ligneous rotatok; herbage hird/lousepiberulent, pedmodes and petioles more densely and somewhat retrorsely hirtellous: leaves from suborbinlar (in the lowest) to round-ovate and deloidovate, obtuss, finely and ovenly creants,  $\frac{1}{2}$  to nearly 1 inch long, on petioles nearly twice as long; sixples lancebake, subplinuately incised toward the base: pedundes quite surpassing the leaves, compriscously bibinecelaties toward the summit, the bractlets opposite, linear: corolla blue,  $\frac{1}{2}$  inch long, the keel petal somewhat shorter than the others, distinctly broader, emarginate or even almost obcordate; spur as long as the blade, abruptly and obliquely acute at the end.

Apparently common to the eastward of the McLeod River, northern Alberta; collected by Mr. W. Spreadborough, June, 1898, and communicated to me by Mr. J. M. Macoun.

V. FILTERS. Near the last, but the proper stem almost obsolets, the leaves and flowers turked at the ends of the flbrour stot-errown or its branches; herbage glabrous; lawrs cordate-oral, the shallow sinus often closed by the overlapping of the rounded basal lobes, obtuse, remotely and obscurely created, a to 1 inch long when young, these of later and fruiting specimens often more than 2 inches long, on almost fillform patiols of 2 to 4 inches: flowers guite surpassing the foliage, and on very slender peduncles; corolla little more than  $\frac{1}{2}$  in a wide, the petal deep purple, all taker narrow, the keel about equalling the others, the spur very long, criticalite, rather narrow, obtuse, curved upwards.

Borders of a meadow in the half desert region of Modoc Co., California, June and July, 1893, Milo S. Baker. Remarkable in this group as being apparently acaulseenci; the peduncles and petioles in the later and fruiting specimens very long and slender, but the proper leaf-bearing stem never obviously developed.

V. CANDERSPOLL Callescent, the numerous slender decumbent or more depresed stars 3 to 6 inches long; leaves small, the subcordate-ovate obtuse minutely eranate blade often merely § inch, seldom § inch long, of firm texture, observely pulveralex-phenotient, the slender peloids about 1 inch long; stipules lanceolate, the lowest serrate clints, the upper nearly entire except toward the base:

slender peduncles little more than an inch long, bibracteolate much above the middle: sepals subulate-lanceolate, glabrous: corolla small, deep-blue; spur elongated, oblique.

In rocky woodland near Aylmer, Quebec, Canada, 6 June, 1901, Dr. J. Fletcher. Allied to the common V. Mublesberginan of the U. S. (now righly or wrongly called V. Labradorica), but easily distinct by its small, thick and somewhat fileshy foling a laways of ovate outline and obtaus; the flowers not half as large, much more deeply colored, and with a different spar.

V. nerroscenne. Root long and deep, with short branched erown or candex, the proper stema at time of pathiferous flowering not developed, the large long-patilode foliage quite arraysming all the flowers, in outline from subcondate-datoid to colate-owner, 1 to 2 inches long and ‡ to 1 inches brack, the sinus brond and open, the margin unarendy arcnats, patholes of the largest 3 inches long or more, the whole berbags more or less litefallous and this hairiness retrons when occurring on the petioles and pedandes; the latter bibracteolate, at about the middle: sepals subalate-lanceolate, acuts, often puberulent: corolla about 10 lines long, pale-violet or biblish, pathar rather marrow, the keel as long as the others and rather broader: stems devel oping in summer to the length of 2 or 3 inches, and bearing numerous small apstalous flowers, these succeeded by short ovoid capsules.

A plant of southern Colorado finst known to me in some autunnal specimens collected by myself in exsicated bog land near Cimarron, 1866. Similar specimens were distribtued from near Mances, by Baker, Earle and Tracy, in 1893, under number 116. Others, also late and only in fruit, were distributed by Mr. Baker, from Pagosa Springs in 1899, Lastly, excellent flowering specimens are now at hand from Mr. Baker from two localities near Cimarron, to be distributed by him later, under numbers 68 and 144 of his plants of the Gunnison region of the year 1901.

V. UNOUTCITATA. Size of the last, but leafy stem well developed at earliest flowering, the pedundes short, not excoeding the leaves; herbage much more pubsecent, even quite hirthlous throughout; leaves much smaller, only the lowest rounded and subcordate, these little more than 1 inch long and brond, the others of more val outline, very obtain a both ends, or some tapering to the peilols: pedundes 11 inches long, bibracetolate near the flower; the branchotes linear, elongated and competences: sepals lanceslate, acuminate: corolla little more than 1 inch long, the peilols peilols marrow, curved upwards, ending in a very narrow class-like curved appendange.

Known only in a single specimen collected by the writer nearly a quarter of a century ago, in the Greenhorn Mountains, Southern Colorado; very interesting on account of the slender claw-like hollow appendage terminating the proper spur.

V. nescarronys. Allied to the last two, rather more strongly hirdiness throughout, ialler, the lasty steams well developed at early flowering, often 5 to 7 inches high and ascending or subsered: lawses somewhat delitoid-ovate, acutish, mody 1 to 14 inches long, rather observely crehateserrate and notably veiney, quile distinctly excellate at the rounded hass when young, and more or less obviously so even in matarity; stipules lanceolate, with a few lacerate test; pedundes filtorm, none from amid the long-petiold basal lawses, all from the axils above, 2 inches long, almost or altogether glaboros, bibraccelate very near the flowr, and the linear bracts long: sepals narrow-lanceolate, glabrous, 1-nerved, in age almost carinately so: corolla little more than § inch long, petals subequal, all narrow, almost oblong: spur elongated, rather slender, cylindric, acute at the unper side at the end.

In the Star Valley meadow lands in the midst of the desert region of middle Nevada, at the foothills back of Desth, 19 July, 1866, collected by the writer. The spuries makes some approach to that of the Pacific Coast V. aduaca, in which that organ is more distinctly hooked, and with a sharper angle at the end, on the upper side.

V. BRILDEPOLL. A funded dwarf, the whole plant barely 2 inches high, appearing as if aculescent, the lafy stem undeveloped; herbage glabrous, slightly fleshy; lawes longpetioled, the subcontate-orate, orate and oral blacks near § inch long, subentiv or slightly and for their size coarsely constant exceeding the lawes, bratetolate above the middle: spals obloghtlencolata, conta, nerviews: corolla less than § hong, strongly modding, the long curved spur as strongly according.

I would indicate as the type of this Colorado species, Backer, Earle and Prency'n ... 287, from a mossy bog in Silde Rock Cafion, west of Mi. Hesperus, 2 July, 1898. Their n. 221, from the Bacz Creek Divide, is even more dwarf, and grew on driver ground. It boars, however, about the same foliage and the same flower, and can hardly be specifically different. Number 166 of the same collection, though much larger, and less acaulescent, may also be specifically identical.

Continued study and comparison of acaulescent purple-

flowered violets from various localities, chiefly northern, has led to the recognition of several more species which seem to have remained hitherto undescribed.

V. ILLINOENSIS. Herbage rather deep-green but lucid. glabrous, in no degree succulent: leaves from stoutish ascending branched rootstocks and of notably triangular outline, the earliest cordate-deltoid, the later ones more hastatedeltoid, saliently crenate-serrate, acute: petaliferous flowers borne rather above the leaves, their bractlets inserted near the middle of the peduncle: sepals oblong-lanceolate, finely serrulate-ciliolate; petals of a pale violet-blue with an obvious greenish tinge, the uppermost pair darker than the others and with a deep-violet spot at base of blade, these also longer and broader than the second pair which are twisted and deflected, and hirsute at base with long slender abruptly clavellate hairs, the keel-petal long, almost liguliform, strongly veined with dark-violet: apetalous summer flowers on very short ascending or nearly horizontal peduncles, or some of them fairly underground, their short oval pods strongly trigonous.

This well marked woodland violet of Central Illinois is common in rich open woods along the Saugamon River, tear Monticello, and is here described from specimens which, tansmitted themes to Washington in the autumn of 1899, have thriven and flowend with me during two successive sessons. There is no other violat with which to compare it as a very near relative, unless it be *V. affinis*, and it is far enough removed from that by many peculiarities.

V. SUBVISCOSA. Rootstocks not much branched, slender, short-jointed and knotted; plant 4 to 6 inches high at time of petaliferous flowering: leaves thin, deep-green, shining

and alightly clammy, very sparsely appressed-hairy above, somewhat hisrate beneath along the veries and sparsely clinks, in outline from cordate-reniform to broadly cordate with deep and often almost closed sinus, subsertately creants, the more strictly cordate ones about 2 inches in diameter and little longer than broad; peduncles shout equaling the leaves, bibractoolate below the middle, more or less strongly hieratulous, as are also some of the petioles: respeals oblong, obtus, strongly and closely clinks with spreading or somewhat retrores hairs: corolla violet, large, about 11 inches wids, the petals not very dissimilar, rather broadly obovate.

A most beautiful northern violet, remarkable for its slender rootstocks, each bearing a few large thin dark leaves and common only on large flower. The species was first recognized by me a year ago last June, in some excellent specimens sent me from Prince Edward Island by Mr. L. W. Watson. I at once diagnosed it as new, but the manuscript became misplaced. This year a fine sheet of specimens was sent from Aylmer, Quebec, by Dr. J. Fletcher, who describes the plant as growing in open spaces among woods, and flowering there early in June. The corolla, though of a deeper color, is so much like that of V. septentrionalis that I at first thought of it as too near that species, but comparison shows a widely different rootstock, vory different foliage, etc. V. septentrionalis has a beavier foliage, of a light green shade, wholly devoid of clamminess, each leaf with a broad open sinus, and each branch of its stout rootstock produces a considerable cluster of leaves and flowers. I may remark, lastly, that some specimens received from Dr. Ezra Brainerd, collected in damp woods near Pleiad Lake, western Vermont, in 1899, and which I then referred with some hesitation to V. septentrionalis, are

now quite clearly seen to be of the present species. These Vermont specimens were taken late in July, and show only the late apetalous fruiting; these peduncles being short and horizontal, but not at all subterranean.

V. CRENULATA. Tufted perennial with rather stout ascending rootstocks, the whole plant small, and with lightgreen glabrous herbage; earliest leaves from deltoid-subreniform to deltoid-ovate, obtuse, 1 to 1 inch broad, on petioles not much larger, very closely and minutely crenate, the later leaves twice as large, cordate-ovate, cucullate, subserrate-crenate, on petioles 1 to 2 inches long : peduncles many, 3 to 5 inches long, erect, far exceeding the foliage, almost colorless and white-translucent, bibracteolate below the middle and the bractlets usually quite remote from each other: sepals small, oblong-lanceolate, obtuse; corolla large, pale-violet; petals spatulate-obvate, obtuse or retuse, the odd one commonly quite obcordate-notched and very strongly veined with dark-violet, its surface also adorned with scattered white papillæ, the two next to it each with a dense small tuft of mostly clavate hairs: late apetalous flowers on short abruptly deflected pedicels.

The specimens of this very well marked violet are from near Syncases, N. Y., and were communicated in a living state by Mr. H. D. Honse. It is a bog-meadow plant, and this fact, along with the light-colored herizage, and flowers much plart that those of F excalds, denote its alimity for that species. It has petals somewhat like those of the Canadian F execute, at least as to their being returns or even obcordate-notched, but the pubsesence of the petals is very different. The folge of F created as suggest that of the Canadian F executes by its small size and very marked ereulation. Otherwise, however, the two are very dissimilar. I have no doubt that what I here define and name as new, has been treated as the equivalent of the *V*. paluetris of the Old World; but the plant so named in our books has not been reported from so far south as New York; nor is our *V*. eremulata at all suggested by Britton and Brown'sfigures of so-called *V*. paluetris.

V. FLETCHERT. Acsulscent, small, the simple ascending rootsdock rather small for the plant, closely jointed: lawres few, small, form ovate-reminform to subcordate ovate; it to the petiols, them of petidires, them forwards, the underologed ones cuculate, all very regularly create, glabrous and shining above, mosely sparse-birautions beneath and on the petiols, these in the earlies to longer than the blade, in the later more than twice as long: flowers very few, often uddels: sparse small, lanceolate, veinless, serart-celibalter corolla large, more than i the brad, rich purple; the upper pair of petals much the largest, obovate, the middle readers are also from the strongly banderid with long cylindric hairs, the odd one as long as these and a striffbrader: a petaloss flowering and fruiting to the vore.

Common in certain moist open grounds, growing among messes, near Ottawa, Ontario, Mr, J. M. Macoun. Plant of about the size of *P. sematola*, but with very different characters, and holding perhaps the same relation to the common *V. pspilionaces* which *Y. sematola* bears to *V. ecculdat*. The individuals are said by *M. Maccoun* to grow singly, and to be often one-flowered. The leaves at time of pskilferous flowering are only three of four. Some small plants of *V. Mancka* accidentally accompany the living specimens, showing that these two are natural associates.

V. NODOSA. Acaulescent, the rather ample foliage and

## NEW SPECIES OF CERASTIUM.

long pedunoles from stout horizontal more or less branching and strongly knotted rootscoks: herbage light green, hirstrubots, the petioles and pedunoles very strongly so and the hairs spreading or deleased: heaves from roundremform to round-vata, obtus, subscratch-cremate, about 2 inches wide at times of petificrous flowering, the undeveloped ones cacultate, all much shorter than their petiolese podunoles equaling or exceeding the leaves, nature slender, bibracteolate near the middle, the pubseence rigid and retrores: sepals incectais, the attempt of the dense torines: eapla incectais, the heat the dense tof of apparently flattened and distinctly woully hairs, the ofd one as long as the others and broady spatulatis.

Near Syracuse, New York, communicated by Mr. Homer D. House. Related to such species as V. cuspidate, V. Dickionii and V. Istexeevice, and remarkable for its large knotted and exactly horizontal rootstocks, the woollyhairiness of its petals, and the retrorsely almost hispid peduneles.

## NEW SPECIES OF CERASTIUM.

C. CONCOUNTLUX. Turbed stams 4 to 8 inches high, leady with about 4 pairs of subscretch alarses and ending in a sessile contracted cyme, the whole stem purple or purplish and glandular-pubscent with white spreading hirs: leaves lance-lunar, acuts, of half the length of the internodes or somewhat more, rather sparsely glandular-hirsutulous and almost equally so no both faces; besaid sterile branches very short, consisting of little more than fasciles of oborateologa carinate-nerved at length almost glabrous leaves of  to i inch long: calys 24 lines long, the sepals very acute, the outer scarious at tip, the inner with broad scarious mar- gin as well as tip, all more or less strigose-pubescent and distinctly 1-nerved: corolla rather largo, twice the length of the calys or more: capsale not seen.

Foothills of the Rocky Mountains near Fort Collins, Colorado, 7 May, 1896, C. F. Baker; species with very characteristic calyx.

C. EFFURTL. Similar stems loosely trufted, according, 8 to 10 induce long, the rather annule eyme short-podunoled: leaves of main stem 1 inch long or less, 14 lines wide below the middle, mixulely glandulars. Fittellous above, glabrous benestle, even as to the prominent midvein, those of the sterile shoots an inch long, narrowly spatialticlianex, glandular-hirtellous above, sparingly so beneath, but midvein almost or al together glabrous; pubsessnee of stems and pedicels more strong and more notably glandular: ealys 2 inkes long, the sepals very acuts, olvioualy 1-nerved, sometimes with traces of two other nerves, the pubsesnee short, ight of the longth of the sepals: capsula large, of rather more than twice the longth of the sepals: capsula straight, selom surposing the ealyst by half the length of its techn.

The typical material of this is of my own collecting in wild grassy pasture land along Dale Creek, Wyoming, 1 July, 1896. While manifestly allied to *C. angustatum*, it differs very markedly by its more slender habit, glandular pubesence, and short straight capsule.

C. SCOPULORUM. Loosely tufted perennial, the main stems 4 to 8 inches long, bearing 2 or 3 remote pairs of linear lanceolate leaves and a contracted few-flowered cyme, the leaves almost glabrous above, but with scattered small

## NEW SPECIES OF CERASTIUM.

bristly bairs on the midvein beneath and on the margin; leaves of the long and well developed stories hostor linnar, hirrato-cillate at the base, otherwise glabrous, nearly  $\frac{1}{2}$  inch long, longer than the internoles and spreading; all the stems and branches more or less hirratulous below the nodes, often hirtellows nearly throughout, only the poduncies and pelicles glabrous, showing only a few scattered and very short glabrous, showing only a few scattered and very short glabrous, showing only a few scattered and very short elind-tipped harris: corolla large, of more than twice the length of the calyx: capsule very short, not even the radively very long teath excerted from the mature calyx.

Rocky Mountains of Colorado, southward chiefly, and at considerable elevations only; well represented in Baker, Earle and Travey's nn. 497, 664 and 893, all from subalpine stations in the La Plata Mis; the species perhaps also embracing Mr. Wooton's n. 639 from the White Mountains, southern New Mexico.

C. OCCENERTALE. The many flowering stems usually decumbent, 5 to 8 inches high, bawring about 3 pairs of leaves and all the internodes elongated, the cyme abort and mody contracted, 5-to 15-flowered (in more reduced forms 3-diversed or even 1-flowered); leaves 4 to 4 inch long, oblong-linear, acuish, ascending, from hirdellous-pubsecent, with minute subsessite glands interspersed, to nearly glabrous, the stem more notably pubsecent with somewing the flefteed hird, but pedundes and pedicid slitenicity visidhirdellous; sterile basal shoots numerous, 2 inches long or more (in reduced forms less than 1 inch), their narrowly spatulate-linear leaves 4 inch long, far surgassing the internodes: sepaks 2 jlines long, scarious at the acute tips and more or less so marginally, the back visid-puberulent and only fainty 1-arrowice heads throise the sepaks:

capsule about twice as long as the calyx, distinctly curved upwards.

A common plant of the Colorado Rocky Monntains at all elevations of from 7000 to 11,500 feet, and quite variable as to the degree of the pubescence. The best specimens are partly my own, from Bear Crock, west of Darver, collected by Mr. Holm partly about Gray's Peak, and partly at similar elevations near Leadville, in 1898. Reduced forms are common on the plains of Wyroning and Montana, and have ben distributed by Nelson, Rviberg and others.

C. ASSUMPATCM. Tufted perminal, the assembling flowering stems often a foot high, ending in a long-peduated rather doutneted cyme, producing from their lower nodes upright densayl leafy steril barnotse 5 inches high: leaves of main stem 1 inch long, half as long as the internodes, sepecially on the strong midvain beneath and on the margin, those of strile shoots as long or even longer, very narrowly linear, subfalcate, sents, of twice or thrice the length of the internodes, pubersence of this is also of the stem histratulous, not glandular: ealyx about 2 lines long, the somewhat appressivel/linear scored langer and linear the length of the calyx, abrupt cervel.

Near Prince Albert, Saskatchevan, July, 1896, John Macoun, Cauad, Sarvey, n. 12,459. The type sheet is in my own herbarium. The corresponding one in that of the Gand. Surv. Anow even greater dimensions, but with the remarkable sterile branches thermalyzes nearly a foot high, and less densely leafy, the leaves of bardy twice the length of the internodes. The plant is said to inhabit sand hills on the open prairies of the region.

C. CANFERTER. Size and habit of *C. occidentals* but rather more leady, the cymes more contracted and with more numerous flowers, but stem cansesculty villous below, the dense indument strongly delaxed, the upper portion and the pedicies with a mach less dense and a spreading villoity of hars mostly gland-tipped and very vised: leaves 4 inch long, subulate-inneolate, strongly ascending, ruther densely appressed-villous on both faces: sepals very acute, hardly earlow accept at the very pace, appressed-publicsent, not vised, 1-nerved: corolla large, the broad bifd petals of nearly thrice the learth of the sends.

Apparently frequent on the high prairies of British America, when it takes the place of the more southerly *C coidinatal*, from which its strong villous publescense and some other characters well distinguish it. Numbers 5,599 (Opyress Hills, N. W. J., 4600 (Indian Head, Assinibia) and 12,450 (Stonewall, Manitoba), of the Canad. Survey, are sheets that parfeelly represent the species.

C. VENTTOR. Loosely tafhed slender stems desembent, often genicatale 4 to 7 inches high, their leaves short and in few pairs, the lowest oblong, others oblong-linear, the upper rather breadly lancolatel, less than 3 inche long (the intermolest 1 to 24 inches), acutiah, ascending or st length obl faces; stem densely aon retrovely white-villous, the peduncies and pedicels with a similar though spesaling indument intermixed with shorter gland-tipped lairs; crowfiel leaves of the short spreading stories ellipsilancolatio to limer-lancolated, it o§ inch long, more sparingly villous, when very old glabrate: sepais 2 lines long, rather broad, hortply acutiab, glandularapbreulent and viscid, wholly herbacoux, or searious at tip: petals three the length of the sepais: capsulo to zearetd.

Dry banks at St. Anne, near Edmonton, Alberta, collected by Mr. W. Spreadborough, 9 June, 1898; n. 19,285 of the Canad. Geol. Surv. Species uncommonly well marked and not otherwise known.

C. CONVERTUR. Stems purplish, 6 to 10 inches high, birtellows (under a lens) and most of the hairs gland-tipped: leaves in about 4 or 6 pairs, shore and remote, oblong-hanceolate, obtusish, seconding, the longest little more than  $\frac{1}{2}$ inch long, all pabescent on both gass started glandular: cymes rather many-flowered but condensed, the whole searchy an inch long except in age: spaals less than 2 lines long, oblong-ovate, obtuse at the abruptly scarious-tipped and purplish space, the body strongly glandular-puberrileut and strongly 1 to 3-nerved: corolla small, but well surpassing the calyz.

An excellent species, of which the only specimens seen, were collected at Stewarts Lake, British Columbia, 20 June, 1875, by Mr. John Macoun, and on Telegraph Trail, in the same region, the same year, 24 June.

C. PATULM. Caspitose and low, the many flowering terms soldom exceeding 3 or 4 inches, decumbent, clothed with shout 4 pairs of lawres and ending in a peduaded cym of shout 3 flowers: lawres sublate-lanceolate, scarcely 3 flow long, spreading, pilose-pubseent above when young and somwhith briely-clinks and though exceeding the short internodes: lasty part of main stem retoreeding the short internodes: lasty part of main stem retoreeding the short internodes: lasty part of main stem retorspit villous-pubseent, the pedunce glandular-intellous and quite visici : brates of the eyms broad and of oval outline: spals 2 lines long, verb broad, obtasish, scantily strigulos and strongly 3-nervel; petals large, obcordate: capsule little surpassing the calyr. Common on stony hills about San Francisco and elsewhere in middle California near the sea, being the C. arvense of my Bay-Region Manual, etc., but a most distinct species.

C. SONNE. Of twice the height of the last, and more sender, the cyme ampler, often 6-fowered: leaves oblonglanceolate, 1 inch long, glandular-hirtellons; those of the storile shoots narrower, otherwise similar: bracks of the syme broad, almosé orate, acute: pubseence of stem very short, spreading glandular: spassh 2 lines long, ellipticoblong, acuts, liphly 1-nerved, with or without traces of lateral nerves, glandular-spubrelate, more so-marginally than superficially: petals deeply obcordate, twice as long as the senak.

Subalpine in the Californian Sierras, my specimens from an altitude of 8,000 feet on Mt. Rose, 22 July, 1888, C. F. Sonne.

C. ADSTROMES. Apparently biennial, with many decumbent or assurgent branches forming a tuft on the crown of the slender root, these a fool long more or less, simple up to the long and narrow errom, horkoge altogether lightcreen, searcely glandular or viscid, minutaly rough-pubescent (under a lens apparing hisripidulous): leaves § to 15 i hohes long, oblong-linear, obtase: calyx searcely 2 lines long, the sepals oblong, acute, hirtfollows with seattered briefly hirts, not viscid, marked at base with a prominent bat short radiment of a midvein: peaks not quite equalifing the sepals, their segments very acute: capsello of nearly thrice the length of the outyx, zerohally curred.

Collected by the writer on wooded slopes of the San Francisco Mountains, northern Arizona, 10 July, 1889.

C. FASTIGIATUM. Of similar dimensions, and with the

same lightgreen herbage as the last, the root annual or biemial, but never branched from the bass, all the branches axillary to leaves of the stem above the bass, and all ascending or unbrevet: leaves 1 to 14 inches long, lance-linaar, acuts, strongly glandular-hirdlous; branches of the syme more divergent and more regularly dichotomous: sepals hispidulous under a lens, not glandular, veinlews: corolla much exceeding the calyx and the lobes of the petida not acute: capsule of about twice the length of the calyx or somehing more, rather strongly curved.

Mountains of southern New Mexico and perhaps adjacent Arizona; my specimens being from the Pinos Altos Mountains, collected in 1880, and distributed for *C. nutans*.

## FIVE NEW SPECIES OF RUMEX.

<sup>4</sup>R. GRATILIPSE. Tall and rather elender, 3 or 4 feet highlavers about 7 inches long and 3 in breadth, of elongated deloid-oute outline, sub-corlate at base, entire, acutish, phane, rather conspineously feather-wriend, the petides very slender, a foot long: paniele a foot long or more, dense, laffesor, or this one or two narrow largest at base: pelicels filtform, 2 or 3 lines long, obscurely jointed at base: valves grainless, rather small, firm and opque, 3 lines long, roundovate, abruptly acute, rather finely and evenly reticulate, the margin erose.

Moist meadows at the Pine Creek Hay Ranch, above Palisade, Nevada, collected by the writer, 25 July, 1896. Very well marked by its broad and short leaf-blades on very long and slender petioles.

The POUTRIMITIZES. Only sparingly leafly, rather elender, 2 or 3 feet high the solitary stem from a rather superficially seated fascile of several or many fleshy roots: leaves all of antrowly lanceotals or linear-lanceolate outling, mostly 6 to 8 inches long, on petioles of equal length or shorter, all plane or eles somewhat crigned towald the base: paniele long and loneo but strict, more or less leafly-bracted: pedicisel rather distinctly subclavits, jointed well above the base: valves thin, delloid-orate, realisels at sarcely much residualts, the margins dentate.

Species of dry land habitat mostly along the borders of apan thickers, in southern Wyroming and adjacent Colorado, distinguished from all other western species by its fascile of numerous samewhat radiating roots scated near the surface of the ground. The specimens before me are those collected by myself near Sherman, Wyroming, July, 1893, and a very good fruiting one by Mr. Osterhout from Lone Phine Creek, Larimer Co., Colo, 22 Aug., 1900. In segregating his *R. densiliona* Mr. Osterhout seems to have taken the present plant for the tron *R. osterhout* seems to have species; eres more so.

•R: PROCEARCS. Very large, the stems often 6 or 8 feet high and the lowest leaves 14 feet long cactuative of the equally elongated petiole; the blade linear-lanceolate, subcoritale, acuitals, the margin inclined to be very full and wavy or plicate-multilate: paniele often 2 or 3 feet long, rather losse, or sometimes more dense, naked or leafybratedi pedieols \$ inch long, filform below, abruptly blackend under the ealyst, jointed blow the middle; valves about 3 lines long and as broad, subcordate-orbitonar, very obtase, thinnihe and redish in maturity, but rather strongly reticulate, and the whole surface closely impressed-puncticulate.

This is what has been called *R* occidentalis in the western middle sections of California; a plant by no means common there, and confined to wet, boggy depressions among the coast hills about San Francisco Bay and Monterey. It is an almost gigantic species and very early flowering; being in matter first before the end of May.

\*R. corrents. Stems as stort and folinge as large as in the last, the paniele ample, less elongatel: leaves even more ample, commonly 6 inches wide toward the deeply sublustate-cordate base: pedicels slender, i to 1 inch long, jointed well above the base: valves suborbicellar, with subtruncate base, green and of thin textures, with a not much mised but very distinctly and completely reinicitated venation, the margin more or less cremate or dontate toward the base.

Common in the lake region of northern Idaho, inhabiting wet meadows; fruiting in July and August. Leiberg, n. 562, and Heller, 3481, as these are represented in my herbarium.

I. F.ENSERTATUS. Stem mot known; plant probably notes atla as in the two last; the single radical lade's seen hancelate, plane, 6 inches long and subcordate, on a petiole of greater length; pedicels slonder, the articulation not obvious: valves lage, bini and translocent; commonly, much longer than break, conspiceously and variously reticulate, and, as seen from within, exhibiting a minute but very disting favore on any or primary precision.

Near Comax, Vancouver Island, 23 June, 1893, John Macoun; n. 1570 of Canad. Geol. Survey.

## CORRECTIONS IN NOMENCLATURE .--- IV.

TRIFOLIUM PETREUM will be a suitable name for Mr. Rydberg's *T. Niacinum*, Bull. Torr. Club, xxviii. 37 (1901), which is invalidated by *T. Niacinum*, Greene, Proc. Philad. Acad. for 1895, p. 547 (1896).

<sup>4</sup>CARDAMINE INFAUSTA. C. cardiophylla, Rydb. l. c. 280 (1991), in conflict with C. cardiophylla, Greene, Fl. Fr. 266 (1891.)

<sup>V</sup> VIOLA OREOPHILA is a name offered instead of the V. monticola of Rydb. Fl. Mont. 264, there being a V. monticola, Jordan, Obs. ii. 37 (1846).

\* SERVED ANACHETES & Tolucomus var. microdontus, Gray, Syn, FL, Laprat, 2, 388 (1884). This elegant subalpine Senzeio, of frequent scentrence from Colorado southward into Mexico, has already been recognized as a species by Mr. Heller, according to whom it is to be called 8, microdontas. But that can not be. There is an 8, microdontu of Madagassar, published by Baker in 1881, not to speak of a still earlier employment of that aljective by Weddell, for a South American member of the genus.

## STUDIES IN THE CRUCIFER.E.-IV.

1. New Species of LESQUERELLA.

L. PRUINOSA. Perennial, the crown of the root not branched, supporting a single tuft of leaves with decumbent scapiform peduncles in their axils: blade of the leaf

an inch long or more, as bread, as long, mostly indefinitely quarkate rather than rounded, observise of more rounded outline and repand-toothed, pale (but not silvery), with a minute and not dones stallati-cleidote indument; patholes about twice the langth of the blades and, logother with the pedmeles, purplish, prinnices with small and not clessly contiguous stallate scales: peduncles and short racemes not gready surpassing the foliage even in fruit, larly below with obvate entire petiolate leaves or bracts: flowers small for the plant, suplumyrollow; fruiting pediods assending; pods oral, glabrous, 3 lines long or more, surmounted by a style nearly as long.

Known in but a single but very excellent specimen obtained by Mr. C. F. Baker, at Pagosa Springs, Colorado, 21 July, 1899.

L overa. Perennial, the candex multiciptions, its branches bearing turbel leves and several isori leafybrated rather for-flowered paduncies, the whole plant, paths and pode scopied, while with a vary dense stellatlepidote indument: blade of lower levers round-ovate to oral, eartish, earting, furn, about i, inch long, on petioles as longs: senges exect, only 2 or 3 inches high, their brates oblance/late; pediels of the short and subcorymokes früiing meems stout, ascending; pode glabroux, subgloboss, substlpitate, about 3 line in diameter, the style as long.

Bluffs of the Arkansas, about Pueblo, Colorado, collected by the writer in May and June, 1873, in flower and fruit; also from Swallows', above Pueblo, 1 June, 1901, C. F. Baker, n. 8.

L PARVULA. Dwarf alpine multicipitous perennial, the branched lignescent and quite subterranean caudex 11

inches high, the peduncles seldom 2 inches: leaves all narrowly linear, erect, an inch long, entire, silvery-stellatelepidote, this indument more definitely stellate on the pedicels and small ovate pods: styles rather longer than the pods.

Summit of Mt. Bross, Middle Park, Colorado, 29 July, 1876, H. N. Patterson; the specimes distributed under the name Voicaria alpina, from which the species differs essentially in its mode of growth by strong Higussent subterranean cander and its invariably long narrow foliage. In true L adpine there is no such underground growth, and the lowest leaves are oblancedaics, or ven broaden. It is a species of the Montana region, nowhere, I think, approaching even the bodres of Colorado.

L DIVERSIDUAL Shall and rather slender perennial, candex simple or with 2 or 3 short branches: turked leaves small, all on rather slender petioles longer than the blads, this form round-orate to orate-basiate, thombie-orate and orate-lancolate, seldom 3 inch long, both faces cance-ently lepidote: racemose pedinoles 2 to 4 inches long, decumbent or savergent, floriferons at summit, below it conspicuously leady-bracted, the bracts oblancolate: calyx and oursies lepidote: node not seen.

An exceedingly well marked species, as to habit, foliage, etc., distributed by Mr. Cusick (n. 2,304 of my set), from an altitude of 7,000 feet in the Wallowa Mts., eastern Oregon, 5 Aug., 1899.

L. NODOSA. Caudex mostly simple, elongated and with short fusiform nodes marking the growths of successive years; herbage silvery-lepidote even to the pods: leaves oblanceolate, acute, entire, of firm texture,  $\frac{1}{2}$  to  $\frac{1}{2}$  inches long; racemose peduncles about 2 inches long; pedicels slender, spreading or deflexed, about twice the length of the ovate pols, these about 2 lines long, little compressed, surmounted by a style 1 line long or more.

Milk River, Assimiboia, 13 July, 1895, Mr. John Macoun; distributed (n. 10,313) as L alpina, which it resembles only as to its pods, being by other characters extremely different.

L. VINSTOLOG. Evidently personial, but root shoulder and branching and no true endex manifest, basal lavers for and small, oval to oblanceolate on sheader petioles, the blade entire or touched; je doulcales sheader, deemubent, often a foot long, oblanceolate lavera clothing the lower portion, the reaceme in fruit long and lax; pubsescene merely stellate and not dense: petals subplar-pellow changing to pikk; spreading pedicesi sheader, i into hong; pods small, globose, little more than a fine in diameter, stellate-tomentos, the sheader stry fully 2 lines long.

Story Mountain, Manitoha, 4 June, 1896, Mr. Maccum. The specimers were distributed (n, 12401) for L Ladoriciona, the pody being globose, and the pubsecnoc stellate; but the plant is widely removed from that species in habit, foliage, etc., much more nearly resembling certain species of the Mexican toroler in aspect not to speck of the changeable color of the corolla, in which point, as well as in some others, it recalls L perpurse.

L. MACOUNT. Perminial, the stort root surmounted by an ample rosette of foliage and several decumbent peduroles, these 3 to 5 inches long and in fruit loosely racemose from toward the base: leaves cancescutly lepidotsetallato on both faces, 14 to 2 inches long, the stout petioles and oral to elliptical repand-dentate blades of about equal length: the recurved pedicels and also the pods stellate-tomentose, the latter globose, 1½ lines in diameter, the style somewhat longer: petals pale-yellow.

Collected by Mr. John Macoun, at Medicine Hat, Assiniboia, 9 Aug., 1895, and distributed (n. 10,308) as *L. Ludowiciana*, but resembling that species only as to fruit; in habit and foliage extremely different.

L. norsz. Very slander and small, the whole plant above ground hearly 3 inches high, the foliage almost white with a dense but searcely more than stellate indument, the slender peduneles, pedicels, calyx and pols more sparsely stellate : analox very short, simple in younger plants, perhaps branched in older ones: basal lavers with short ovate or vorta-inecolata, scatte entire black shorter to the petide, the whole leaf seldom i inch long; peduneles with a a fow oblanceolate seasile lavers and a short few-flowerd racenes: petals well exceeding the sepala; ross-purple : globuse polds see than a line broad, the alender style rather longer.

Old Wives' Creek, Assiniboia, 2 June, 1895, Mr. Macoun (n. 10,309). The smallest species of the gends.

## 2. Miscellaneous New Species.

Threaseconcres arguints. Very erect, 1 to 14 feet high simple bolow, parted above the middle into several subsect racences branches; herbage glabross glaucous; lowed leaves not seen, the larger equilines 5 inches long, of narrowlanceolate outline, with several pairs of very prominent subulate or often findex-incurred tect, the base slightly arrieled, thoses of the flowering branches lance-linear, very subsidy dedicative; petal very small, not exceeding the

sepals, but stamens well exserted: silicles of strongly pyriform outline, small, unevenly cronate, never perforate, the scarious margin very narrow or obsolete, the whole body of silicle hirtellous.

South Catalina Island, California, March, 1901, Blanche Trak. The species has the foliage of *T. ramosus* of the same island and of others of the group, but in mode of growth this plant is at the opposite extreme, while the charters of the pools are very distinctive.

Largences of access. White annual, erect, 3 to 6 inchess high, fastigisately branchied from below the middle of the stam, each branch ending in a slander raceme; herbage very glancous, glabrous except as to pinnate basal larvae, these minutely pubseent, their rather remote pinna insided: flowers very small, both ealys and corolla while; stames eparently 4; pols nearly orbicaira, about 4 [ine broad emarginate, not margined, glabrous and obscurely lineolake, their slander accending pedicies about 14 or 2 lines long.

In clayey soil about Mesilla Park, New Mexico, March, 1900, Theo. D. H. Cockerell.

DRAMA AtimETESA. Apparently annual or biennial, the tuth of radial leaves single, surmoniting a sincher taproot; flowring stems, many and of equal length, 3 to 6 incless high, loosely reacemoss from neur the base and naked or with a single oblong entire leaf near the base: crowled basal leaves besthan an inch long, spatialisel-linear or o-blong, entire very sparingly best with short, simple or ofroked hairs or even wholy glaborus excort as to the setoneelliate margin: base of stems with scattered simple hairs, inflorescence glaborus: posls ellipticoblong, solidom 4 inch long, on ascending pedicels of about equal length or longer: style none.
# STUDIES IN THE CRUCIFER.E .- IV.

Crow's Nest Pass, Alberta, August, 1837, Mr. John Macoun, being n. 18, 122 of the Canadian Greed Surv. collection. Also in flower only (showing pale-yellow flowers, with glabrous calyz), by the same, from Ellow River, in the same region, n. 18, 123; both distributed as *To. Astendolog'*, an Alaskan perennial to which such plants as these sustain no near affinity.

DRAME DETYORA. ANNUAL, af 600 high, rather freely branching from next the bass, the branches seconding, lowest leaves obloug-hanceolate, an inch long or more, nearly or quits entire, pubescent on both faces with losse dendritic rather than stellate hairs, the cauline 5 or 6, lanceolate, serratetoothed: leavy portion of stem villous with simple hairs and lake minutely stellate, the rachet of the long loose raceme glabroux: flowers small, pale-yellow, the green sepals glabrous; petals obcordate-notched: jood should thinse long, narrowly oblong, glabroug, notably reticulate-venlose, the stigma nearly sessile.

At Calgary, Alberta, 7 June, 1897, Mr. John Macoun, n. 18,132 of Canad. Surv. Species akin to *D. nemorosa*, but with a branching habit, elongated leaves, and pods marked by a prominent reticulation of long narrow meshes.

DRAMA OLIDARTIA. Peregnial, slender, the subscapiform flowring stems 21 to 6 inches high: lawers modify roulate,  $\frac{1}{2}$  inch long or less, spatialateobiong, rather thin, 1-nerved, entry, locsely pubsecant this subscalessice craciform hairs, the 1 or 2 sessile acutine lawers oblong-lanceolate, occasionally tootheir diverse commonly 2 or 37, nerly 5 or 6, sometimes 1 only, white, the early glabroas, the rather long petala rotus or emarginate: pod  $\frac{1}{2}$  inche long, very more, tapering gradually from the middle and slighty falaste, glabroas, their spreading policies  $\frac{1}{2}$  inche long.

## PITTONIA.

This exceedingly well marked permutial Droba is from the Alaska seaboard, and has been collected, in so far as I can discover, only by F. Funston, who obtained the speciromes at Disanchantment Bay, 9 Aug. 1892. They were distributed for b. denolos, and the pols are even narrower than in that species; but the true D. stenolos is a very different plant.

TREEPROFILE RECONSTRUCT. Bicmail, very stort, a yrad high or more, desp-green and glabrous, the stem solitary, corymbose-panieled at summit: besal leaves 4 to 10 inches long, short-pediolat, broad and of rhombic-lanceolate outline, obtuse, entire, those of the dowering branches only 2 inches long, linear, acute: flowers in short dams resense, these in fruit lengthening to 6 or 6 inches, the event spals and more than tweie longer spatial-leinear petals dull fish-bolor or white: pola short for the plant, only an inch long fewesseled and rather long-stiplize.

Collected by the writer, in the West Humboldt Mountains, Nevada, July, 1894, and allowed to pass for *T*: integrifolum, until now, when it is seen to be very distinct by its large rhombic-lanceolate larves, elongated inflorescence, short few-seeded pode, etc.

TRETFORTMENT AFFINE. Allied to the last, quite as large and stout, glabores, glaucescent: radical levens 5 to 10 inches long, spatulate-hanceolate, obtuse, denticulate, the blade decurvent as a narrow wing to near the base of the rather elongated petiolic: stont corynilose paniele of faw binnches and nearly naked; flowering meeneme dense, 1 to 14 inches long; finch broad; sepale ascending, the spatial petial strives at long; mature points not seen, but young fruit-

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ing racemes elongated and lax, and growing ovaries notably stipitate.

Described from specimens obtained by the writer in the mountains near Tehachapi, California, 22 June, 1889. If has also been permitted to pass for *T. nistogrifolium*, though seen to be remarkably distinct when compared with the original of that species, which is from the remote interior, toward the sources of the Columbia River.

# NEW SPECIES OF LACINIARIA.

<sup>1</sup>L. VITATA. Stem 2 feed high, from a narrow fibrouscontext tuberous root, herbage glabous: leaves nearly all from below midway of the stem, hance-linear, accending or subscret, the longest nearly a foot long, plane, the lowest and broadest channelled beneath between each pair of the free prominent elevated parallel vinis: night e4 to 7 inches long, on an almost naked (merely small-bracked) pedunders heads subscription, only about 4 lines long, crowed c; bracts of involucer about 20 and closely imbrirated, oval to oblong or obovtae-oblong, 5-Artista up to nær: the rounded narrowly searious-margined and erose-cilicate tips: flowers 5 to 7: schemes hirstutulons; npomes subplumose.

Near Biloxi, Mississippi, 19 Sept., 1898, S. M. Tracy (n. 6350 of my set of Tracy's plants). This was distributed by my advice, as *L. spicata*; but it is a most distinct species, allied to the northern *L. pyenostachya*. It is remarkable for its long ribbon-like glabrous channelled foliage.

"L SEROTINA. Rather slender, 2 feet high or less, the stem hirsute or almost tomentose with white more or less

## PITTONIA.

enrich bairs: lowest leaves few, narrowly lancedate, pedilack, prominently 5-nerved, the lower cauline linear, 2 inches long, gradually diminishing to a series of subultat linear short bracks, all glabrous except a few seathered hairs on the lower face and chiefly along the midVenin: spike lowes: involuere eyiIndrical, 6-flowered, heir bracks about 10 or 12, the lowest ovate, clinite, the inner ones oblong, glabrous, 1-nerved, acuitah and with little marginal seariounness; achenes pubescent with short approach tairs; pappus barbelluate.

In low pine barrens at Covington, Louisiana, collected 8 Nov., 1885, by the late Rev. Fr. Langlois. Remarkable for its late flowering. The corms are destitute of the fibrous coating seen in those of other species.

• L. Eanner. Rigidly erect, stoutish, 2 feet high or more, leafy to bolw the middle, thence narrowly and strictly recemons, the small campanulate heads 60 or more, herebage jabtoous except for a few bridgy marginal hairs at bases of some leaves, lightly punctate: leaves narrowly lanceolate and linear, right, spreading, or the larger lower comes assending: based about § inch high, on pedicels as long or longer: based many appression, with rounded not scarious but purple-margined and somewhat cilicitate tips; achenes rather strongly hinrue; many about the larger lower comes.

Near Auburn, Ala., Sept., 1896, F. S. Earle. Certainly allied to *L. scariosa*, and remarkable for its small and very numerous heads forming a long strict raceme.

"L KLEGANTULA. Very slender, 1 to 2 feet high, leafy toward the base, bracteate from below the middle, loosely subspicate or racemose toward the summit: leaves narrowly lanceolate and with a broad petiole, the whole 3 to 6 inches

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long, faintly punctate, glabrous except as to the woolly-cilitate petioles and some hirster pubsesence on the midwin beneath : bracts linear, ciliato, the lowest more than an inch long, the upper half as long : heads to 12, sessile or pedicallate, turbinate, small ; bracts few, appressed, with rounded obovate narrowly scarions-margined more or less ciliolate glabrous and strong/pyonatate tips: achenes small, strongly hirsutulous along the ribs; pappus fine; barbellulate-scabrous.

A slender and very elegant species allied to L. scariosa, found near Auburn, Alabama, by Prof. F. S. Earle, Oct. 18, 1896.

L xRRvara. Stems 14 to 2 feet high leafy and leafybended to the summit, with 8 to 10 subcylindric and subsessite heads in the axils of the uppermose bracks, herbage deepgreens, accerdy punctate, scenning glabrons, a lean disclosing some short briefly hairs along the stem and on the leaver beneath: leaves linear, or the lower narrowly lancelinear, these odden 8 or 10 inches long, with very prominent white midvein, 2 to 4 smaller but still prominent veins intervening between that and the callous margins, the upper leaves and bracts small, linear, 1-nerved: subcylindric hads subcladed by several lanceholas testongly dilate bracts, the proper bracts or scales of the involucer few green, in no degree scarbos or cillate, their broadly owat lips cuspitably acute, not striate: papus not strongly plumose, though more than subplumose.

Monteer, Missouri, 2 Aug., 1889, B. F. Bush, distr. as L. cylindrica (n. 221). Said to grow in woods.

L. SCABRA. Stems stoutish, 2 feet high, loosely and rather slenderly spicate from above the middle, below

# PITTONIA.

strate-angled and retrorely seabro-pubsessent: lower leaves 4 to 6 inches long including the short petiols, the blade oblong-hanceolate punctate and seaberations above, retroscely sabrous beneath, the smaller and more oppious middle leaves norw-lanceolate, sessifie, scabrous as the others, and magningly strothy so: short-ampanulate subsessifie hands  $\frac{1}{2}$  to  $\frac{1}{2}$  inch long, their branets rather few, densily scabrous, not pranciste, their branets rather few, densily scabrous, entire cilicitate scarious margin: style-branches very long and sender: nouros subbinnoses.

Pine Hills, Illinois, 23 Sept., 1890, F. S. Earle.

<sup>•</sup>L. aserna. Listris aspren, Michx, F. I. 192. Stoutish, J. Cets high, locally spicate from about the middle: lowest leaves narrowly lanceolate, 4 to 6 inches long including the picklo, those above semewhat crowded, narrowly spatulatelanceolate, obtune, 2 or 3 inches long, all punctate and sachrons, the stem tomentulone-pulsescent: heads 12 to 20, subsessile, subsempaulate, 3 to 4 inch high, their bracks glabroux, with rounded green and deeply punctate herbacedust fry which more or less spreading, and encircled by a thin erosed-entate purple scarious margin: pappus subplanose.

Prairies of Illinois to Kansas and northward. I am not able to understand upon what principle a plant so well marked as this could be confused, as it has been, with *L. scariosa*.

# NEW OR NOTEWORTHY SPECIES .- XXIX.

PENTSTEMON BAKERI. A large-flowered subalpine dwarf, the tallest plants barely 6 inches high, others less than half as large, the stoutish decumbent stems leafy at base and

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# NEW OR NOTEWORTHY SPECIES .- XXIX.

subnermose from the middle, leaves oblong or obvarkeoblong. I or 2 inches long, taporing to a petiole, obtuse, entire, rather firm in texture, glabrous, sparsely punctate, inforescence glandular-puberulent: racenus of from 3 to 5 large foreer: spasi large, oborate, cupidately acute, the margins scarious and lacerate-toothed: corolla reduprile, more than an inch long, with subvellificit tabe and threat and not very strongly bilabiate limi, its lobes obvarte oblong: storile filament hirtellous at and next the summit.

At 11,500 feet in the mountains about Pagosa Peak, southern Colorado, 6 Aug., 1899, C. F. Baker.

- Encounces services: Near Z purifies and no larger but more pronouncedly unitidipitons, with well developed and subligneous branched caudez, the branches notably leafy up to within an inch of the solitary head: leave narrowly patulati-lanceous throughout, like the stem and peduncles, with short spreading still bristly hairs: bracks of the involuces sparingly setses-hispid; rays purplish or white: outer pappas complexond, of broadly linear and well congreted pales inclusely touched at summit.

Obtained at Artec, New Mexico, 28 April, 1899, by C. F. Baker, and inadvertently referred by me, in Baker's distribution, to E constanae, from which it is now seen to be most distinct, being much more like E purified as to size, and the monocephalous character of the branches, while by its distinct subligneous caudex it is equally remote from both these its allies.

FRIGGONUM ARCUATUM. Near E flavum, about as large, more extensively casspitose, forming broad matted tufts: leaves oval, obtuse, an inch long or less, abruptly tapering to a rather slender petiole about as long, white-tomentose beneath, pale-green and thinly tomentellous above: except form pedurales is inclush sigh, baaring a single large esselie involucer and a pair of long-peduncled ones arising from its bass, these opposite acch other and curring upwards to the length of 14 to 2 inches: involucers turbinate, nearly 1 inch high, silky-tomentoses: perianths yallow, very sparsely silky-villow; stamen long-excerted.

On hillsides about Pagosa Springs, Colorado, 17 July, 1899. C. F. Baker.

'Encoowsux Assearstwa. Near *E. diokolomum* and with quite similar white-tomentess foliage with sheafer twisted petioles; mode of growth the same, the inforcesence very different, being narrow and fastigiate, the involveres narrow and faw-lowered: periatinks greenish-yellow, smaller than *E. diokolomum*, not as broad at base, the outer segments retuse.

On hills about Goose Lake, Modoc Co., California, 27 June, 1895, Mrs. R. M. Austin.

# NEW SPECIES OF MONARDELLA

• M. MONOCENSE. Perminial but exactly suffratescent, the several stems arising from an almost horizontal idender and not væry ligneous rootstock, and seldom n foxt high, parple, deliately puberulent i sevær starther dall-græne but glabrous, ovate-lanceolate, entire, obtuse, an inch long or somewhat more, including the distint alshor petiole, oleedy punctate below, not so above: hends 1 inch brad, the purple bracets below, not so above: hends 1 inch brad, the purple bracets below, not so above: hends 1 inch brad, the purple bracets below, not so above: hends 1 inch brad, the purple bracets below, not so above: bends 1 inch brad, the purple bracets below, not so above: bends 1 inch brad, the purple bracets below, not so above: bends 1 inch brad, the purple bracets below, not so above: bends 1 inch brad, the purple bracets below, not so above: bends 1 inch brad, the purple bracets below, not so above: bends 1 inch brad, the purple bracets below, not so above: bends 1 inch brad, the purple bracets below, not so above: bends 1 inch brad, the purple bracets below, not so above: bends 1 inch brad, the purple bracets below, not so above: bends 1 inch brad, the purple bracets below, not so above: bends 1 inch brad, the purple bracets below, not so above: bends 1 inch brad, the purple bracets below, not so above: bends 1 inch brad, the purple bracets below, not so above: bends 1 inch brad, the purple bracets below, not so above: bends 1 inch brad, the purple bracets below, not so above: bends 1 inch brad, the purple bracets below, not so above: bends 1 inch brad, the purple bracets below, not so above: bends 1 inch brad, the purple br

Rather common in the mountain districts of northern California; here described from specimens taken by Mr. Milo S. Baker in Modoc Co., 1893. It was distributed by myself, from near Yreka in 1876, under n. 910, and Mr. Sone obtained it near Verdi, Nevada.

<sup>4</sup> M. GAUCA. Stems many, 8 or 10 inches high, rather erowded on the slort stort decumbent wody branches of the caudes: leaves oblong and oblong-lanceolate, entire, puberulent nucler a strong lens), copiously dotted, about 4 puberulent nucler a strong lens), copiously dotted, about 4 inch long (the intermoles searcely longer), subsculin, the erdp-pupel stems more distinctly puberulent: heads an linch broad: brates long and narrow for the genus, varying from oblong-orate to narrow-loowta, the veries almost parallel, the whole surface equally somewhat seabro-puberutent, the margin not strongly clinities: short ealty-ited in not hirsute, scarcely more strigillose than the nerves below corollas like-purple.

PITTONIA, Vol. IV. Pages 321, 322. Issued Nov. 7, 1901.

# PITTONIA.

Deserts of eastern Oregon, W. C. Cusick, 21 June, 1898; distributed under n. 1956, for *M. adoratissima*, but very different, representing a strongly marked new species.

· M. Starovat. Stems fewer from the stout woody base, taller, usually 12 to 13 inches high: leaves orate- and oblong-lanceolate, obtuse, entire, prominently veiny beneath, plane above, about ‡ inch long, notably shorter than the internodes, hoard-y-domentuleso on both faces but most so beneath, only sparsely punctate: heads about 1 inch bread; breads ovate-oblong, villous-tomentoss and strongly woolly-ellistic: body of the calyx nearly glabrous, the teeth strongly villous-hirpute: corollaw white.

Distributed by Sandberg & Leiberg from the arid region of eastern Washington in 1893, under the name of *M. adoratissima*, which is a plant of quite other characters.

New genera and species in bold-face type; synonyms in italics.

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# ERRATA.

Page 43, line 20, for when, read where. " 160, " 7, for nearly, read merely. " 161, " 17, for Waksatch, read Wahsatch. " 167, " 14, for less. read Less.