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BOTANICAL CONTRIBUTIONS,

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EXTRACTED FROM

THE PROCEEDINGS OF THE AMERICAN ACADEMY OF ARTS AND SCIENCES, VOL. V.

JANUARY, 1861.



1. *Characters of some Composite in the Collection of the United States South Pacific Exploring Expedition under Captain Wilkes, with Observations, &c.* By ASA GRAY.

*Vernoniaceae.*

MONOSIS INSULARUM (sp. nov.): fruticosa, laxe ramosa; foliis oblongis acuminatis repando-dentatis basis cuneatis in petiolum attenuatis puberulis supra glabratis subtus ad costam venasque cum ramis adpresso-tomentellis; capitulis corymbosis; pappi setis rigidis vix denticulatis, majoribus apice clavellatis. — Tonga and Feejee Islands. A true congener of *M. Wightiana*, DC, the type of the genus, which stands in nearly the same relation to *Gymnanthemum* that De Gandolle's section *Eremosis* does to *Vernonia*.

ALBERTINIA BRASILIENSIS, Spreng. To this belongs Gardner's *Vernonia platycephala*, and Nuttall's *Symblomeria Baldwiniana*\*

PARANEPHELIUS UNIFLORUS, Foep. & Endl. Of this three varieties may be recognized, viz. a. PINNATIFIDUS,  $\beta$ . BULHATUS (*P. bullatus*, Gray, Wedd. Chi. And. 1, p. 214),  $\gamma$ . OVATUS (*P. ovatifolius*, Gray, ined. *P. ovatus*, Wedd. 1. c. t 37), which Weddell as well as I myself had distinguished as species; but an attentive examination of various specimens leads to the conclusion that they are all forms of one.

LIABUM LYRATUM (sp. nov.): herbaceum; foliis supra hirsutiusculis glabratissive subtus arachnoideo-tomentosis, caulinis lyrato-lobatis petiolis basi auriculatis plerumque connatis, summis sessilibus basi dilatata connatis, lobo terminali maximo subinciso et repando-denticulato; pedunculo terminali elongato mono-oligocephalo; involucri squamis oblongis substriatis; pappo e setis paleolisve rigidis inaequalibus, exterioribus dimidio brevioribus. *Alibum liaboides*, Less.? — Obrajillo, Peru: also collected by Matthews, no. 3057. If this proves to be the *Alibum liaboides* of Lessing, that genus cannot stand upon the characters indicated. For, as well as can be told from imperfect specimens with the heads injured by insects, the pappus is similar in the disk and ray, the exterior not really coroniform; and the plant nearly accords with *Liabum*, in the extended sense, or with *Andromachia* § *Pleionactis*, DC, except that the bristles of the pappus are more stout and rigid, and also fewer. They are fragile and deciduous, when the summit of the acbenium appears somewhat like a short crown.

*Eupatoriaceae.*

CONOCLINIUM SUBGLUTINOSUM (sp. nov.): glabrum; caulibus basi

suffruticosis; foliis longe petiolatis late deltoideo-ovatis acuminatis serratis membranaceis tripli - quintuplinerviis utrinque subglutinosi; corymbo polycephalo; involucri squamis 10-13 dorso subglutinosi bicarinatis, exterioribus ovatis, intimis spathulatis acutis; achenio glaberrimo. — Brazil, at the base of the Organ Mountains, near Rio. This may be somewhere described as an *Eupatorium*, but I do not identify it with any published species. The receptacle is acutely conical.

*Asteroides.*

#### VITTADINIA, A. Rich.

*Char, emend.* Capitulum multiflorum, heterogamum; fl. radii pluriserialibus foemineis, disci (pluribus paucisve) tubulosis hermaphroditis. Involucrum obconicum seu hemisphaericum, imbricatum, pauciserialiale, squamis inaequalibus angustis appressis. Receptaculum planum, nudum, p. m. alveolatum. Ligulas parvae, tubo suo fere semper breviores, nunc exiguae stylo ipso breviores. Corollas disci tubulosae, 4-5-dentatae. Antherse *Euasterinearum*. Styli rami fl. hcr. superne elongato-subulati hirtelli. • Achenia compressa, striata, vel 4-6-costata, vel tantum marginato-bicostata lateribus enerviis, apice saepius contracto, disco epigyno parvo. Pappus simplex, conformis, e setis capillaribus scabris uniserialibus. — Suffrutices vel herbae Oceanicae, caulibus ramosis plerumque foliosissimis, foliis alternis. Capitula aut solitaria ramos terminantibus aut corymbosis: ligulae abae vel purpureae.

*Vittadinia*, A. Rich. Bot. Voy. Astrol. Fl. N. Zel. (1834), p. 250.

*Tetramolopium* Nees, Ast. (1833), p. 202, pro part.

*ViUadinia*, *Tetramolopium* § 1 & *Eurybiopsis*, DC. Frodr.

De Candolle's *Eurybiopsis* is essentially identical with the older *Vittadinia* of A. Richard, and has been referred to it by Dr. Hooker. The only observed difference is, that the faces of the achenium of *Eurybiopsis macrorhiza*, if I rightly identify the plant, are nerveless; those of *vittadinia* are striate-nerved. There must, however, now be added to the genus several Hawaiian species, one of which is strictly an *Eurybiopsis*; another, the type in part of *Tetramolopium*, Nees, differs only in its less copious uniserial pappus, and in the shorter, mostly four-ribbed achenia; while others, with corymbose and still smaller heads, have decidedly pluriserial rays, with their more reduced ligules sometimes even shorter than their styles, and the hermaphrodite flowers fewer, — in one instance even reduced to unity, — so that these are to *ViUadinia* proper what the Conyzoid Erigerons are to *Stenactis* or to true *Erigeron*. The genus, thus augmented, while by its larger-flowered species

nearly related to *Eurybia* (from which De Candolle and Dr. Hooker remark that it\* technically differs only in its compressed achenia), and nearly congruous with the group of ambiguous Asters designated under the name of *Orthomeris* by Torrey and Gray, is now seen, on the other hand, to be the analogue of *Erigeron*. From the latter already too polymorphous genus, *Vittadinia* would be well distinguished by its striate or ribbed achenia, and the slender subulate tips of the styles, except that, unfortunately, some of the species show neither facial ribs nor striae, while a few species of *Erigeron*, as Weddell regards them, have long and slender tips to their styles, and some North American ones have four-nerved achenia. The habit generally is not that of *Erigeron*, and the achenia and the more imbricated involucre will distinguish those species which might otherwise be confounded with the *Ccenoti*. The short, but always distinct ligules are characteristic of the genus. Most of the Sandwich-Island species are decidedly shrubby plants, those of New Zealand and Australia woody at the base; but there are two Australian species which appear to have annual roots. On the other hand, *Erigeron fruticosum* of Juan Fernandez, which forms a shrub, is apparently a genuine *Erigeron*,

De Candolle assigns uniserial rays to his *Eurybiopsis* and to the New Zealand *Vittadinia*, and bi-triserial rays to the Australian *Vittadinice*; Dr. Hooker regards all as uniserial. When ligules are numerous and narrow, this character has neither definiteness nor significance, as the genus *Erigeron* shows. To both *Eurybiopsis* and *Vittadinia* De Candolle ascribes a "*pappus uniserialis*," a term which he seems not always to have employed in one and the same sense. In the species known to De Candolle, the very copious bristles of the pappus certainly occupy two or more ranks, just as in *Aster*. From these there is a gradual transition to the more scanty and obviously uniserial pappus of *V. tenerrima* and the smaller-flowered species of the Sandwich Islands.

For the genus, as here augmented, the name of *Tetramolopium* might be assigned in virtue of its priority, as it antedates *Vittadinia* by a year. But the former name was given to two heterogeneous species, viz. one from the Sandwich Islands, which has long remained obscure, and one from the Quitensian Andes, which is a *Diplostephium*, and with which De Candolle rightly associated two other of Humboldt and Kunth's Asters. In this case the name *Vittadinia* may fairly be kept up. The three generic names thus brought together may be retained for as many sections, characterized as follows:—

§1. VITTADINIA VERA. Achenia elongata, faciebus pluristriatis.

Pappus copiosus pluriserialis. Ligulae pi. m. conspicue. Capitula majuscula, solitaria.

V. TRILOBA (DC. non Hortul.): caule erecto e radice annua apice subcorjmboso cum foliis spathulatis cuneatisve basi longe attenuatis superne trilobis vel tridentatis (ramealibus angustioribus ssepius integerrimis) scabro-hirtellis vel hirsutis; ligulis purpureis breviter exsertis; acheniis clavato-linearibus pluristriatis immarginatis pubescentibus, maturis involucro etiam pappo pluriseriali fulvo sequilongis. — Variat foliis caulinis tripartite, lobis trifidis seu laciniatis. — Eastern Australia.—The plant cultivated in the European gardens, a few years ago, as *Vittadinia triloba*, and which Dr. Sonder, mistaking it for the Australian plant of that name, described as *Erigeron trilobum*, is manifestly De Candolle's *Erigeron mucronatum*, of Mexico and Venezuela.

V. OUNEATA, DC. (*Eurykopsis gracilis*. Hook. f. and probably *V. dentata*, DC.) is not well named. The perennial root, undivided leaves, and less rough pubescence distinguish it from the preceding species.

V. SCABRA, DC. (*Eiirybiopsis scabrada*, Hook. f. *E. Hookeri*, Sonder). Müller's plant, or at least the var. *angustifolia*, accords pretty well with the character of De Candolle's *V. scabra*. It appears to be distinguishable by the less copious and shorter pappus, and by the less attenuated achenia, which are evidently margined by ribs considerably stronger than the facial nerves.

§ 2. EURYBIOPSIS. — Achenia minus elongata, marginato-binervia, faciebus haud striatis. Pappus uni-pluriserialis. Cast, pned.

V. HISPIDULA (F. Mfill. ined.): undique scabro-hispida seu hispidula; caule erecto e radice annua stricto oligocephalo; foliis caulinis linearibus sessilibus imisve spathulatis paucidentatis;\* ligulis e pappo leviter exsertis; acheniis appresse-hirtellis obovatis apice breviter acutatis faciebus enerviis pappo fere uniseriali brevioribus. — Australia.

V. MACRORHIZA (*Eurybiopsis macrorhiza*, DC.) if rightly identified with Dr. Müller's specimens from " Providence Hill," resembles dwarf and narrow-leaved forms of *V. scabra*, but the faces of the achenia are nerveless, as in *V. hispidula*. The pappus is more copious than in the latter, and about the length of the (immature) linear achenia.

V. HUMILIS (sp. nov.) : suffrutiosa, e basi crassa multicaulis; caulibus foliosissimis; foliis anguste spathulatis integerrimis undique hispidis seu hirtellis aveniis, costa subtus incrassata; pedunculis brevibus solitariis vel subumbellatis; ligulis uniserialis flores disci (6-12) vix superantibus stylis duplo longioribus; acheniis lineari-oblongis marginato-binervatis hirtellis estriatis pappo subtriseriali inaequali dimidio brevi-

oribus. — Variat foliis hirsutioribus vel subglabratibus, nunc fere linearibus basi longe attenuatis. — Sandwich Islands, on the mountains of Hawaii and Maui. — This species manifestly connects the original *Tetramolopium* with *Euryhiopsis*. A depressed and glabrate variety, from the district of Waimea, Hawaii, makes the nearest approach to *T. tenerrimum*, Nees, which, however, is distinguished by its smoothness, smaller size, more exerted ligules† uniserial pappus, and glabrous mostly four-ribbed achenia. It belongs therefore to the following section.

§3. TETRAMOLOPIUM (*Tetramolopium*, Nees, pro parte).— Achenia breviuscula, quadricostata, nempe costis 2 marginalibus validis, 2 facialibus angustioribus, his raro inconspicuis quandoque geminatis. Pappus uniserialis.\* Capitula nunc solitaria ligulis exsertis, nunc parva corymbosa ligulis pluriserialibus discum haud superantibus, floribus disci paucis vel paucissimis.

V. TENERRIMA (*Aster tenerrimus*, Less. *Tetramolopium tenerrimwn*, Nees): suffruticulosa, glabra, caespitoso-multicaulis; foliis in caulibus (brevisimis seu decumbentibus) confertis lineari-spathulatis uninerviis aveniis parce hispidulo-ciliatis basi longe attenuatis; pedunculis solitariis gracilibus bracteis pluribus setaceis instructis; ligulis uniserialibus discum pluriflorum superantibus tubo subsequilongis; acheniis obovato-oblongis 4-5-costatis; pappo uniseriali aequali. — Oahu, Chamisso, Macrae.

V. REMYI (sp. nov.): fruticosa, corymboso-ramosissima, glabra; foliis secus ramulos confertissimis acerosis deorsum leviter attenuatis supra canaliculatis; pedunculis terminalibus solitariis elongatis puberulis bracteis parvis setaceis instructis monocephalis; involucri hemisphaerici squamis lineari-subulatis margine vix scariosis; ligulis biserialibus discum pluriflorum superantibus tubo breviusculo subduplo longioribus; acheniis appresse hirsutulis obovato-oblongis quadricostatis; pappo albo uniseriali. — Maui, Sandwich Islands, coll. Remy, no. 239. — A shrub, at least a foot or two in height, with rigid branches squarrose with the crowded leaf-scars, the laciniate leaves much crowded on the branchlets; the heads about as large as those of *V. tenerrima*. It is the only species known in which the ligules are decidedly longer than their tube. Although it is not surprising that Lessing should have failed to recognize the relationship of his *Erigeron lepidotm* with his *Aster tenerrimus*, he would surely have associated them had he known the present species, which, with the inflorescence and the exerted ligules of the former, has the habit of the latter, especially of the variety *arbuscula*.

V. CHAMISSONIS (*Erigeron lepidotus*, Less. *E. pauciflorus*, Hook. & Am.): fruticosa, ramosissima, glabella; ramulis corymbosis puberu-

lis usque ad apicem foliosissimis; foliis lineari-lanceolatis seu linearibus basi sensim attenuatis et ssepius hirsuto-ciliatis integerrimis subdentatis rariusve laciniato-incisis creberrime papuloso-punctulatis submembranaceis venulosis; pedunculis brevibus filiformibus eorymboso-oligocephalis; capitulis parvis (2 lin. longis); involucri squamis lineari-lanceolatis acutis vel acuminatis; ligulis 15-20 tubo sub-brevioribus flores disci 5-10 vix superantibus styli plerumque longioribus; acheniis obovato-oblongis parce hirtellis vel glabris quadricostatis, costis marginalibus calloso-incrassatis, facialibus angustioribus nunc fere obsoletis raro geminatis; pappo uniseriali. — Kaala Mountains, Oahu.

Var. ? ARBUSCULA: foliis secus ramulos ultimos confertissimis rigidioribus angustioribus nunc fere filiformibus; pedunculis abbreviatis; capitulis paucioribus majoribus. — On the Great Crater of the eastern part of Maui, Sandwich Islands. — This would naturally be taken for a distinct species, and may prove to be so. The heads are decidedly larger than those of *V. Chamissonis*, being three lines in diameter, and the flowers more numerous, but similar.

V. CONS ANGUINEA (sp. nov.): fruticosa, corymboso-ramosissima, glabella; ramulis usque ad apicem foliosissimis; foliis lineari-lanceolatis seu lineari-spathulatis basi attenuatis et subciliatis integerrimis (raro 1-2-dentatis); pedunculis brevibus corymbosis mono-oligocephalis; capitulis parvis (2 lin. longis); involucri pluriseriali squamis linearibus oblongis obtusissimis scarioso-marginatis, margine creberrime denticulato-ciliato; ligulis 25-30 tubo subsequilongis flores disci adaequantibus; acheniis *V. Ghamissonis* sed glabris. — Sandwich Islands, on Hawaii and the mountains of Kauai. Much resembles the preceding, but the involucre is more imbricated, its scales broader, very obtuse, and bordered with a more definite scarious margin, which is fringed with fine and close denticulations: the ligules are more numerous.

Y. ARENARIA (sp. nov.): suffruticosa, laxa ramosa, hirtella; ramis usque ad apicem foliosis; foliis lanceolatis seu oblongo-lanceolatis basi attenuatis hirsuto-ciliatis integerrimis mucronatis; capitulis (3 lin. diametr.) breviter pedunculatis corymbosis; involucri squamis linearibus acutis submembranaceis; ligulis plurimis (30-35) tubo brevioribus flores disci 5-9 subsequantibus; acheniis oblongis quadricostatis hirsutulis seu glabris; pappo uniseriali, setis inaequalibus. — Sandwich Islands, on sand-hills of Maui, and district of Waimea, Hawaii.

V. CONYZOIDES (sp. nov.): fruticosa, ramosissima, cinereo-pubescent; ramulis usque ad apicem foliosis; foliis angusto-lanceolatis basi longe attenuatis integerrimis membranaceis; capitulis minimis compluribus

congestim corymbosis; involucri squamis linearibus subacutis; ligulis plurimis brevissimis pappura. uniserialem adaequantibus stylis suis brevioribus; flore hermaphrodito saepius unico; acheniis parce hirsutulis 2 - 4-costatis. — Sandwich Islands, on the sand-hills of Maui.—The facial ribs of the achenia are often obsolete. If the species which connect it with the original *Tetramohpium* were unknown, this would, surely be referred to the *Gcenotus* section of *Erigeron*.

*CALOTIS PALMATA* (sp. nov.) : hispido-pubescens; foliis cuneatis seu flabelliformibus palmato-3 - 5-fidis (nunc pedatifidis) inferne longe quasi in petiolum alatum attenuatis basi leviter auriculatis, summis linearibus oblongisve integerrimis vel apice tridentatis; involucro biseriali fere 20-phyllo; acheniis complanatis lsevibus; pappo e paleis 2 - 4 et aristis 1-2 versus apicem parce retrorsum aculeolatis.—Hunter's River, New South Wales. An herbaceous species, with larger heads than those of *C. dentex*. Cunningham's *C. dilatata* has the awns of the pappus similarly but more sparingly barbed; but its leaves are not lobed, and the basal auricles are more conspicuous.

*LAGENOPHORA PICKERINGII* (sp. nov.): foliis hirsutis primum villosolanatis oblongis ovalibusque in petiolum attenuatis repando-dentatis; scapo gracili nudo; involucri squamis linearibus fere glabris; acheniis radii oblongo-lanceolatis erostratis insigniter costatis glaberrimis, disci sterilibus. — Mountains of Muthuata, one of the Feejee Islands. Among the largest species of the genus, the scape 6 to 8 inches high, but the head is proportionally rather small, in fruit only three lines in diameter. The achenia are coarsely striated by 8 or 10 strong and salient ribs (in a manner unknown in other species), not beaked, but terminated by an epigynous disk about the size of the basal callus.

*APLOPAPPUS PCEPPIGIANUS*, var. *RADIATUS* (*Diplopappus Pceppigianus*, Hook. & Am., forma *eradiata*. *Aplopappus sericeus*, Philippi) : humilis, fruticosus; foliis secus ramos breves confertissimis anguste lanceolatis rigidis utrinque attenuatis cuspidatis integerrimis undique sericeis; pedunculis elongatis nudis parce setaceo-bracteatis monocephalis; involucri hemisphaerici squamis lineari-subulatis glanduloso-puberulis, apicibus squarroso-patentibus; ligulis discum vix superantibus; acheniis sericeis. — Chili, on the Andes above Santiago. The rigid, entire, "silvery-silky, Protea-like leaves are crowded on the short and tufted woody branches. Head rather larger than that of *A. pidchellus*.



**APLOPAPPUS MAORJANUS**, will be a proper name for *Pyrrcoma* (*Chromochceta*) *angustifolia*, DC, *P. Afacraana*, Remy in Gay. Fl. Chil. ?), in honor of one of its discoverers.

APLOPAPPUS PARVIFOLIUS (*Pyrrcoma parvifolia*, DC), although nearly related to the last, is known by its smaller leaves and heads, and thinner, acutish scales, of the involucre. The genus *Pyrrcoma* cannot be sustained upon the rayless heads, as De Candolle and Remy would have it; for intimately related, and even identical species are both 'rayed' and rayless in different specimens, and the original *Pyrrcoma* has rays, as was long ago shown; the shape and the smoothness of the achenia also fail as characters; the form of the involucre scales offers no definite distinction, and the color of the pappus is of no account. That of *A. Macrceanus* varies from deeply rufous to fulvous. *A. ?* (*Pyrrcoma*) *Hankei*, DC, is *Corethrogyne filaginifolia*, and was doubtless collected in California.

NARDOPHYLLUM REVOLUTUM, DC. To this belongs *Dolichogyne stahelinoidei* and *D. gnaphalioides*, DC (*D. CandoUei*, Remy). Contrary to Weddell's opinion, it seems clear that Remy's second thought (in Ann. Sci. Nat. ser. 3, 12, p. 18\*4) was best, when he approximated *Dolichogyne* DC. to Dr. Hooker's section of *Chiliotrichum*, his genus, *Anaclinia*. The wonder is that he did not combine such evident congeners. *Dolichogyne*, however, is antedated by *Nardophyllum*, Hook, in **Ant.** Here it is again remarkable that De Candolle, who had established the latter genus upon Hooker and Arnott's data, did not suspect its identity with his subsequent *Dolichogyne*, probably because he had ascribed to the former "anthera basi bisetosas" and "pappus plumosus." The anthers, like the corolla, are strictly Asterineous, and the bristles of the pappus moderately barbellate along their thicker upper part, not "plumose," as Hooker and Arnott write in their generic character, and hardly "subplumose" as they give it under the species. As to Weddell's extension of *Dolichogyne* to include (in his section *Tola*) three species with heterogamous flowers, the pistillate ones incipiently ligulate, I remark that the adoption of this view would merge the whole in a still older genus, *Lepidophyllum*, Cass., which differs only in having the ligules a little more developed (yet often bilabiate or irregularly cleft), and the pappus of stouter bristles. The leaves of *Lepidophyllum cupressiforme* are indeed opposite; but both opposite and alternate leaves occur in the nearly allied South African genus *Pteronia*; and the difference between *L. cupressiforme* and *L.*

*Meyeni* (*Bacckaris quadrangularis*, Meyen, *DoUchogyne lepidophylla*, Wedd.) is paralleled in *Pteronia* and *Aphopappus*, &c. I should therefore propose to keep up the two genera, *Lepidophyllum* and *Nardophyllum*, and refer to the former (as above) Weddell's *DoUchogyne lepidophylla*, which he has figured, and probably his *D. rigida* and *D. nupetris*, with linear leaves. The nearest relative\* of both genera (if we may distinguish them as genera) inhabit the corresponding cool and dry portion of the northern part of the American Continent, where they constitute similar features in the vegetation, i. e. are mostly scabrous frutescent plants on naked plains or plateaux,—Xanthoxylum's *Ohrysotamnus* (sect. of *Lin. osyris*, Torr. & Gray) strictly representing *Nardophyllum* and *Ericameria* being analogous to *Lepidophyllum*. Taken in connection with geographical distribution, slight characters in the pappus (though weakened in *L. (Chrysothamnus) Bigelovii*) and in the style may serve to separate the North American from the South American species. Yet in a general system and under a truer valuation, of generic characters, they may well be combined. To *Nardophyllum* belong:—

**NARDOPHYLLUM KINGII** the *Chiliotriclum Kingii*, *King*. f. Fl. Antarc, this being a strict congener of *N. revolutum*, and therefore the following, of which I have no specimens to examine; and which perhaps are not all specifically distinct:—

**NARDOPHYLLUM SOMILE.** *Chiliotrichum humile*, Hook. f. *Anacatinia Hookeri*, *Hook.*

**NARDOPHYLLUM DARWINTI.** *Chiliotrichum Darwini*, Hook. f.

**CHILIOTRICHOIDES.** *Dolichogyne chiliotrichoides*, *Remy*. — Weddell's *DoUchogyne armata*, with the branched of the style subspatulate and oblong, appears doubtful.

**BACCHARIS GILLIESII** (*sp. nov.* *B. paucidentata*, var. *f.* *Hook. & Arn.* pi. masc.): herbacea e basi lignescens, glabra, humilis: caule ramosissimo; rami corymbosis gracilibus triato-angulatis foliosis, ultimo capitulo solitario terminata; foliis sessilibus leviter uninerviis aveniis, caulinis linearibus basi attenuata integerrima sen denis 2-4 patentibus, ramalibus parvis angustissimis; involucri campanulato, lobis oblongis obtusissimis coriaceis dorso herbaceis margine tenuiter scariosis apice lanato-ciliatis; acheniis glaberrimis; pappo fimbriato involucrum ter operante. — Bio Negro, North Patagonia: first gathered by Tweedie, and at Buenos Ayres by Gillies. One specimen in the Hookerian herbarium is ticketed *B. nana*, Don, a

name which I do not propose to revive, since the stems when well developed are a foot high. It is distinguished from *B. paucidentata* by its solitary heads, and its campanulate involucre with broader and very obtuse scales. *B. coridifolia* has clustered and much smaller heads, and scabrous-ciliate leaves. — *B. juncea*, Desf., to which belongs *B. subulata*, Don, often has the stems leafy, and so lignescent at the base that the root would seem to be perennial.

*Senecionidece.*

TITHONIA PUSILLA (sp. nov.): annua, hispidula; foliis oppositis subalternisve lanceolatis fere integerrimis breviter petiolatis; capitulis nudis pedunculatis; involucri squamis lanceolatis hirsutis subpaucis; acheniis villosis; pappi paleis 4 - 6 aristisque binis plumoso-ciliatis. — Obrajillo, Peru.

VIGUIERA PERUVIANA (sp. nov.): foliis alternis ellipticis seu ovato-oblongis acutatis vel mucronatis acute serratis trinervatis utrinque cinereis supra hispidulo-scabris subtus appresso-hirsutulis basi acutis subsessilibus; involucri squamis oblongo-lanceolatis apice patentibus extus praesertim ad margines albo-hirsutis; receptaculo obtuse conico; ligulis elongatis; pappo 4-squamellato biaristato. — Andes of Peru, between Obrajillo and Culluay.

COREOPSIS (AGARISTA) PICKERINGII (sp. nov.): suffruticosa, fere glaberrima; ramis apice longe nudis monocephalis; foliis oppositis petiolatis triternatisectis, segmentis lineari-subulatis rhachi tenui vix latioribus; involucris linearibus inferioribus oblongis dimidio brevioribus; paleis receptaculi oblongis obtusissimis, exterioribus dorso villosis; acheniis lineari-oblongis dorso sub palea glabris adventrem et praesertim margines villosissimis biaristatis; aristis villosobarbellatis corolla paullo achenio dimidio brevioribus. — High Andes of Peru above Obrajillo. — This is one of a group of species of the Andes which unite De Candolle's Californian genus *Agarista* to *Coreopsis*. Of these *C. fasciculata*, Wedd. is in the present collection, and is no. 571 of Matthews's collection in the same district, wherefore I had named it *O. Matthewii* in the Hookerian herbarium. It has both faces of the achenia glabrous, but the margins ciliate with long villi. *C. venusta*, H. B. K., or an apparent variety of it with nearly filiform leaves and smaller heads on short peduncles, was gathered by Matthews in the province of Chachapoyas. *C. capitate*, H. B. K., was collected by Seemann at Loxa. And the two succeeding species (of which the latter

most neatly approaches De Candolle's genus *Agarista*) are described from specimens in the Hookerian herbarium.

**COREOPSIS (AGARISTA) FOLIOSA (sp. nov.)** : ramis hirtellis usque ad apicem confertissime foliosis; foliis (subpollicaribus) oppositis glaberrimis rigidis crassiusculis tripartitis, segmentis lateralibus anguste spathulato-oblongis, terminali tripartito; capitulis paucis subcorymbosis breviter pedunculatis; involucri externi squamis 8 lineari-oblongis obtusissimis pubescentibus quam interiores ovales & brevioribus; ligulis (flavis) oblongis; corollis disci luteis demum brunneis; acheniis oblongis hirsutis utrinque unicarinatis margine hirsutissimis biaristatis; aristis subsquamelliformibus triquetris dense ciliato-hirsutis corollam adaequantibus. — Andes of Peru, Matthews, No. 1376.

**COREOPSIS-(AGARISTA) SPECTABILIS (sp. nov.)**: suffruticosa? glabra; foliis oppositis circumscriptione rotundis bipinnatisectis Tel 3-5-sectis, segmentis 5-partitis, lobis linearibus acutis integerrimis bi-trifidisve laxis; ramis in pedunculum longissimum (6-10-poll.) nudum monocephalum desinentibus; involucri ambobus 8-phyllis glaberrimis basi connatis, squamis exterioris linearibus quam interiores ovato-oblongae colorato-marginatae dimidio brevioribus; ligulis 8 magnis; disco luteo brunnescente; acheniis lineari-oblongis extus sub palea glabris marginibus et costa ventrali longissime villosis aristas 2 paleoliformes villosociliatas corollam subaequantibus gerentibus. Folia sesquipoll. diametro, capitulum disco semipoll. et ultra diam.; ligulae pollicaria, flavae. — Andes of Peru, McLean.

**COREOPSIS MAUIENSIS (sp. nov.)** : fruticosa, diffusa, parce hirtella, mox glabrata; foliis trisectis, segmentis oblongis vel subcuneatis incisedentatis (nunc 3-5-partitis seu terminali pinnatipartito); pedunculis elongatis monocephalis; involucri exterioris phyllis linearibus (apice nunc glandula instructis) interioribus sequantibus; acheniis glabris anguste oblongis modice alatis haud contortis apice bidentatis, dentibus triangulari-subulatis. — Maui, Sandwich Islands, on sandy or dry hills near the coast; a form with more dissected leaves also collected by Remy.

*Coreopsis* and *Bidens* are separated by a single, artificial, and not wholly constant character. The group of species on which Nuttall grounded his genus *Diodonta* wholly accords with the *Platycarpea* section of *Bidens*, except that the awns or teeth are antrorsely hispid or naked. Recently we have received, from Mr. Fritchey of Missouri, specimens of *C. aristosa*, Michx., or perhaps of a wild cross between

that species and some *Bidens*, with *retrorsely* hispid awns. The Sandwich Islands offer a series of species which equally connect the *Psilocarpea* section of *Bidens* with *Coreopsis*. Some of these, having their achenia remarkably curved or twisted at maturity, were naturally distinguished as a separate genus, *Campylotheca*. But its adoption merely gives us three limitless genera unmarked by any peculiarity of habit in the place of two artificially separated ones. The foregoing species is in all respects a good *Coreopsis*. The first of the following ones differs merely in its elongated achenium, slightly disposed to curve or twist. The others are *Campylothece*, with more or less curved or spirally twisted achenia, either narrowly wing-margined or wingless, but manifest congeners of the rest. Their union with *Coreopsis* is suggested both by their wanting the technical character of *Bidens*, and by the fact that the former already contains species with winged and with curved achenia. On the other hand only a slight and arbitrary line is to be drawn between *Bidens Sandwicensis*, Less., and *Campylotheca micrantha*. Yet when the (always straight) achenia of the former bears awns, these are retrorsely hispid, although sparingly so. Vain is the attempt to draw absolute limits where Nature luxuriates in gradations; but, on the whole, the old distinction between *Bidens* and *Coreopsis* appears to be practically the best one.

COREOPSIS (CAMPTLOTHECA) MACROCARPA (sp. nov.): herbacea ? glabra; foliis pinnatim 5-sectis, segmentis ovatis cuspidato-acuminatis argutissime creberrime serrulatis; pedunculis oligocephalis folia sub-superantibus; acheniis pro capitulo magnis (subpollicaribus) linearibus striatis alatis vix tortis subapice biaristulatis seu bicorniculatis. — Sandwich Islands, on the mountains of Oahu.

COREOPSIS (CAMPTLOTHECA) MACRAEI (*Campylotheca grandijtora*, DC. Prodr.) : herbacea, puberulo-hirtella; ramis elongatis patentibus ; foliis ternatim sectis, segmentis lanceolatis acuminatis creberrime serratis ; capitulis laxè paniculatis haud magnis; acheniis linearibus glaberrimis calloso-marginatis calvis "aut junioribus vix bisetosis" spirali-ter tortis. — Hawaii, Sandwich Islands, Macrae, Remy. The above character is drawn up (with De Candolle's in view) from no. 287 of Eemy's collection, supplied by the Paris Museum. The species does not merit the name *grandiflora* (preoccupied in *Coreopsis*), although the heads are nearly twice the size of those of *C. micrantha*.

COREOPSIS (CAMPYLOTHECA) COSMOIDÈS (sp. nov.) herbacea, fere glabra; foliis caulinis pinnatim 5-sectis summisve trisectis, ramealibus

saepe indivisis segmentisque ovato-oblongis acuminatis argute serratis membranaceis; pedunculis breviusculis monocephalis; capitulo magno (pollicem longo) ; involucreo exteriori 8-phyllo interius adaequante, phyllis oblongis seu oblongo-lanceolatis; ligulis (subpollicaribus) apice inciso lobatis; genitalibus praesertim stylo longissimo valde exsertis; acheniis (immaturis) linearibus exalatis nunc flexuoso-curvatis margine bispidulis apice setuloso-corniculatis aristis 2 brevibus seu brevissimis fere nudis subterminatis. — Hawaii, Sandwich Islands: also in coll. Remy, no. 278.

COREOPSIS (CAMPTLOTHECA) MENZIESII (sp. nov. *Campylotheca australis*, Less, pro parte?): suffruticosa, fere glaberrima, corymbosoi ramosa; foliis bipinnati-(vel subternati-) sectis, summis 3 - 5-partitis, segmentis longe anguste linearibus integerrimis; capitulis parvis (2 lin. longis) plurimis in corymbum digestis breviter pedunculatis ; involucreo exteriori brevioris; acheniis angustissime linearibus elongatis glaberrimis apice calvis rariusve obsolete 1 - 2-setulosis, exterioribus saepe tenuiter subalatis, maturis leviter flexuosis vel tortis. — Variat inflorescentia foliisque (segmentis interdum laciniatis) pi. m. pubescentibus. Ligulae 3 lin. longae. — Hawaii and Maui, Sandwich Islands. Also collected by Menzies, Chamisso ? and Remy.

COREOPSIS (CAMPTLOTHECA) MICRANTHA (*Bidens micrantha*, Gaud. *Campylotheca micrantha*, Cass. *G. australis*, Less. excl. syn. Forst. & Spreng.): basi suffruticosa, glabra, paniculato-ramosa; foliis pinnatis 3 - 7-sectis partitisve, summis nunc indivisis, segmentis lanceolatis seu oblongo-lanceolatis grosse argute serratis nunc incisus nunc 3-5-fidis venosis; capitulis parvis (2 lin. longis) plurimis corymbosis; involucris subaequilongis; acheniis elongatis angustissime linearibus glabris exalatis apice nudo aut truncato aut saepius mucrones vel aristulas 1-2 breves laeves gerentibus, raturis brunneis arete spiraliter contortis. — Sandwich Islands, especially Oahu. Variable in the foliage, which is commonly more dissected than in Gaudichaud's figure. Chamisso seems to have had specimens of *C. Menziesii* intermixed with various forms of the present species. The achenium, described by Lessing as "anguste alatum" would appear to belong to the former species.

BIDENS SANDWICENSIS (Less.): herbacea, glabra; foliis membranaceis plerisque trisectis, segmentis ovatis seu ovato-lanceolatis acutiusculis argute serratis, lateralibus petiolulatis vel sessilibus; capitulis laxo corymboso-paniculatis parvis radiatis; involucris phyllis linearibus gla-

bris eciliatis; acheniis anguste linearibus glabris vel marginibus parce hispidulis apice setulosis aut exaristatis aut aristatis 1-2 (nunc nudis nunc parce retrorsum hispidulis) superatis. — To this belongs *B. micrantha*, Hook. & Arn., but not of Gaudichaud; *B. peduncularis*, DC, but not of Gaudichaud; *B. mutica* and *B. gracilis* of Nuttall. In more than one collection it has been confounded with *Campylotheca micrantha*. Moreover, the awnless state is doubtless the *Adenolepis pulchella* of Lessing; a gland-like thickening at the tip of the involucre scales being often obvious in this, and also in some allied species (especially in *Coreopsis Mauiensis*), but, it is inconstant. To this species may also be referred *B. paniculata*, Hook. & Arn., from Tahiti (as a simple-leaved state, with the awns more developed and more barbed than usual), and probably *B. angustifolia*, Nutt. (with dissected leaves); likewise the following varieties: —

Var. HETEROPHYLLA (*R. luxurians*, Hook. & Arn.): caule basi suffruticosa? foliis longe petiolatis plerisque simplicibus oblongo-lanceolatis acumine longo integerrimo caudatis basi attenuatis, paucis trisectis, segmentis sublinearibus; acheniis saepius biaristulatis.

Var. OVATIFOLIA: caule herbaceo; foliis simplicibus ovatis subcordatis longissime petiolatis; ovario coronula setularum superatis exaristatis.

BIDENS HAWAIENSIS (sp. nov.): herbacea, glaberrima; caule elato ramoso polycephalo; capitulis corymboso-paniculatis; foliis omnibus simplicibus longe petiolatis oblongis vel ovatis acutis vel acuminatis crebre serratis crassiusculis; involucri glaberrimi phyllis linearibus obtusis eciliatis; ligulis 7-8 elongatis; acheniis anguste linearibus glabris apice nudo breviter biaristatis, aristis erectis retrorsum barbatis.—Hawaii, Sandwich Islands, at various stations. Disk of the capitulum when in flower 3 or 4, in fruit fully 6, lines long; ligules yellow, 5-9 lines long.

BIDENS LANTANOIDES (sp. nov.): fruticosa, ramosa, hirsutulo-pubescentis; foliis omnibus simplicibus ovalibus oblongisve creberrime serratis petiolatis; pedunculis solitariis monocephalis folia subsequantibus; involucri exterioris phyllis lineari-oblongis discum adsequantibus; ligulis brevibus; acheniis lineari-subtetragonis marginibus apiceque hispidulis breviter vel brevissime biaristatis.—Eimeo, Society Islands. Head 4 lines in diameter.

Var.? GLABRATA: magis herbacea; foliis utrinque attenuatis; capitulis subpaniculatis. — Tahiti.

**LIPOCHIETA, DC. excl. sp. Amer.**

- Lipotriche*, proparte, Less, in Linnæa, 6, p. 510, & Syn. p. 231, non R. Br.  
*Lipochceta*, DC. Prodr. 5, p. 610, excl. sp. Amer. (i. e. sp. *Zexmenice*).  
*Mitchata*, Nutt. in Trans. Amer. Phil. Soc. 7, p. 450, excl. sp. *Wollastonica* B.  
*Schizoplyllum*, Nutt. 1. c. p. 452, non Fries.  
*Aphanopappus*, Endl. Gen. Suppl. 2, p. 43.  
*Macrcea*, Hook. f. in Proceed. Linn. Soc. n. 28, p. 278, & Linn. Trans. (Fl. Galap.).  
*Trigonopterum*, Anderss. Yeg. Galap. in Yoy. Eugen. Bot. t. 6, f. 1.

I cannot doubt that the following Sandwichian species are all congeneric, notwithstanding their diversified habit, and the complete abortion in two of them of the short awns or chaffy scales of the pappus. With the latter may also be associated Dr. Hooker's *Macrcea*, in which the coronula is generally a little more developed, and the awns, obsolete, but not always entirely wanting. To merge all these plants in *Wottastonia* (which shows no tendency to winged achenia) would hardly be permitted, although the earlier-enumerated of the following species would not there appear widely out of place. On the whole, it will be more difficult to separate them clearly from *Wedelia* on the one hand and *Zexmenia* on the other.

Since the last-named genus takes in all the American species of De Candolle's *Lipochceta*, which genus was essentially founded upon Lessing's *Lipotriche*, and this mainly upon the leading Sandwichian species, it is evident that the present group should in strictness bear the name of *Lipochceta*. If the rule of priority be waived on account of the inappropriateness of this name to one or two of the species, the succession would best fall upon *Macrcea*. But convenience in the present instance coincides with precedence.

L. AUSTRALIS (*Lipotriche australis*, Less.) : suffruticosa, hirtello-scabra vel hispidula; foliis ovatis ovato-lanceolatisve 3-5-plinerviis acuminatis argute serratis nunc incisus aut sessilibus aut in petiolum brevem niarginatum decurrentibus; involucris squamis ovato-lanceolatis subacuminatis.

Var. a. CONNATA (*Verbesina connata*, Gaud. *Lipochceta connata*, DC.) : foliis sessilibus basi nunc angustata connatis nunc late connato-plexicaulibus.

Var. /3. DECURRENS : foliis basi in petiolum plerumque alatum contractis, lamina nunc ovata seu rhombea nunc oblongo-lanceolata, in latifoliis sæpius argute duplicato-vel laciniato-serrata.—Here probably belongs *Microchceta lanceolata* Nutt.



Var. y. LOBATA (*Verbesina lobata*, Gaud. *V. hastuhta*, Hook. & Am. *Lipochceta lobata* *fy kastulata*, DC.): foliis subsessilibus vel breviter petiolatis basim versus utrinque lobatis seu laciniato-dentatis. — Pappus, in all the forms of this polymorphous species, of 2 or 3 short chaffy awns or narrow scales. In all the species an epigynous gland, at the base of style of the disk-flowers, fills the bottom of the tube of the corolla.

L. SUBCORDATA (sp. nov.): herbacea? erecta, cinereo-strigulosa; foliis deltoideo-subcordatis acuminatis duplicato-serratis reticulatis longe petiolatis, petiolis gracilibus; involucri squamis ovato-oblongis obtusiusculis. — Hawaii, on the coast.

L. GALYCOSA (sp. nov.): fruticosa, hispidulo-scabra; foliis lanceolatis oblongisve obtusis obsolete subserratis vix triplinerviis brevissime petiolatis; involucri squamis 5-8 ovalibus seu obovatis obtusissimis foliaceis discum subsuperantibus; paleis receptaculi convolutis truncatis. — Diamond Hill, Oahu.

L. LAVARUM, DC. (*Verbesina lavarum*, Gaud.) Well marked by its silvery-canescient (but scarcely strigose) leaves, which vary from narrowly to broadly lanceolate or oblong, the veins and triple ribs conspicuous beneath. Achenia all fertile, very variable (as in the other species and in the manner of many Yerbesinoid genera) as to the wings, &c. The wings, when developed, are extended upwards into a salient process as long as the pappus (which is of 2 or 3 stout, puberulent, more or less clavate and blunt awns or paleae) but wholly free from it.

L. INTEGRIFOLIA (*Microchceta integrifolia*, Nutt.): herbacea e radice lignescente, humifusa, ramosissima, minutim sericeo-canescente; foliis subcarnosis parvis (pollicaribus) spathulatis linearibusque integerimis, venis haud perspicuis; pedunculis solitariis terminalibus; involucri squamis biseriatis ovatis vel rotundis obtusissimis disco brevioribus; paleis receptaculi obtusissimis. — Oahu and Maui. Achenia generally less winged than in the preceding.

L. SUCCULENTA, DC. (which Remy has collected both upon Nihau and Kauai), has the habit of *JEclipta*, and ranges between *L. australis* and *L. integrifolia*. The leaves are not absolutely glabrous; a lens shows some minute strigose hairs.

L. HETROPHYLLA (sp. nov.): suffruticosa, ramosissima, erecta, asperohispidula; foliis plerisque trifidis, segmentis oblongo-linearibus seu lineari-lanceolatis denticulatis nunc lacihiatis vel inciso-pinnatifidis; involu-

cri squamis late ovatis ssepius acuminatis disco parum brevioribus; paleis receptaculi mucronatis. — Folia 1 - 3-pollicaria, nunc petiolata petiolis marginatis, nunc connato-amplexicaulia. — Maui. Pappus of 2 or 3 very short and squamellate awns or palese, which are somewhat coroniform concreted at their base.

L. TENUIFOLIA (sp. nov.) : herbacea, erecta, gracilis, fere glabra: foliis pinnatipartitis, segmentis rhachique angustissime linearibus seu filiformibus integerrimis; involucris squamis lanceolatis discum adsequantibus; paleis receptaculi acutatis. — Oahu. The achenia are 2 - 4-angled, their angles sometimes slightly winged, or produced at the summit; and the pappus consists of 2 to 4 short and somewhat deciduous awns.

L. (APHANOPAPPUS) MICRANTHA (*Schizophyllum micranthum*, Nutt. *Aphanopappus Nuttattii*, Walp.) : herbacea, minutim strigulosa; caulibus gracillimis ramosissimis diffusis; foliis tenuibus bi - tripinnatipartitis, segmentis parvis subcuneatis saepe bi-trilobatis; capitulis parvis breve pedunculatis; involucris squamis exterioribus lineari-spathulatis laxis, interioribus oblongis; ligulis 2 - 3 ovalibus; fl. disci 6 - 8; acheniis apteris; pappo obsolescente.— Kauai (Atooi). Ovaries pubescent at the summit, as in *Lipochceta* generally, the short hairs, or part of them, apparently forming a minute coronulate pappus, of which only mere vestiges remain upon the mature short-obovate achenium. The exterior achenia are the most fertile, and turgid, 3-4-angled; the inner more compressed or lenticular; the central ones by no means always infertile.

L. (APHANOPAPPUS) REMYI (sp. nov.): herbacea, ramosissima, diffusa, cinereo-hirsuta; foliis oblongis petiolatis obtusis saepius parce dentatis vel sublobatis, superioribus alternis; capitulis parvis subpaniculatis breviter pedunculatis; involucris squamis oblongis obtusis; ligulis 5 - 7 obovatis brevibus; acheniis radii praesertim ad angulos tuberculatis vel interrupte subalatis, disci inanibus; pappo obsoleto.— Oahu, Remy, no. 260.

L. (APHANOPAPPUS) LARICIFOLIA. *Macrcea laricifolia*, Hook. f. *Trigonopterum Ponteni*, Anders. — Galapagos Islands.

GUNTHERIA MEGAPOTAMICA, Spreng. *Polypteris Brasiliensis*, Less, in *Linnoea*. *Gercostylis Brasiliensis*, Less. Syn. Compos. Sprengel's name for the genus, founded like Lessing's upon Sellow's specimens, and revived by Schlechtendal (*Linnaea*, 11, p. 4), is the earlier by several years, and nothing stands in the way of its restoration. The

genus is the representative, on the plains of Buenos Ayres, &c, of *Gaillardia* and *Agassizia* in the equivalent region of North America; and the three genera are very closely related. The style of the *Guntheria* is intermediate between that of these two related genera, from both of which it recedes in the want of rays, and of an involucre around the achenia.

Var. SCABIOSOIDES : foliis pinnati- vel sub-bipinnati-partitis. *C. seabiosoides* Sy Arn. in DC.

RAILLARDIA, Gaud. — Although the rays of the pappus are setae instead of paleae, the true place of this genus is next to *Dubautia*, among the *Helenieae*. It differs from *Dubautia* chiefly in the slender and truly plumose setae of the pappus, the absence of chaff to the receptacle (which is convex or obtusely conical and pubescent) and in the nearly valvately uniserial involucre, the scales of which connive or lightly cohere into a cylindrical cup. These two genera, with *Argyroxiphium* and *Wilkesia* (a connecting link between *Argyroxiphium* and *Dubautia*) are the striking, characteristic, and wholly peculiar shrubby or arborescent Composites of the Sandwich Islands, especially of their high mountain region or elevated lava plains. The present collection contains specimens of the four published species of *Raillardia*, in such perfection and variety as to enable me to characterize them properly, and also, five others. Some of these are so polymorphous — after the fashion of the characteristic plants of those Islands — that, at the first view of the collection, one would be disposed to double the number of species here admitted. The species now known may be arranged as follows, under three sections; of which the third, by its nervose leaves and more numerous flowers in the capitula, most approaches the genus *Dubautia*,

§ 1. *Venoso-reticulatæ*.

1. RAILLARDIA LATIFOLIA (sp. nov.): foliis oppositis planis amplis oblongis penninerviis reticulatovenulosis dissitis subpetiolatis cum ramis elongatis patentibus glaberrimis; capitulis 4-5-floris numerosissimis in panicula nuda composita effusa. — Island of Kauai. A rambling shrub.

§ 2. *Uhinervia, avenice*.

2. RAILLARDIA SCABRA (DC): humilis; caulibus floridis (1-2-ped.) gracilibus superne parce foliatis ferè herbaceis e basi decumbente irritica ramosa; foliis plerisque alternis linearibus uninerviis supra vel

undique hispidulo-scabris marginibus revolutis baud raro parce dentatis, inferioribus confertissimis reflexis; capitulis plurimis paniculato-corymbosis 5 - 7-floris. — Var. j8. **HISPIDULA** : gracilior, foliis anguste linearibus utrinque hispidulis. y. **LEIOPHYLXA** : foliis anguste linearibus laevigatis vel superne obsolete marginibusque hispidulo-scabris. — Hawaii 4nd Maui.

3. **RAILLARDIA LAXIFLORA** (DC.) : ramis etiam floridis ligneis saepius foliosissimis; foliis latiuscule linearibus seu lanceolatis planis vel marginibus (scabris nunc denticulatis) parum revolutis uninerviis crassis supra lucidis scaberulis seu laevigatis patentibus serius reflexis, plerisque ternato-verticillatis, superioribus saspe alternis; panicula subsimplici laxa; capitulis plerumque longe pedicellatis 6 - 13-floris. — Hawaii. Intermediate between the preceding and the following, apparently very different, species.

4. **RAILLARDIA CILIOLOATA** (DC.) : ramosissima; ramis usque ad apicem confertissime foliosis ligneis; foliis lanceolatis lineari-oblongis vel obtuse lanceolato-subulatis crassis uninerviis infra convexis seu carinatis supra concavis vel marginibus (semper hispidulo-ciliatis scabro-ciliolatisve) leviter involutis lucidis oppositis ternisve plerisque arrectis seu erectiusculis et secus ramos steriles imbricatis; capitulis paucis subracemosis 5-12-floris. — Variat foliis vernicoso-lucidis vel opacis, laevigatis scaberulis vel hispidulis, et (in extremis), j3. **LAXIFOLIA** : foliis patentibus subplanis minus crebris. y, **JUNIPEROIDES** : foliis minoribus involuto-canaliculatis quasi acerosis confertissimis imbricatis; capitulis subsolitariis. — Hawaii.

### § 3. *Nervosce.*

\* **Folia plana, 3-11-nervia, omnia opposita vel plerumque terna, subpatentia vel patentissima, nunc denticulata.**

5. **RAILLARDIA LINEARIS** (Gaud.) : orgyalis; ramis laxis patentibus; foliis confertiusculis lanceolatis linearibusve 3 - 5-nerviis utrinque vel basi attenuatis glabris vel sericeo-puberulis; paniculis compositis polycephalis nudis; capitulis cymuloso-fasciculatis 3 - 7 - (raro 12-) floris. — Oahu, Hawaii, and Maui.

6. **RAILLARDIA MENZIESII** (sp. nov.) : ramis rigidis usque ad apicem conferte foliosissimis; foliis ellipticis seu lanceolato-oblongis arete sessilibus 3-5-nerviis scabro-hirsutulis (nunc laevigatis); panicula subsimplici; capitulis pedicellatis 7-15-floris. — Variat foliis laxiusculis subpatentibus seu confertis fere imbricatis, oblongo-lanceolatis seu

ovato-ellipticis, opacis hirsutulis vel nitidis glabratis, marginibus hispidulo-ciliatis. — Hawaii and Maui. «

7. *KAILLARDIA PLATYPHYLLA* (sp. nov.): fruticosa; ramis validis conferte foliosissimis; foliis oppositis lanceolato-ovatis e basi semiamplexicauli ad apicem sensim angustatis subacutis 7-11-nerviis undique scaberrimis, junioribus glanduloso-viscosis; panicula nuda; capitulis 10 - 20-floris. — Variat foliis angustioribus oblongo-lanceolatis ternis. — Maui. Leaves 2 or 3 inches long, commonly an inch wide next the base.

8. *RAILLARDIA ARBOREA* (sp. nov.): trunco 20-pedali; ramis validis conferte foliosis; foliis elliptico- seu elongato-oblongis utrinque obtusissimis arete sessilibus 3-5-nerviis glanduloso-scabridis, junioribus viscoso-pubescentibus; panicula basi foliosa cum involucre 9 - 14-phylo 25 - 45-floro hirsutis et glanduloso-viscosis. — Hawaii, on Mouna Kea. Leaves 1 ½ to 2 inches long.

\* \* Folia pi. m. concava, erecto-imbricata, terna, leviter vel infra obsolete 3-5-nervia.

9. *KAILLARDIA STRUTHIOLOIDES* (sp. nov.): caule arborescente; foliis secus ramos imbricato-confertis oblongo- seu elliptico-lanceolatis acutiusculis arete sessilibus cinereo-hispidulis vel scabridis, junioribus hirsuto-ciliatis; panicula seu racemo simplici; involucre 6-9-phylo 12 - 20-floro. — Hawaii, on Mouna ETea, with the preceding and higher. Leaves 1J to 2 inches long.

*DUBAUTIA*, Gaud. — The best published description is that of Lessing, who rightly ascribed to *D. plantaginea* a couple of palese on the receptacle. These, overlooked by Hooker and Arnott, and therefore, it would seem, ignored by De Candolle and Endlicher,\* are generally if not always present whenever the flowers are more numerous than the scales of the involucre, subtending the flowers which are not subtended, and their achenia embraced, by the involucre scales. In *D. laxa*, accordingly, these palese are more obvious, and still more striking are they in a new species with many-flowered heads, which is moreover remarkable for its truly paleaceous, instead of aristiform, pappus. As the old species need diagnoses as well as the new, I append the characters of all of them.

1. *DUBAUTIA PLANTAGINEA* (Gaud.): foliis glabratis glabrisve elongato-lanceolatis sensim acuminatis basi modice angustatis; capitulis parvis 7 - 10-floris numerosissimis in ramos divergentes folioso-bracte-

atos paniculæ thyrsoides magnæ congestis; receptaculi parvi paleis 1-3; corollas tubo gracili limbo abrupte campanulato duplo longiore pappi sordidi paleas aristiformes barbellatas subsuperante. — Oahu and Hawaii. — In Gaudichaud's original specimens the inflorescence is undeveloped, so that his plate gives no idea of the ample, thyrsoid, compound panicle, the divaricate primary branches of which are sometimes six inches long, nor of the great number of the small heads. The leaves, also, are represented as much too broad at the base.

2. *DUBAUTIA LJSVIGATA* (sp. nov.): foliis oblongo-lanceolatis deorsum longe attenuatis quasi petiolatis ultra medium argute serratis laxè inconspicue plurinerviis nitidis ramisque glaberrimis; panicula thyrsiformi pedunculata nuda; receptaculo parvo. Flores desunt. — Kauai, Sandwich Islands. Incompletely known; possibly a variety of the foregoing.

3. *DUBAUTIA LAXA* (Hook. & Arn.): foliis glabratis vel strigosohispidis oblongo-lanceolatis rariusve ovali- seu cuneato-oblongis antice argute serrulatis acuminatis deorsum longe attenuatis; capitulis 10-15-floris parvulis in cymam brevem congestis; corolla paleas pappi (mox rufi) subuladforistiformes serrato-fimbriolatas vix superante, tubo glanduloso. — Oahu. Badly named, the inflorescence being less lax than that of *D. plantaginea* in fully developed specimens.

4. *DUBAUTIA PALEATA* (sp. nov.): foliis strigoso-hispidulis lato lanceolatis utrinque vix angustatis sessilibus; capitulis 12-30-floris corymbosis paucis majusculis (5-6 lin. longis); receptaculo elevato paleis pluribus onusto; corollas tubo pappi paleas lanceolatas margine eroso-denticulatas superante, fauce vix ampliata, limbo 5-partito. — Kauai, Sandwich Islands.

*ARGYROXIPHIMUM* and *WILKESIA*. The characters of the latter genus, and of a new species of *Argyroxiphium*, with the announcement that this had a circle of paleae at the margin of the receptacle, — and epappose ray-achenia enclosed in the involute subtending scales of the involucre, and therefore belonged to the *Madiece*, — were published by me, in the Proceedings of the Academy (Vol. II. p. 160), a dozen years ago. These notes appear to have escaped attention. Having now further to add that the paleas of *Argyroxiphium* are concreted into a cup, in the manner of several *Madiece*, — so that, indeed, *Wilkesia* may be viewed as an *Argyroxiphium* with the ray-flowers and the subtending involucre suppressed, — it is worth while to reproduce the characters with emendations.

## WILKESIA, Gray.

Capitulum homoganum, multiflorum. Involucrum campanulatum, 14-28-dentatum, bina inde subincisum, herbaceo-membranaceum, dentibus villosociliatis. Receptaculum convexum, nudum, glabrum. Flores hermaphroditi, conformes. Corollas tubulosas, glabras, e tubo gracili cyathiformes, lobis 5 brevibus recurvis. Antherae ecaudatae. Styli rami revoluti, cono hispidulo complanato apice subulato superati. Achenia elongata, compresso-quadrangulata, ad angulos seu costas hispidula. Pappus paleaceus, persistens, uniserialis, paleis 8 lanceolato-subulatis hirtociliatis. — Arbuscula? Sandwicensis, Yuccaeformis; caule simplici orgyali seu biorgyali; foliis lineari-gladiatis summisve lanceolatis coriaceis crebre nervulosis praeter margines tomentoso-ciliatos glabris (nascentibus sericeis) in verticillos propinquos polyphyllis congestis et per baseos p. m. coadunatis; pedunculis gracilibus glandulosis 1-5-cepbalis ex axillis fol. supr. ortis paniculam laxam amplam efficientibus; capitulis post anthesin nutantibus.

WILKESIA GYMNOXIPHUM, Gray, l. c. — Kauai, Sandwich Islands, alt. 3,700 feet

## ARGYROXIPHUM, DC.

Capitulum hemisphaericum, heterogamum, multiflorum; fl. radii uniserialibus ligulatis foemineis, disci hermaphroditis tubulosis. Involucrum uniserialis, squamis numerosis (tot quot ligulae) discum subaequantibus angustis convolutis achenia radii involventibus. Receptaculum convexum vel conicum, inter radium et discum gerens paleas uniserialis gamophyllas, ceterum nudum. Ligulae breves, plerumque tridentatae. Corolla fl. herm. glabra, e tubo gracili sursum ampliata, 5-dentata. Antherae ecaudatae; filamenta sub apice articulata. Styli rami lineares, fl. herm. cono complanato hispidulo superati. Achenia elongata, glabra, 4-5-angulata angulis costaeformibus, radii incurva, aut omnia praeter coronulam brevem calva, aut disci pappo persistente, e paleis paucis valde inaequalibus subconcretis, superata. — Herba? insignis, Sandwicensis, 3-6-pedalis; caule simplici percrasso foliis angustis pugioniformibus plerumque sericeo-argenteis confertissimis undique horrente, panicula ampla laxius foliata terminata; pedunculis viscoso-pubescentibus; capitulis nutantibus; floribus radii luteis, disci roseo-purpureis.

1. A. SANDWICENSE, DC: ligulis 12-16 longiusculis; styli fl. disci ramis breviter obtuseque appendiculatis; acheniis disci inaequaliter

paleaceo-papposis; receptaculo convexo. — Hawaii, alt. 6,300-12,000 feet.

2. *A. MACROCEPHALUM* (Gray in Proceed. Amer. Acad. 2, p. 160) : capitulo sesqui-bipollicari; ligulis 20-30 brevibus; styli fl. disci ramis cono acuto superatis; pappo nisi coronula brevissima disciformi nullo; receptaculo conico. — Maui, above 9,000 feet.

*ABROTANELLA (CERATELLA) SUBMARGINATA* (sp. nov.) : pulvinato-caespitosa; foliis crebris linearibus e basi erecta patentibus sursum leviter calloso-marginatis truncato-obtusis vel retusis; capitulis solitariis subsessilibus paucifloris; involucri squamis subuninerviis; acheniis obsolete 4-nervatis angulatisve inferne hirtellis pappo coroniformi et pauciaristulato vel dentato superatis. — Orange Harbor, Fuegia. — In foliage nearly intermediate between *A. emarginata* and the following species, in general appearance very like *A. (Ceratella, Hook, t.) rosulata*, but the leaves smaller and narrower. Heads and flowers nearly as in *A. emarginata*, but with a rather conspicuous pappus, consisting of a thin and scarious coronula, two to four teeth of which are commonly extended into short awns. — Nothing is less reliable, at least generically, than distinctions founded upon the presence, degree of development, or absence of a paleaceous, coroniform, or other reduced kind of pappus. Dr. Hooker will not be surprised that this and the following species demand the reduction of his *Ceratella*, *Trineuron*, and therefore *Scleroleima*, to *Abrotanella*.

*ABROTANELLA (CERATELLA) LINEARIFOLIA* (sp. nov.) : laxe caespitosa; foliis linearibus seu lineari-subspathulatis immarginatis patulis, supremis capitulum pedunculatum adsequantibus; involucri squamis ovalibus sub-2-3-nervatis; floribus foemineis 2-3, hermaphroditis 6-8 stylo pi. m. bifido, omnibus ssepissime fertilibus; acheniis glaberrimis elongato-obovatis 4-costatis apice subcontractis pappo obscure cupulato truncato nunc sub-4-dentato nunc plane 4-aristulato superatis. — Orange Harbor, Fuegia. — With the aspect and foliage (although on a rather smaller scale) of *A. spathulata (Trineuron, Hook, f.)* this has the floral characters of *A. (Ceratella) rosulata*, except that the flowers are all fertile; and as to the pappus, it is intermediate between *Ceratella* and *Scleroleima*.

*ARTEMISIA AUSTRALIS*, Less. Frutex!

Var. a. *ESCHSCHOLTZIANA*: foliis adultis subtus canescentibus supra glabratiss, lobis planis saepius parce incisiss. — Oahu and Kauai.



Var. 0. MAUIENSIS : foliis utrinque incanis, vetustissimis glabrescentibus, divisionibus lobisque plerumque h'lififormibus integerrimis. — Crater of Maui.

LUCILIA, Cass., remanded to the *Gnaphaliece* by Remy, and rightly described as to the pappus by Weddell, ought to include *Belloa*, too slightly distinguished by the papillose instead of silky achenia, as is *Merope*, by the at length spreading, instead of connivent, scales of the involucre.' In some specimens they appear neither to spread nor to connive. — Nuttall's *Gnaphalium depression*, described from Pichincha specimens of Professor Jameson's collection (nq. 642 and 57) is not the *G. radians*, Benth. i. e. *L. {Merope} Kunthiana*, but apparently the *L. conoidea*, Wedd., or near it, although larger. *L. gnaphalioides*, Less, includes *L. argentea*, Hook. & Arn., in which, by a typographical error of the Prodrumus, the heads are said to be three-flowered in place of thirty-flowered.

LUCILIA (MEROPE) PIPTOLEPIS, Wedd., a form with more caulescent sterile shoots from the Peruvian Andes.

LUCILIA (MEROPE) SCHULTZII (*Gnaphalicum evacoides*, Schultz Bip. and *Merope Schuhzii*, Wedd.), a depressed, pulvinate plant, with the habit of *Sikne acaulis*, has glabrous achenia.

LUCILIA (MEROPE) PICKERINGII (sp. nov.): cano-tomentosa, multi-ceps, depressa; caulibus confertis uncialibus foliatis; foliis spathulatis seu obovatis planis dense undique lanuginosis; capitulis subsolitariis sessilibus cylindraceis; involucri squamis interioribus linearibus obtusiusculis badiis discum aequantibus/, acheniis minutim papillois. — Var. (3. ? MINOR : condensata, pube appressa, capitulis minoribus aggregatis, — High Andes of Peru.

ANTENNARIA § MNIODES. — Plant® andicolae, musciformes, densissime pulvinate-csespitosae, cinereo-tomentosae; foliis obovatis squamaeformibus creberrimis arete imbricatis; capitulis solitariis in apice ramulorum inter folia sessilibus fere absconditis: dioica.

1. ANTENNARIA (MNIODES) ANDINA (sp. nov.): foliis lingulato-subcuneatis fere truncatis retusisve utrinque pilis longis crebris villosocrinitis; involucri squamis lineribus obtusis; acheniis glabris; pappi setis fl. masc. apice subito valde clavato-incrassatis. — Alparamarca, high Andes of Peru. Also collected by Hsenke, in the same region. Forming cushion-like perennial tufts, like those of *Leucobryum*, and of the related *Mcy'a*, Wedd. Flowers as in *Antennaria*.

2. ANTENNARIA (MNIODES) ARETIOIDES (*Baccharis aretiodes*, Schultz Bip., *Merope aretioides*, Wedd. Chlor. And: t. 25),\*from the Andes a little farther south, has more obovate, less truncate, and much less villous leaves, papillose sterile ovaria (fertile plant not known), and the bristles of the male pappus very gradually and moderately thickened upwards. These distinctions are derived from Weddell's figure and description, and from a small specimen of no. 1823 of Lechler's collection, kindly communicated by Dr. Schultz. But what he has communicated under the same name, from Hsenke's *reliquice*, is plainly the *A. andina*.

WERNERIA, H. B. K. This interesting and now rather polymorphous andine genus, like its analogue *Senecio*, is either radiate or discoid, the rays either yellow, white, or rose-color; the branches of the style are either truncate, or, in a few species, tipped with a setiform appendage. In one remarkable species the receptacle is alveolate; in one or two the leaves on the branches, or some of them, are opposite; in several there are five abnormal nerves to the disk-corollas, occupying the axis of the lobes, as in De Candolle's *Mesogramma*; but this is an inconstant character. The collection of the Exploring Expedition comprises the following species, viz.: —

WERNERIA NUBIGENA, H. B. K., including, with Weddell, *W. disticha* and *graminifolia*, but not *W. rigida* (misprinted *frigida* by De Candolle), which is apparently the larger form of *W. pumila*.

WERNERIA ORBIGNYANA, Wedd., var. BREVIRADIATA: involucri laciniis 10-14 ligulas breves adaequantibus; foliis saepius integerrimis. — High Andes of Peru, near Casa Gancho. This, which I had formerly named *W. nuda*, is perhaps *W. nubigena* var. *caulescens*, *leioscapa*, Wedd. 1. c.

WERNERIA VILLOSA (sp. nov.): rhizomate repente; caule florifero" gracili simplici usque ad eapitulum parce folioso villosolano; foliis angustissime linearibus primum villosis mox glabratiss, summis brevibus filiformibus eapitulum bracteantibus seu involucrantibus, radicalibus obtusis deorsum longe attenuatis, basi dilatata scariosa intus fulvo-Crinita; involucro 12-15-fido, lobis lineari-lanceolatis margine scariosis; ligulis exsertis; styli ramis apice fruncato penicillato-hispidis; achenio glabro. — High Andes of Peru near Alpamarca. — To be compared with *W. stacicifolia*, Wedd., especially the var. *cehnisioides*; but that \*s said to have the branches of the style subulate, &c.

WERNERIA PYGMUEA, Gillies, including *W. Rhizoma*, Remy, *W. mi-*

*nima*, Walp., *W. graminifolia*, Benth., *W. brachypappa*, *cherlerioides*, and *apicidata*, Schultz Bip. Andes of Chili and of Peru.

WERNERIA CASPITOSA, Wedd., which was long ago collected by Dombey, on the high Andes of Peru. \*

WERNERIA CARNULOSA (sp. nov.) : acaulis, caespitosa, parva (pollicaris), undique glabra; rhizomate crasso fere lignoso ramoso; foliis confertissimis linearibus vel spathulatis brevibus integerrimis obtusissimis carnosus capitulum sessile vix sequantibus; involucro 12-lobo, lobis tubo parum brevioribus lineari-oblongis obtusis apice ciliolatis; ligulis nullis; acheniis glabris; antheris luteis. — High Andes of Peru.

WERNERIA STRIGOSISSIMA (sp. nov.): caespitosa, subpollicaris; rhizomate ramoso crasso repente; foliis rosulatis, brevibus spathulatis integerrimis capitulum sessile fulcrantibus cum involucro 10-14-fido strigosissimis; vaginis crinitis; ligulis exsertis; styli ramis apice truncato hispidulo penicillatis et appendice setacea auctis; achenio pubescente; pappo rigidulo. — High Andes of Peru near Casa Cancha. Bristles of the leaves themselves denticulate, or the larger ones resolved above into a tuft of slender hairs.

WERNERIA CILIOLATA (sp. nov.) : caespitosa, ramosissima, depressa, glaberrima; ramis brevibus confertissime foliosis; foliis (saepe oppositis) linearibus subcomplicatis vel canaliculatis acutiusculis subcarnosus sub lente spinuloso-ciliolatis; capitulis sessilibus; involucro cylindraco pluricostato 8-fido, lobis triangulato-lanccolatis obtusis subscariosis, costa valida; ligulis paucis brevibus; styli ramis truncatis apiculo brevi vel obsoleto; acheniis glabris. — High Andes of Peru, near Alparmarca.

WERNERIA DIGITATA, Wedd. A scanty specimen was collected along with the preceding and the succeeding species, exhibiting some minor discrepancies from Weddell's description. The leaves bear some woolly hairs; their lobes are incrassated, although far less so than in the following, and are blunt, instead of acute; a few of them are truly opposite. Involucre costate or nerved; the divisions 13 to 20, scarcely if at all longer than the tube. The branches of the style, as well in the ray as in the disk, sometimes bear a conspicuous, slender, setiform appendage (either naked or sparingly setulose); sometimes this is obsolete, or not distinguishable from the coarse hairs of the truncate obtuse summit.

WERNERIA DACTYLOPHYLLA, Schultz Bip. This extraordinary species was first detected by Dombey. On account of the habit, the

appendage of the style, and the alveolate receptacle, I was disposed to regard this (as was Dr. Schultz) as the type of a new genus, sustaining to *Gynoxys* the relation which *Wemeria* does to *Senecio*. But all these characters break down; that of the style is inconstant even in the same species; the closely allied preceding species has a naked receptacle; and in this the alveoli vary, being sometimes very deep and here and there irregularly extended into scarious *fimbrillae*> some of them even half the length of the flowers; while in Dombey's own specimens, in the Parisian herbarium, the receptacle is only moderately alveolate.

SENECIO LEUCOMALLUS (sp. nov.) : fruticosus, ramosus, undique albo-lanosissimus ; ramis 1 - 3-cephalis ad apicem usque foliosis; foliis spathulatis integerrimis obtusis planis (denudatis glabratis aveniis)» capitulis breviter pedunculatis; involucro lanosissimo, bracteolis lineari-subulatis squamas proprias subcequantibus; ligulis nultis ; acheniis glaberrimis. — Var. ? : INCISXIS : caulibus laxis adscendentibus; foliis pierisque apice 3 - 5-lobatis vel inciso-dentatis. — Orange Harbor, Fuegia. Related to *S. Patagonicus*, Hook. & Arn., of which *S% Andersonii*, Hook. f. and & *Duyausii*, Hombr. & Jacquinet are forms.

SENECIO WEBSTERI, Hook, f., var. SUBDISCOIDEUS : ramis adscendentibus ; foliis flabellatis grosse crenato-dentatis, basi nunc truncata nunc late cuncata; ligulis paucis parvis tubo brevioribus.—Orange Harbor, Fuegia.

SENECIO DARWINII, Hook. & Arn., var. EUADIATUS : pumilus, condensatus; foliis parvis ; ligulis nullis. *S. Lasegifci*, Homb. & Ja<\*qui-not? With the preceding.

SENECIO EIGHTSII, Hook. & Am., in its more luxuriant states shoys indications of being only another variety of *S. Darwinii*\*

SENECIO TRIFURCATUS, Less., is stoloniferous, a character not mentioned in any published description; but a young stolon is delineated on one specimen in Dr. Hooker's excellent figure.

SENECIO SUBCANDIDUS (sp. nov.) : herbaceus vel basi frutescens, Uixe arenoso-lanatus; canle mox glabrato erecto scsquipedali apice corymboso; foliis membranaceis, caulinis oblongis ovato-subcordatis vel subdeltoideis grosse duplicato-dentatis crenatisve supra glabratis subtus toinentoso-incanis, petiolo saepius alato; capitulis in corymbo 3-9 longe pedicellatis; involucro circiter 20-phylo glabrescente (squamis lineari-bus) basi bracteolis brevibus subulatis parce calyculato; ligulis elongatis; acheniis sericeo-puberulis. — Ludit foliis sinuatis et, var. MINOR : caule subaphyllooligocephalo; foliis lyrato-pinnatifidis seu pnnatipar-

titis, petiolo basi ssepius stipulato-appendiculatis. — Andes of Peru near Obrajillo. Also crest of Purruchocha, by Matthews, and in some part of Peru by Pavon.

SENECIO GRACILIPES (sp. nov.): herbaceus, pruinoso-pubens; caule erecto simplici pedali parce foliato oligocephalo; foliis membranaceis, inferioribus longissime graciliter petiolatis ovatis subrotundisve sinuato-5-7-lobatis lobis denticulatis, superioribus parvis paucis ^pinnatifidis petiolo basi aurito-dilatatis; capitulis longiuscule pedunculatis discoideis; involucri parce bracteolis setaceis calyculato 20-phylo, squamis lineari-lanceolatis dorso hirtellis; acheniis minutim hirtellis. — Andes of Peru, near Obrajillo.

SENECIO BICHII (sp. nov.): herbaceus, glaber; caule erecto gracili apice corymboso polycephalo; foliis angustissime linearibus plerumque laciniatis vel pinnatipartitis; capitulis parvis discoideis pedicellatis; involucri parce minutimque bracteolato 12-13-phylo, squamis lanceolatis obtusiusculis; acheniis hirtellis. — Var. |8.? foliis latioribus, lobis lanceolatis^; ramis floridis patentibus. — With the preceding.

SENECIO PICKERINGII (sp. nov.): fruticosus, humilis, ramosissimus, glaber; ramulis brevibus rigidis, floriferis capitula 1-3 subpedicellata saepius nutantia gerentibus; foliis crebris linearibus seu lineari-oblongis sessilibus subcarnosis grosse pinnatifido-dentatis rariusve integris; bracteolis calyculi ovatis seu obovatis squamis involucri 10-12 late oblongis triente brevioribus; ligulis nullis; acheniis glabris; pappi setis barbellulatis. — Var. £.? foliis minus carnosius magis incisius; capitulis minoribus; bracteolis squamisque involucri angustioribus. — High Andes of Peru, between Culluay and Casa Cancha, &c:

SENECIO DANÄI (sp. nov.): suffruticulosus, caespitoso-depressus, glabratus; foliis crebris carnosius linearibus inciso-3-5-dentatis subpinnatifidis vel integerrimis primum cum caule apice subaphyllo monocephalo lanulosis; capitulo nutante discoideo; involucri squamis 14-16 lato-linearibus obtusius cum bracteolis calyculi dimidio brevioribus dorso nigro-pubescentibus; acheniis cinereo-puberulis. — Alpamarca, high Andes of Peru.

SENECIO DICLINUS, Wedd. This collection contains male as well as female specimens, as also does the Hookerian herbarium, in specimens collected by Mr. McLean. The female flowers have imperfect anthers; the male have a style like that of the female, only its branches are minutely papillose externally, as in Weddell's *S. iodopappus*. The style in the female flowers, instead of resembling that of

the hermaphrodite blossoms of *Senecio* generally, imitates that of the ray-flowers of the genus.

*SENECIO EVACOIDES*, Schulz Bip., is also in the present collection, but with a pappus the bristles of which are indistinctly, if at all, barbulate at the apex.

*SENECIO PELLITUS* (sp. nov.): subdioicus? manus, herbaceus, surculosus, acaulescens, undique pilis longis sericeis dense crinitus; foliis rosulatis obovatis vel subrotundis integerrimis sub-3-5-nerviis in petiolum brevem attenuatis; scapo brevi vel subnullo monocephalo; involucro 20-phyllo ecalyculato; ligulis nullis; floribus creberrimis; styli ramis obtusis (nee truncatis) hirtulis; acheniis glabris; pappo rigidulo. — High Andes of Peru near Casa Cancha. The flowers in the specimens are structurally hermaphrodite; but the anthers bear very little pollen, and the style resembles that of the female flowers of *S. dictynus*, &c., to the same group with which this species evidently belongs.

*SENECIO WERNERIOIDES*, Wedd. Chlor. And. I. p. 128, t. 19.

Var. j8. *EXSCAPUS*: capitulo inter folia rosulata creberrime pinnatifido-dentata sessili. — Alpamarca, high Andes of Peru.

Var. y. *ACAPUS*: scapo multibracteato 3-pollinari folia spatulata simpliciter dentata subsequente. — At a lower elevation, between Culuy and Obrajillo.

#### *Bilabiatiflorce.*

*ONOSERIS ODORATA*, Hook. & Arn. To this species (which includes *O. Cumingii* Hook. & Arn.) belongs the *Cursonia Peruviana* of Nuttall. The bristles of the pappus, said by De Candolle to be biserial, are better described by Don as in a triple order, the innermost much larger and stouter, the outermost very short.

*HTALIS ARGENTEA*, Don. The receptacle is naked, with broad areolae, between which one or two minute setulae may often be found; these hardly answer to the character "fimbriis callosis singulis sub achenio singulo." Pappus no more connate at the base than in all the allied genera, pluriserial, the bristles denticulate. Tails of the anthers plumose with cobwebby hairs. A more remarkable addition to the generic character, — one which rather militates against Weddell's group of *Plazietia* — is that the corollas, although more commonly uniform and bilabiate, are not rarely, in one or more of the flowers of the head, deeply and equally five-parted, the lobes narrow and revolute, — in this and in some other respects indicating an affinity with Weddell's genus *Aphyllcladm*.

**CHAETANTHERA PERUVIANA** (sp. nov.): annua, tenella, diffuse ramosa; foliis lineari-cuneatis vel spatulatis versus apicem spinuloso-dentatis laxe villosis mox glabris, summis angustioribus circa capitulum confertis; involucri squamis subscariosis retusis, exterioribus ovalibus, costa in appendicem nunc folioformem producta, interioribus lineari-oblongis saepe mucronulatis; ligulis linearibus fere glabris involucri vix superantibus, labio interiori parvo brevi apice bidentato. — Andes of Peru, above Baños. Near *C. tenella*: the first species detected north of Chili.

**ORIASTRUM COCHLEARIFOLIUM** (sp. nov.): pulvinatum, laxe arachnoideo-lanatum; foliis in caules breves confertis imbricatis sessilibus crassis obtusissimis muticis dorso mox glabris intus sub margine incurvo concavis lanuginosis, inferioribus oblongis, superioribus spatulatis capitulum sessile arete rosulato-cingentibus; involucri squamis omnibus scariosis, apice radiante colorato ovato-lanceolato acuto rigidiori; pappi setis capillaribus rigidis basim versus parce barbellulatis superne fere ferevibus. — Alpamarca, high Andes of Peru. A very distinct species, interesting from its extending the range of the genus farther north than before. Ray-flowers perhaps fertile; their linear ligule obscurely tridentate at the apex, and with two minute teeth at the base on the inner side, representing the lower lip. Mature achenia unknown. — Those<sup>1</sup> of *O. Chilense*, Wedd., are pyriform; the papilla of their surface when soaked swell into a jelly, and then the achenium appears as if glabrous. Its pappus in the ray-flowers, generally of two or three caducous bristles, is sometimes wholly wanting; that of the disk-flowers is nearly uniserial, the bristles united at the base into a ring. They are finer and softer than in *O. pusillum*; but it is not worth while on this account to keep up *Aldunatea* as a section. — *O. pusillum* has abortive stamens in the ray-flowers, not before noticed, still more approximating the genus to *Tylloma* and *Egania*, which last might well enough be referred to *Oriastrum*, and even both, perhaps, back to *Tylloma*.

A serious error in transcription vitiates Weddell's amended character of *Oriastrum*, i. e. the achenia of the disk, instead of those of the ray, are said to be glabrous and effete; those of the ray, instead of those of the disk, papillose and fertile.

**JUNGIA FERRUGINEA** (Linn, f.): scandens vel sarmentosa; foliis 5 - 9-lobatis subtus pannoso-villosis; capitulis 5 - 10-floris glomerulatis, glomerulis in corymbos vel thyrsos congestis; squamis involucri

interioribus palcisque arete involutis flores et pappum subaequantibus; acheniis glabris. Bogota, Mutis? Holton. Quito, Jameson, Couthouy, &c.

JUNGIA PANICULATA (*Dumerilia paniculata*, DC. *Jungia ferruginea*, Don et auct, non Linn. f. *J. spectabilis*, Less., non Don.) : fruticosa; foliis subtus tomentosus, tomento albido implexo; capitulis conferte cymosis plerisque pedicellatis multifloris; involucri squamis interioribus paleisque floribus "luteis" pappoque subdimidio brevioribus; acheniis pilosiusculis. Petioli nunc nudi nunc basi quasi stipulati. — Peru. — I suppose (although I cannot now verify the supposition) that Linnaeus received his *J. ferruginea*, along with most of the new species from "America Meridionali" described in the Supplement, from Mutis, therefore probably from Santa Fé de Bogota, where Dr. Holton collected what is manifestly the Linnsean species. In this species the individual heads, only 5 - 10-flowered, are commonly so closely clustered in fascicles as to explain, if not to justify, the view taken by the younger Linnaeus of a compound capitulum. The Peruvian species referred by Don to *J. ferruginea* is quite different. De Candolle's (but not Don's) *J. spectabilis* is the same as his *Dumerilia paniculata* without the stipular appendages, which are inconstant.

PERKZIA. Dr. Schultz goes too far when he refers the Mexican and North American species of this extensive genus to *Trixis*. In the former even the fewest-flowered species have a gradated imbricate involucre and erostrate achenia. The latter has a uniserial involucre, the scales all of the same length, with or without a circle of spreading, mostly foliaceous bracts.

To *Trixis frutescens* I refer *T. paradoxa*, Cass., *T. cacalioides*, Don, and *T. Neobana*, DC. *T. angustifolia*, DC, which is probably a narrow-leaved form of the older *T. cornubosa*; Don, is known by the linear-lanceolate scales of the involucre gradually tapering to a point, the margins of the leaves usually revolute. *T. obvallata*, Hook. & Arn. probably belongs to *T. hngifolia*, Don.

#### Oichoraceae,

ACHYROPHORUS CHONDRILLOIDES (*Oreophila chondrilloides*, Don in herb. Hook. *Seriola Brasiliensis*, subvar. b., Hook. & Arn. Comp. Bot. Mag. I. p. 30): glaucescens, undique glaberrimus, radice fusiformi; caule folioso stricto mono - oligocephalo; pedunculis elongatis; foliis subcarnosis lineari-lanceolatis integerrimis seu obsolete



denticulatis superioribus subamplexicaulibus, imis in petiolum basi dilatatum sensim angustatis; involucri squamis lanceolatis subacutis. — Rio Negro, North Patagonia, in saline soil.

ACHYROPHORUS SESSILIFLORUS (*A. Quitensis*, Schultz Bip. Wedd. with *A. Humboldtii* and *albiflorus* Schultz), a widely variable species, must include not only *A. sonchoides*, DC. (the most caulescent form), but also a

Var. *p. BARBATUS* (*A. barbatus*, Schultz Bip. Rev. Crit.): minor; involucri phyllis exterioribus superne p. m. setosis.

Var. *y. SUBRUNCINATA* (*A. setosits*, Wedd. & *A. eriolcenus*, Schultz Bip.): foliis runcinato-dentatis vel incis marginis ssepius setuloso-ciliatis; involucri phyllis exterioribus oblongis seu obovatis dorso setosis vel nudis. Ludit, 1, involucri tomentoso, 2, foliis rhombeo-ovatis longius petiolatis.

ACHYROPHORUS STENOCEPHALUS, Gray (including *A. taraxacoides* Wedd.) is perhaps only an extreme variety of the preceding. Meyen's specific name was *taraxacifolia*, which Walpers, perhaps accidentally changed to *taraxacoides*, which name both Weddell and Schultz cite under *A. Meyenianus* (which is most probably a form of *A. sessiliflorus*) as well as under the present species, showing some confusion, to avoid which I have retained the appropriate name of *\*A. stenocephalus*.

PICROSIA LONGIFOLIA, Don. The pappus is fulvous and soft, not fragile, and the genus is probably nearest related to *Pyrrhopappus*.

FITCHIA NUTANS, Hook. f. Of this curious arborescent Cichoracea Professor Dana collected a single specimen on the mountains of Tahiti, which is about 25 degrees of longitude farther east than Elizabeth Island, where it was discovered by Mr. Cuming. The single capitulum in the collection being male adds nothing for the completion of the character of the genus. The plant from which it was taken is said to be a tree, with yellow flowers.

## 2. Notes on Lobeliaceae, Goodeniaceae, Sfc. of the Collection of the U. S. South Pacific Exploring Expedition. By ASA GRAY.

*Lobeliaceae Sandwichens.* The Sandwich Islands are remarkable for their arborescent, shrubby, or fleshy-stemmed Lobeliaceae. The species are numerous and peculiar, but very difficult to investigate in herbaria, owing to the imperfection of materials in collections and to

the injuries from insects to which these and other lactescent plants are especially liable. There are moderately good materials extant in different collections of ten or eleven species, and indications of almost an equal number; while many others doubtless remain to reward the labors of future explorers of the forest region of Hawaii, a large part of which lies still untrodden by the naturalist. Exclusive of three true *Lobelia*s, and of a striking new *Isotoma*? of Kauai or Nihau in Remy's collection, the known specie? of the Sandwich Islands may all be referred to Gaudichaud's genera *Delissea*, *Oyanea*, and *Clermontia*, three genera which also shade off into each other in a somewhat troublesome manner. The only essential character of Gaudichaud's genus *Rollandia*, viz. the adnation of the staminal tube with one side of the tube of the corolla, is as I suppose a mistake. At least it does not occur organically in flowers of the plants which well accord with the (now flowerless) specimen of *R. lanceolata* collected in Freycinet's voyage, upon which Gaudichaud founded the genus, nor, I believe, in the plant which answers\* to his more miserable specimen of *R. crispa*. The former is a good *Delissea*; the latter, having larger and somewhat foliaceous calyx-lobes, is one of the species through which *Delissea* graduates into *Cyama*. To the latter genus we may confidently refer Presl's *Macrochilus (Lobelia?) superba*, Cham., of which the calyx-lobes are probably incorrectly said to be imbricated in aestivation, and also a new and most remarkable arborescent species, which by its extremely long and apparently petaloid calyx-lobes, equalling the corolla in length, approaches *Clermontia*; but these divisions are perfectly separate down to the ovary, almost filiform, spreading in anthesis, and not deciduous. Our *Delissea* are: —

1. DELISSEA LANCEOLATA. *Rollandia lanceolata*, Gaud. Bot. Voy. Freyc. *R. montana* on the plate, the upper leaves reduced in size. *R. lanceolata* var. *grandifolia*, A. DC. Prodr. is really just the type of the species, which Gaudichaud characterizes as having "foliis magnis."

2. DELISSEA CLERMONTIODES, Gaud. Bot. Voy. Bonite, t. 47, which may probably also be *D. Kunthiana*, t. 77, and even *Rollandia %Humboldtiana*, of the same author, t. 76.

3. DELISSEA DELESSERTIANA. *Rollandia Delessertiana*, Gaud. 1. c. t. 75. We have what may be a variety of this species, *pinnatiloba*, from Kauai.

4. DELISSEA CORIACEA (sp. nov.): fruticosa, glabra; foliis amplis (pedalibus et ultra) oblongo-lanceolatis coriaceis repanda-serrulatis basi

acutis longiuscule petiolatis, venulis conspicue reticulatis; racemis plurifloris petiolum haud superantibus; calydis limbo obsolete seu dentibus 5 minutis instructo; corolla pollicari subcurvata. — Kauai, Remy.\*

Var.  $\beta$ . foliis spathulato-lanceolatis in petiolum brevem longe attenuatis. — Crater of East Maui. Fruit as large as a cherry.

5. DELISSEA OBTUSA (sp. nov.): suffruticosa; ramis junioribus floribusque undique pubescentibus; foliis (5 - 6-pollic.) membranaceis oblongis serrulatis apice vel utrinque obtusis subtus parce pubescentibus; racemis plurifloris petiolum gracilem haud superantibus; calycis limbo fere obsolete); corolla gracili subpollicari incurva. — Mountains of Maui.

Var. ? MOLLIS: caule crassiori; foliis elongatis (subpedalibus) oblongo-lanceolatis basi in petiolum breviusculum attenuatis supra puberulis subtus molliter pubescentibus; "floribus pollicaribus crassiusculis caeruleis." — Mouna Kea, Hawaii. — Possibly both may be varieties of the following.

6. DELISSEA ACUMINATA, Gaud. Bot. Freyc. p. 457, t. 76. — Oahu.

Var. ANGUSTIFOLIA: foliis elongato-lanceolatis aut angustatis aut latiusculis. *D. {Lobelia} angustifolia*, Cham., DC. — Oahu.

7. DELISSEA UNDULATA, Gaud., to which belongs *D. subcordata* of the same work; leaves with the base subcordate, obtuse, or acute being found on the same stem. The small protuberances on the tube of the corolla represented by Gaudichaud occur in all the forms, but are inconstant.

8. DELISSEA ? PLATYPHYLLA (sp. nov.): caule fruticoso orgyali petiolisque tuberculis aculeisve conicis mollibus obsitis; foliis sesquipedalibus obovato-oblongis repandis membranaceis glabris; pedunculis axillaribus brevibus crassis paucifloris: lobis calycis glabri brevissimis subulatis. — District of Puna, Hawaii. The port is rather that of *Gyanea*, and the resemblance to Gaudichaud's *Rollandia crispa* is not remote.

To *Cyanea* > Gaud., distinguished by the foliaceous or enlarged and persistent lobes of the calyx, I refer all the following: —

1. CYANEA GRIMESIANA, Gaud. 1. c. t. 75. — Oahu. The corolla is variously stated to be "bluish rose-color," or "white striped with reddish-purple externally."

Var. ? CITRULLIPOLIA: foliis bipinnatipartitis, segmentis sinuatis; caule aculeis conicis creberrimis horrido. — Mouna Roa and Mouna Kea, Hawaii. Flowers unknown.

2. CYANEA ASPERA (sp. nov.): foliis oblongo-ovatis acuminatis

denticulatis subtus ad venas venulasque ochraceo-mirtellis utrinque sessilibus basi papillatis asperis, petiolo muricato; calycis glabri lobis ovatis obtusissimis foliaceis tubum elongato-obconicum sequantibus; corolla 2-pollicari curvata. — Oahu. (Leaves of one or two seemingly allied species were collected, without flowers or fruit.)

3. CYANEA ? PILOSA (sp. nov.): caule frutescente; foliis subpedalibus membranaceis obovatis utrinque acutis vel acuminatis eroso-crenatis pilis brevibus mollibus hirsutis; racemis brevibus in pedunculo 1-2-pollicari hirsutissimo paucifloris; floribus "parvis griseo-ceruleis" pedicellisque glabris; lobis calycis linearibus foliaceis ovario oblongo aequilongis. — Mouna Kea, Hawaii. This and the preceding are doubtless related to Chamisso's *Lobelia calycina*, *ambigua*, and *pinnaefida*, — obscure species, referred by Presl and De Candolle to *Delissea*, but by their foliaceous calyx-lobes apparently effecting a transition to *Oyanea*. The next species, of which materials are also incomplete, is equally ambiguous.

4. CYANEA ? ROLLANDIA (*Rollandia crispera*, Gaud. *Lobelia calycina*, Cham. ?) : fruticosa; foliis sesqui-tripedalibus obovato-lanceolatis inferne longe attenuatis breviter petiolatis membranaceis fere glabris margine serrulatis undulatis vel integerrimis; pedunculo petiolum adaequante superne bracteato-paucifloro; floribus cinereo-puberulis; calycis lobis oblongis seu lanceolatis foliaceis ovario aequilongis; corolla sesqui-pollicari; fructu pyriformi pollicari. — Oahu.

5. CYANEA TRITOMANTHA (sp. nov.): caule simplici arborescente orgyali; foliis lato-lanceolatis membranaceis subintegerrimis fere glabris basi acutis tripedalibus (in pedunculo crasso 5-8-pollicari); floribus "confertis" magnis; calyce pubescente, lobis linearibus pollicaribus foliaceis ovario cylindrato longioribus; corolla tripedalibus extus tomentoso-pubescente in segmenta 3 longo-linearia mox divisa. — Mouna Kea, Hawaii.

6. CYANEA SUPERBA, *Lobelia superba*, Cham. *Macrorchilus superbus* Presl. — Oahu.

7. CYANEA LEPTOSTEGIA (sp. nov.): glabra; foliis ad apicem caulibus simplicibus arboreis confertis lanceolatis subsessilibus integerrimis undulatis (bipedalibus et ultra); racemis brevissimis confertifloris; calycis segmentis praelongis e basi latiori angustissime linearibus patentibus corolla gracili longioribus persistentibus. — Upper edge of the forest near the tabular summit of Kauai. Calyx-lobes fully two inches long, and, except at their broader base, less than half a line wide!

Of *Ctermontia*, Gaud., the specimens examined are reducible to two species, viz.: —

1. CLERMONTIA GRANDIFLORA, Gaud., with its several varieties,

Var. a. BREVIFOLIA (*O. grandiflora*, Gaud. Bot. Voy. Freyc. p. 459, t. 73): foliis membranaceis ovalibus leviter, obovatis ovatisve utrinque angustatis vel acutatis modice serratis bi-triplicaribus, petiolo gracili pollicari. — The flowers are evidently amplified or exaggerated on Gaudichaud's plate,

Var. j8. OBLONGIFOLIA (*O. persicifolia* and *Ci oblongifolia*, Gaud. 1. c. t. 71, 72): foliis oblongis seu elongato-oblongis saepe obtusis deorsum attenuatis repando-serratis 4-6-pollicaribus, petiolo bi-tripollicari.

Var. y, LONGIFOLIA (*C grandiflora*^ Hook. & Arn. (7. *Kakeana*, Meyen in Presl. Lob. *O. macrophytta*, Nutt. *O. macrocarpa*, Oaud. Bot. Voy. Bonite, t. 49. *O. viridis*, Gaud. ined. in herb. Mus. Par.): foliis subcoriaceis vel membranaceis oblongo-lanceolatis seu anguste oblongis creberrime serrulatis 3-9-pollicaribus basi in petiolum 1-2-pollicaribus utriculatis.

2, CLEKMONTIA PAHVIFLONA, Gaud. ined. (*C. oblongifolia*, Hook. & Arn., non Gaud. (7. *Byroni*, *pyrifolia*, seu *parviflora*^ Gaud. in herb. Mus. Par.): fruticosa, glabra; foliis membranaceis lanceolatis vel subspathulato-oblongis breviter acuminatis crebre repando-serrulatis; pedunculo paucifloro pedicellisque brevibus petiolum haud superantibus; floribus vix pollicaribus gracilibus leviter curvatis "caeruleis"; calyce breviter 5-lobo corollam hinc alte fissam squante. — Plawaii (and Oahu ?), first collected by Macrae.

There are three species of true, fleshy-frutescent *Lobelias*, viz.: —

1. LOBELIA MACROSTACHYS, Hook. & Arn. Bot. Beech. Voy. p. 88; Gaud. Bot. Voy. Bonite, t. 46. — Oahu and Hawaii. Gaudichaud's plate exhibits flower-buds only." These when fully formed are 1J to 2 inches long and mostly recurved; the developed corolla 2 or 3 inches long, "pale" or "white with the summit lilac."

2. LOBELIA GAUDICHAUDII, A. DC; Gaud. 1. c. t. 45. — Oahu.

Var/ KAUAENSIS: racemo puberulo; calycis viscosi lobis brevioribus, i. e. tubo paullo longioribus. — Kauai. "Corolla pale, with pink veins."

3. LOBELIA NERIIFOLIA (sp. nov.): caule fruticoso crasso medulla farcto; foliis confertis elongato-linearibus utrinque angustatis in petiolum attenuatis coriaceis transverse venosis margine integerrimo revolu-

us & ipra glabris subtus incanis; racemo virgato densifloro; bracteis lobisque calycis subulato-setaceis; corollâ rectiuscula caerulea. — East Maui. Leaves a foot or less in length, only a third or half an inch long. Capsule dehiscent through the short and obtusely conical vertex.

*Sccevolce Polynesia.* The collection contains,

1. SOIEVOLA LOBELIA, Linn., De Vriese. Coast of all the coral islands, and of the Feejees, &c.

2. SÆEVOLA SERICEA, Forst., of which *S. plumerioides*, Nutt., of the Sandwich Islands, is a variety with ample and almost glabrous leaves. Tonga, Samoan Islands, &c.

3. SÆEVOLA CORIACEA (Nutt.) : fruticosa, decumbens; axillis brevissime barbatis; foliis parvulis camoso-crassis obovato-spathulatis in petiolum brevem attenuatis aveniis saepe retusis; pedunculis axillaribus uni- (raro tri-) floris; calycis limbo truncato vel obscure quintjuelobo; corolla; lobis lineari-lanceolatis, alis angustis. — Sandwich Islands.

Var. a. (*S. coriacea*, Nutt. in Trans. Amer. Phil. Soc. n. ser. 8, p. 253) : cinereo-puberula vel glabella; foliis integerrimis; corolla extus glabra vel piloaula, lobis intus piloso-barbatis. — Kuuai and Maui, uu sand-hills.

Var. p. corolla intus imberbi extus foliisque glabris. — Nihau, Remy.

Var. y. foliis cinereo-tomentulosis apice 3—5-denticulatis; corolla extus pubescente, lobis intus glabris. — Molokai, Remy. — To this species probably belongs the Sandwich Island specimen referred by De Vriese to *S. montana*, Labill.; but that species is an upright shrub, with well-developed calyx-lobes.

4. SÆEVOLA GAUDICHAUDI, Hook. & Arn. (non *Gaudichaudiana*, Cham.), includes *S. montana*, Gaud., non Labill., and apparently & *Menziesiana*, var. *glabra*, Cham. It will probably prove to be only an extreme form of the following polymorphous species; but it has a less developed inflorescence, narrower and somewhat fleshy-thickened, nearly veinless, more entire, and smaller leaves, a more slender and usually glabrous corolla, &c. The flowers of this and the following species are white, not yellow as De Vriese implies. De Vriese's genus *Temminchia*, founded on these Sandwichian species, is said to differ from *Sccevola* in the inflorescence not being cymose, nor the filaments, bearded, nor the fruit fleshy (baccate). But it would be difficult to find a more purely cymose inflorescence than in these species whenever the peduncle is several-flowered; the filaments are equally beardless in the original and perhaps in every known species of *Sccevola*, and the mature fruit is a baccate drupe.

5. *SCJEVOLA CHAMISSONIAXA*, Gaud, (a form with pubescent corolla), Hook. & Ara., Cham', (corolla, &c. glabrous), clearly includes & *Menziesiana*, Cham. (excl. var.), a small-leaved form, either glabrous or pubescent; *S. ciliata*, G. Don; *S. ligustrifolia*, Nutt. 1. cl '(a form with small and almost entire leaves) ; *S. pubescens*, Nutt. 1. c.; *S. pubescens*, Gaud, in the Paris herbi (with the younger leaves beneath and the inflorescence softly pubescent, the corolla externally pubescent); *S. intermedia*, Gaud. L c (with the corolla and the lanceolate nearly entire leaves glabrous) ; & *DieUiana*, Gaud. 1. c., "with larger, puberulent, and sparingly serrate leaves, the peduncle elongated. All are forma of *ono apaoius*, whiteli has in . . . x. my rñi toothed leaves liiou the foregoing, mostly slender and often several-flowered peduncles, and broader, broadly wing-margined lobes to the corolla.

6. *SCJEVOLA MOLLIS*, Hook. & Arn., of Oahu, also on Kauai with the leaves not so downy, is well marked by the soft and dense canese'ent pubescence or close tomentum of the lower surface of the large, oblong-lanceolate leaves, short-peduncled inflorescence, and outside of the corolla. The latter has not a particularly long tube, nor are its lobes unusually pointed.

7. *SCJEVOLA (CAMPBUSIA, De Vr.) GLÁBRA*, Hook. & Arn. The limb of the more or less curved yellow corolla is nearly equally five-cleft, although some of the lobes are apt to be conglutinate; and the anthers are normal for the genus. - The connective is similarly produced in the following species, and, as figured by Labillardiere, in *S. montana*\*

8. *SCJEVOLA FLORIBUNDA* (sp. nov.): fruticosa, orgyalis; ramis puberulis mox glabratis, axillis vix barbatis; foliis lanccolato-oblongis subspathulatis submembranaceis repando-dentatis obscure penninerviis glabris basi attenuata sessilibus vel subpetiolatis ; cymis multifloris ex axillis supremis et terminali thyrsum amplum efficientibus; calycis lobis ovatis oblongisve ovario brevioribus; corolla extus incana, lobis intus glabris oblongis; stylo glabro; indusio ciliato extus piloso. — Feejee Islands, where it was also collected by Professor Harvey.

Of *Campanulaceae* the only thing of interest is

*WAHLENBERGIA PERUVIANA* (sp. nov.): hirtella, humilis; caulibus ramosis diffusis; ramis usque ad apicem foliosis ; foliis alternis parvis spathulatis subintegerrimis sessilibus, sutnms Horem bracteantibus; calycis tubo hemisphaerico hirsuto lobis oblongis brevioribus; corolla brevi-campanulata ultra medium quinquefida; capsula semisupera, parte libera conico trivalvi. — Andes of Peru above Baiios.

- i. *tittut/eration, of a Collection of Dried Plants made by L. J. Xantus; at Cape San Lucas, Spc. in Lower California, between August^ 1859, and February, 1860, and communicated to the Smithsonian Institution.* By ASA GRAY.

Such scanty knowledge as we have hitherto possessed of the botany of Lower or Peninsular California was nearly all supplied by the notes and hasty collection made by the late Mr. Hinds, in the voyage of the British surveying ship Sulphur! which touched at the Bny of Mngtlalena, Capo San Lucas, &c, late in the autumn of 1839. These notes, and an account of the collection, with descriptions of the new species by" Mr. Bentham, were published in the Botany of the Voyage of the Sulphur, in 1844. The present collection was made by the indefatigable Mr. Xantus, at San Lucas and the vicinity, while in the employment of the Tl. S. Coast Survey in charge of a station for tidal observations. Small as this collection is, it contains not a few novel-ties, and I trust is an earnest of many more. Where the coast furnishes so large a percentage of new species, the interior, and especially its mountains, may be expected to yield a richer harvest to future explorers. Mr. Xantus has already made one successful visit to the mountains within his reach, with very interesting zoölogical results. At the same time he made a good botanical collection, which has most unfortunately been lost.

The numbers in the ensuing list are those under which the specimens have been distributed, as far as the extent of the collection allowed, among leading herbaria, the full set being reserved for the national collection in charge of the Smithsonian Institution.'

1. ARGEMONE MEXICANA, Linn.

2. LTROCARPA COULTEEI, Hook. & Harv. in Lond. Jour. Bot. 4, 1876, t. 4. — Radix annua. Folia inferiora cordato-oblonga, repanda; petiolo longo submarginato, superiora brevi-petiolata, dentata vel incisa. Petala latiora quam in exemp. Coulterianis, clongato-spathulata, rosea? post anthesin purpurascens. Fructus haud maturus.

3. POLYGALA XANTI (sp. nov.): nana, cineceo-pubescent; caulibus adscendentibus e caudice perenni usque ad racemum densiflorum foliosis; foliis ovalibus subaveniis breviter petiolatis; floribus (majusculis) mox recurvis; pedicellis bractea sepalisque angustis aequilongis; alis ovali-oblongis; carina imberbi; fructu ovato sinu profundo emarginato



pubescente. — Caules vix spithamasi, simplices. Folia 4-6 lin. longi. Flores 3 lin. longi, albi luteo et purpureo tincti: corolla basi valde gibbosa: stamina 8.

3<sup>tt</sup>. POLYGALA PUBERULA, Gray, PL Wright 1, p. 40; floribus minoribus.

4. IONIDIUM FRUTICULOSUM (Benth. Bot Voy. Sulph. p. 6, t. 2): var. DENTATUM: caulibus herbaceis 9-pollicaribus; foliis lanceolatis seu linearibus, majoribus argutissime dentatis. — This must belong to Bentham's *I. fruticosum*, a bad name; for in our plant the stems are wholly herbaceous, and I am not sure that the indurated and stout root is really perennial. The leaves vary from linear to broadly lanceolate, and the larger ones especially are beset with sharp salient teeth. The short peduncles, flowers, &c, accord with the published character and figure.

5. DRYMARIA FRANKENIOIDES, H. B. K. NOV. Gen. & Sp. 6, p. 21, t. 515; Torr. in Mex, Bound. Surv. 2, p. 36. *Spergularia rupes-tris*, Benth. Bot. Voy. Sulph. p. 17? non Carab. The leaves are narrower than in the figure above cited, and the small intermediate lobes of the petals are three instead of four; otherwise there is no obvious difference, and No. 698 of Coulter's Mexican collection (from Zimapan) is intermediate in appearance. Without examining the petals the plant might naturally be taken, as I suppose it was by Bentham, for a *Spergularia*.

6. DRYMARIA CRASSIFOLIA, Benth. Bot Voy. Sulph. p. 16. *D. polycarpoides*, Gray, PL Fendl. p. 12.

7. TRIANTHEMA MONOGYNA, Linn.; Gray, PL Wright 1, p. 15.

8. SIDA ELLIOTTI, Torr. & Gray, var.? Gray, PL Wright 2, p. 21. Frutescens.

9. ABUTILON CALIFORNICUM, Benth. Bot. Voy. Sulph. p. 8; var. *ibliis sublobatis discoloribus*.

10. SPEUERALCEA INCANA, Torr. in Gray, Fl. Fendl. p. 23, & Bot. Mex. Bound, p. 39. One of the less canescent forms.

11. HIBISCUS (BOMBICELLA) RIBIFOLIUS (sp. nov.); fruticosus, humilis, fere glaber; stipulis setaceis persistentibus; foliis rotundatis subcordatis crenato-dentatis saepe trilobis chartaceo-membranaceis venulis reticulatis; pedunculis axillaribus unifloris folio longioribus subtipice articulatis; involucello 8-9-phyllo, phyllis lineari-setaceis calycis lacinias ovato-lanceolatas subsuperantibus corolla (purpurea?) triplo brevioribus capsulam subglobosam rquantibus; seminibus in loculis

plurimis laxè crinitis. — Caulis subpedalis. Folia serai - sesquipollicaria. Corolla sesquipollicaris. — Most allied perhaps to *IT. phcenicetis*; but the leaves are all rounded and obtuse, mosty lobed, and resembling those of a *Ribes*, the corolla much exceeding the calyx and involucl, &c. The young stems and petioles are slightly pubescent; the leaves perfectly glabrous.

12. GOSSYPIUM, foliis omnibus integris cordato-ovatis, Benth. 1. c. — Like the specimens noticed by Bentham from the same district, destitute of fruit. The leaves of one specimen, however, begin to show lobes. It is probably a cultivated Cotton run wild.

13. MELOCHIA TOMENTOSA, Linn. "A common West Indian and Central American species, of which this is probably the northern limit."

14. KALLSTRCEMIA GRANDIFLORA, TOIT. in PI. Wright. 1, p. 28: var. DETONSA, Gray.

15. GALPHIMIA ANGUSTIFOLIA, Benth. Bot Voy. Sulph. p. 9, t. 5. Apparently *G. linifolia*, Gray, Gen. 111, is the same species, which extends across the continent on the southern border of the U. S.

16. KARWINSKIA HUMBOLDTIANA, Zucc.; Gray, PI. Wright. 1, p. 32. (== Berland. coll. no. 820, 889, 689, 906, 2340, 2359, 1230, &c.)

17. MAYTENUS PHYLLANTHOIDES, Benth. Bot. Voy. Sulph. p. 54. This has also been found on the eastern side of the continent, on the "lower part of the Rio Grande, and at Key West.

18. CARDIOSPERMUM MOLLE, H. B. K. ? A single specimen without fruit.

19. CARDIOSPERMUM? sp. nov. A shrubby species, with the habit of Bentham's *Cardiospermum tortuosum*, from the same district, but wholly glabrous and with a different foliage; the fruit unknown, and therefore the genus uncertain.

20. DODON^EA VISCOSA, Linn. ? Destitute of flowers or fruit.

21. BURS ERA MICROPHYLLA' (sp. nov.): foliolis 14-16-jugis cum imparri 2 - 3 lin. longis oblongo-linearibus seu oblongis obtusis sessilibus in rhachi superne marginata; pedunculis 2 - 3-floris brevibus. — (In Sierras Tulè, Sonora, leg. A. Schott, ex herb. Torr.) Frutex rigidus. Folia ad apicem ramulorum brevissimorum conferta. Flores hermaphroditì, an polygami ? Petala 5. Stamina 10. Discus 5-lobus. Ovula ex cl. Torrey in loculis solitaria suspensa. Cotyledones contortuplicatissima.—Mr. Schott collected this with a few flowers and young fruit. • Mr. Xantus, with fruit only, which is that of a *Bur&era*.

22. *DALYA CHRYSORHIZA* (sp. nov.): pilosula; caulibus perplurimis e radice annua? filiformibus procutnenti-diffusis; foliolis 7-10-jugis parvis (sesquilineam longis) obovato-linearibus emarginatis subtus nigro-glandulosis; stipulis minimis; pedunculis folia superantibus apice capitato-plurifloris; calycis pubescens dentibus oblongo-linearibus obtusis tubo fere sequilongis.— Radix perpendicularis, ut videtur annua, cortice aurantiaco. Caulis pedales et ultra, tenues, parce pilosuli. Spikes breves circiter 12-flores; rhaehi inter flores glandulis? singularibus fusiformibus acutis obsita. Calyx inter costas glandulosus, lobis cum bractea ovata calyce breviori foliaceis glandula acuta apiculatis. Corolla brevis, violacea. Legumen pilosulum. — A well-marked species of this large, prevailing North Mexican genus.

23. *PHASEOLUS FILIFORMIS*, Benth. Bdt. Voy. Sulph. p. 13. But the whole plant is puberulent. The root is certainly annual.

24. *PHASBOLUS (MACROPTILIUM) ATROPURPUREUS*, DC. Fl. Mex. Ic. ined., & Prodr. 2, p. 395; Torr. in Mex. Bound. Surv. 2, p. 50; var. *SERICEUS*. I do not possess any specimen of Dr. Torrey's *P. atropurpureus*, which, described as a new species, may well be identical with its homonym of De Candolle. Our South California specimens are identical with those of Mr. Schott, from the Rio Grande, dubiously appended to this species by Dr. Torrey, only they are for the most part still more silky-downy. The plant is of the section *Macroptilium*, but has a short calyx. The wings are deeply colored. The root is perennial.

25. *COURSETIA? GLANDULOSA* (sp. nov.): foliis ramisque glabris, petiolo in setam desinente, foliolis ellipticis mucronatis; racemis saepe fasciculatis sessilibus brevibus plurifloris cum calyce viscoso-glandulosis. — Kami tortuosi, nodosi, nascentes cinereo-villosi. Stipulae setaceae, persistentes. Foliola 7-9-juga, haud stipellata, petiolulata, 6-9 lin. longa, 3-4 lin. lata, parce appresso-puberula, mucrone conspicuo. Flores ex axillis foliorum annotinorum orti; racemi brevissimi saepius bini vel terni; pedicelli conferti, 3 lin. longi. Bractae parvae, caducae. Calyx ebracteolatus, breviter campanulatus, 5-fidus, pilis capitato-glandulosis viscosus; lobis triangulari-lanceolatis acutis, 2 superioribus paulo brevioribus et connatis. Corolla ut videtur pallide lutea; vexillum latissimum, emarginatum, basi biauriculatum, auriculis parvis; carina, obtusa alis paulo breviori. Stamina diadelpa; anthesae conformed Ovarium sessile, lineare, glanduliferum, 10-12-ovulatum, continuum. Stylus gracilis a medio ad apicem subunilateraliter villosus: stigma capitatum. Legumen ignotum.

26. STTLOSANTHES VISCOSA, SW. (*S. glutinosa*, H. B. K.): var. ACUTIFOLIA.

27. CROTALARIA LUPULINA, DC.

28. GFFSALPINIA MEXICANA (sp. nov.): inermis, glabra; pinnis 3-4-jugis cum impari; foliolis 4-5-jugis; racemis plerumque simplicibus laxis; filamentis inferne villosis petala flava vix superantibus; ovario canescente; legumine glabrato acinaciformi 5-6-spermo.— Var. *at foliolis venosis*. In Nueva Leon et Chihuahua, Mexico, Berlandier, no. 941, 2371, Gregg, Eaton & Edwards. Var. *j8. CALIFORNICA*: foliolis plerumque aveniis, coll. Rich. no. 4, & coll. Xantus.— Foliola 6-9 lin., in var. Calif. 3-.7 lin. longa, oblongo-vel subrotundo-ovalia. Alabastra 3 lin. longa. Sepala intus sericeo\*puberula. Petala "4-5 lin. longa, glabra, suberosa. Legumina acinaciforma vel cultiformia, plana, sesqui-bipollicaria, in spec. Berland. magis oblonga rectiuscula.— This has long been extant in several collections, but we have only now, with the complete specimens of Xantus, fit materials for description.

29. MIMOSA XANTI (sp. nov.): Eumimosa, fruticosa, cinereo-pubescentis; rami's aculeis infrastipularibus vel sparsis rarisve armatis; pinnis unijugis; foliolis 5-9-jugis oblongis supra velutino-puberulis subtus canescenti-pubescentibus et praesertim ad margines rhachique strigoso-setulosis; capitulis globosis; bracteolis hispidis corollam quadrifidam sequantibus; calyce parvo byalino setoso-ciliato.— Legumen ignotum. Pinnae petiolo duplo longiores. Foliola 3-4 lin. longa, inajquilatera, pennivenia, hinc nervo laterali percursa, setulfe validioribus incumbentibus quasi marginata. Pedunculi solitari vel bini, monoccephali, semipollicares.— Apparently a well-marked species of the *Custce* or *PectincB* subdivision, not described in Bentham's monograph.

30. LYSILOMA MICROPHTLLA, Benth. in Lond. Jour. Bot. 3, p. 83, & PL Hartw. p. 345. Legumen generis, 3-6 poll, longum, 5-8 lin. latum, stipite 2-3 lin. longo.— Berlandier's no. 3144, coll. distributed by Dr. Short, is a Lysiloma, in fruit, belonging to Mr. Bentham's second division; compared with Hartweg's no. 75, in flower only, it appears to be the same species. Therefore the character of *L. desmostachys* may be completed as follows:— Legumen lineari-oblongum, 6-7-pollicare, 1J--2 poll, latum, substipitatum.

31. CALLIANDRA CALIFORNICA, Benth. Bot. Voy. Sulph. p. 14, t. 11. Only a fragment, depauperate, with the pinnae reduced to a single pair. Stamens bright red.

32. LEUCJENA MACROPHYLLA, Benth. l. c. p. 90? In fruit only; doubtful if Bentham's plant, which was collected at Acapulco, and in flower only. From the pod and the look of the foliage it may be an *Albizzia*.

33. ACACIA FLEXICAULIS, Benth. in Lond. Jour; Bot. 1, p. 505. In fruit.

34. ACACIA FARNESIANA, Willd. — Also foliage of another species, perhaps *A. Greggii*.

35. OENOTHERA SINUATA, Linn., var. HUMIFUSA, TOIT. & Gray. Except that the flowers are larger, the specimens accord with those from the counterpart peninsula of Florida.

36. MENTZ^EA ASPERA, Linn.

37. TURNERA PIJMILEA, L.

38. FOUQUIERIA SPINOSA, Gray, PL Wright. 1, p. 76. *Bronnia spinosa*, H.B. K. Nov. Gen. & Sp. 6, t. 528; Benth. Bot. Voy. Sulph. p. 16. This was collected at Rayon in Sonora by Professor Thurber, but is not enumerated in the Botany of the Mexican boundary.

39. ECHEVERIA FARINOSA, Lindl. in Jour. Hort. Soc. 4, p. 292, ex Walp. Ann. Bot. 2, p. 669. *E. lanceolata*, Nutt.? sed floribus longe pedicellatis. — The broad-leaved *Echeveria* collected by Dr. Bigelow in Whipple's Exploration, and referred to *E. lanceolata*^ Nutt, is evidently Lindley's *E. laxa*.

40. LORANTHUS. A species of the section *Notanthra*, *Oscillanthera*, indeterminable for want of foliage.

41. RANDIA ARMATA, DC? In fruit only.

42. MITRACARPIUM LINEARE, Benth. Bot. Voy. Sulph. p. 20. The leaves vary from linear to lanceolate. Seeds as in *M. breviflorum*, which is probably a form of *M. lineare* with a smaller corolla.

43. HOUSTONIA (ANOTIS) ASPERULOIDES. *Hedyotis asperuloides*, Benth. Bot. Voy. Sulph. p. 19, t. 13. This nearly approaches some of the various forms of *H. angustifolia*; but the capsule is more clavate-turbinate and the seeds are smooth, not pitted.

44. PECTIS MULTISETA, Benth. Bot. Voy. Sulph. p. 20.

45. PECTIS (PECTIDIUM) PUNCTATA, Jacq. A single fragment, perfectly resembling the West Indian plant.

46. HOFMEISTERIA FASCICULATA, Walp. Repert. 6, p. 106. *lie-logyne fasciculata*, Benth. Bot. Voy. Sulph. p. 20, 1.14. The leaves are less dissected than in the specimens figured, often cordate-orbicular and obtusely or obscurely lobed, or only crenate, others three-cleft, *ff. ure-*

*nifolia* would seem to differ mainly in the greater number of setae and paleae of the pappus. *H. plurisetata* is more different, having much fewer involucre scales as well as flowers, the innermost of the former much broader, the bristles of the pappus, &c. more numerous. The slender and numerous interior scales of the involucre of *H. fasciculata* are deciduous with the flowers.

47. *CARPHEPHORUS ATRIPLICIFOLIUS* (sp. nov.): caule basi fruticoso; ramis patentibus; foliis oppositis hastatis vel triangulatis plerumque laciniato-dentatis petiolatis utrinque appresso-pubescentibus seu hirtellis; corymbis nudis polycephalis; capitulis circiter 20-floris pedicello brevioribus; involucri squamis oblongis, exterioribus brevioribus cinereo-pubescentibus, interioribus paleisque receptaculi fere scariosis; pappo plumoso albo; achenio piloso; corollis antherisque ut videtur flavidis.—Folia cum petiolo 4 - 6 lin. longo 1-2-pollicaria; floralia parva, sessilia. Pedicelli 4 - 8 lin. longi, glanduloso-puberi. Capitula semipollicaria. Involucrum floribus dimidio brevius, squamis leviter striatis obtusiusculis, interioribus glabris. Corolla e tubo brevi extus glandulifero infundibuliformis, glabra, lobis brevibus late ovatis siccitate flavis extus parce hispidulis. Antherae semi-exsertae. Stylus basi haud bulbosus; ramis planiusculis obtusiusculis minutim hirtellis. Pappi setae circa 20, longe et molliter plumosus. — Without the paleae on the receptacle, which subtend each flower and are rather persistent, this plant would be taken for a plumose *Brickellia*. It is a close congener of the other South Californian species, *C. junceus*.

48. *PERITYLE CALIFORNICA*, Benth. Bot. Voy. Sulph. p. 23, 1.15; forma biaristata, aristis achenio brevioribus. — The awns of the pappus are less barbellate as well as shorter than in the published figure, and uniformly two in the flowers examined. The achenium is broader than in any other species, being obovate-oblong, with the summit, bearing the pappus, narrow; when mature broadly obtuse with a much thickened callous margin, more so than is represented in the figures, or than appears in the younger fruits; the corona of the pappus is much more delicate than is shown in the figure, and dissected into slender hyaline squamellae.

49. *SOLIDAGO (EUTHAMIA) DIFFUSA*: laxè ramosissima, subglutinosa; foliis fere filiformibus subcanaliculatis; capitulis oblongis subclavatis; floribus disci 4 - 5, ligulis 0 - 2; alveolis receptaculi paucis longe paleato-productis. *JEricameria diffusa*, Benth. Bot. Voy. Sulph. p. 23. — "Funiculus humilis" according to Benilun; but our specimens.

although they include not the root or base, seem to be herbaceous. I cannot doubt that the plant is a true congener of *Solidago* (*Euthamia*) *tenuifolia* and *lanceolata*, of which it has the habit (though more loosely-branched), involucre, flowers, stigmas, &c. Only the flowers are fewer, and therefore also the fimbriæ of the receptacle, which are more elongated, chaffy, and combined in the centre of the receptacle. Commonly, however, all the flowers are hermaphrodite and tubular, but one or two of the marginal ones are becoming liguliform and their stamens abortive. This adds another to the many intricate transitions among the Chrysocomeous genera which I have had occasion to notice. If, in any revision, *Euthamia* is adopted as a genus, it may well embrace *Bigelovia* of De Candolle.

50. APLOPAPPUS ARENARIUS, Benth. Bot. Voy. Sulph. p. 24. Folia ramealia oblonga vel lanceolata, caulina (prasertim inferiora) spatulata, magis inciso-dehtata quam uñdulata (dentibus mucrone cuspidatis), ima nunc lyrato-subpinnatifida, majora pollicaria vel paullo longiora.—Mr. Bentham's specimens were probably older, and wanted the lower cauline leaves. In ours the stems are nearly or quite herbaceous.

51. BACCHARIS CERULESCENS, DC. Prodr. 5, p. 402. Same as the Northern Mexican plant.

52. BACCHARIS VIMINEA, DC. Prodr. 5, p. 400? This accords with what was named *B. Douglasii* in Whipple's Facif. R. R. Exploration, and with specimens gathered in California by Fremont in 1845. Although allied to *B. Douglasii*, it is not the same, but I believe is De Candolle's *B. viminea*. The heads are larger and looser than those of *B. Douglasii*; the scales of the involucre broader, the outermost ovate, the innermost oval-lanceolate, smooth, and more scarious. The specimens of Xantus all have the heads diseased or monstrous, probably by the puncture of insects.

53. PLUCHEA SUBDECURRENS, DC.? var. PARVIFOLIA. Folia sesquipollicaria vel breviora, 2½-3 lin. lata, fere ad basin usque argute serrulata, basi in alas lineares decurrentia.—This is quite different from Hartweg's no. 112, and probably really belongs to *P. subdecurrens*\*

54. FRANSERIA AMBROSIOIDES, Cav. Ic. 2, p. 79, t. 200.

55. FRANSERIA TENUIFOLIA, var. TRIPINNATIFIDA, Gray, PL Lindli. J, p. 227, & PI. Wright. 1, p. 104. *Ambrosia fruticosa* (exci. β.) and *A. confertiflora*, DC. Canescent forms.

56. *FRANSERIA PUMILA*, Nutt. A single specimen, without flowers; perhaps a dwarf and more canescent state of the preceding.

57. *HYMENOCLEA* sp. without flowers or fruit, the branches bearing abnormal growths, incited by the punctures of insects. Doubtless one of the two published species.

58. *HELIOPSIS BUPHTHALMOIDES*, Dunal. *H. canescens*, H. B. K. *Forma minor*.

59. *ALDAMA UNISERIALIS*, Gray, Pl. Lindh. 2, p. 228. Somewhat depauperate specimens, well agreeing with the Texan plant.

60. *VIGUIERA DELTOIDEA* (sp. nov.): herbacea, pubero-scaberula, ramosa; ramis polycephalis; foliis inferioribus oppositis, superioribus alternis, omnibus deltoideis vel subcordatis obtusis subintegerrimis longiuscule seu breviuscule petiolatis supra scabris subtus albidopubescentibus; capitulis corymbosis; involucro biseriali disco breviori, squamis lineari-oblongis obtusiusculis canescentibus; receptaculo breviter conico, paleis latis mucronatis; acheniis praesertim ad margines longe villosis; pappi aristis breviusculis paleis intermediis latis bis terve longioribus. — Folia 1½ - 2 poll, longa, basi 1-1½ lata, trinervia; petioli 3 - 6 lin. longi. Pedunculi ½ - 2 pollicares. Capitula semipollicaria. Ligulae 6-8, oblongae, 10-nerves. Achenia matura fere 2 lin. longa: pappi paleae ex angulis ortae lanceolatae, in aristam hispidam corolla brevioris products; intermedia utrinque 2 latae vel 1 latissimae, truncatae, subintegrae, firmae, ½ lin. altae. — A well-marked species. Plant apparently more than two feet high, the base of the stem not seen.

61. *VIGUIERA TOMENTOSA* (sp. nov.): fruticosa; foliis oppositis petiolatis subcordatis (raro subhastatis) sensim acuminatis serratis pube molli utrinque tomentosis subtus incanis; capitulis corymbosis; involucri discum subsequantis squamis 1-2-serialibus lanceolatis incanis; receptaculo parvo subconico, paleis lanceolatis muticis; acheniis villosis; aristas 2 longis et squamellas plures parvas gerentibus. — Frutex vel suffrutex ramosus, ramulis junioribus molliter pubescentibus. Folia (cum petiolo 3-6 lin. longo) 3-5-pollicaria, e basi leviter cordata (nunc truncata, raro hastata) sensim attenuata, argute serrata, basi trinervia; floralia parva, linearia. Pedunculi 1-3-pollicaria. Capitula quam praecedentis paulo minora. Ligulae amplae, pollicares, circiter 15-nerves. Pappi aristae subulatae, achenio aequilongae; squamellae intermedise utrinque 4-6 angustae vel 2 profunde 2-3-fida, laciniato-fimbriatae, aristis multo breviores. — A true *Viguiera*, with the habit rather of *Oyedcea*.



62. COREOCARPUS HETEROCARPUS (sp. nov.): annua; foliis membranaceis punctatis bipinnatifidis, segmentis brevibus hinc inde dentatis; acheniis exterioribus obovatis ala pinnatisecta cinctis, interioribus longioribus clavatis plerumque exalatis nunc tuberculis exasperatis, omnibus calvis. — Herba gracilis, pedalis, capitulis corymbosis, involucri 2 lin. longo, ligulis 2-4, lineas 3 longis. — I am confident that Bentham's *Coreocarpus parthenioides*, and his *Acoma dissecta*, along with the present plant, belong to one genus, for which, from its analogy to *Coreopsis*, the name of *Coreocarpus* may be preferred. Its nearest relationship is with *Leptosyne* on one hand, and, still more, with *Chrysanthemum* and *Heterospermum* on the other. In the next complete revision of the Bidentoid or Coreopsoid genera with fertile rays, I expect to see all these four and some others reduced to one (*Heterospermum*), which will be the analogue of *Coreopsis*, and about equally polymorphous in the achenia, &c.—Although the *Coreocarpus (Acoma) dissecta* is described as a "suffrutex," with linear entire lobes to the leaves, and the achenium with a narrow entire wing, yet I am not sure that it is really distinct from the present plant. The indurated stems and roots of some annuals of a dry region are not rarely described as fruticose; and the achenia of Bentham's plant, I suspect, were far from mature. Yet our specimens are those of a tender and slender annual, and even the ovaries show the rudiments of the lobed wing, which at maturity is dissected in the manner of most *Coreopsides* of the section *Coreoloma*, only more coarsely. The inner disk-achenia are longer and much narrower than the rest, are more or less roughened or tuberculate, and mostly quite wingless. The disk-corollas show a bearded ring at the summit of the proper tube. This Bentham describes, but the artist has neglected to delineate, in his *C. parthenioides*; on the other hand, the artist delineates the same thing in the *Acoma dissecta*, while it is not noticed in the description. Of the latter plant, also, the appendages of the style are described as "vix puberula," while the artist makes them hairy. In our plant these appendages are elongated linear-subulate and minutely hispid.

63. HETEROSPERMUM XANTI (sp. nov.): tenue, glabrum; foliorum segmentis paucis angustissime linearibus integerrimis; pedunculis filiformibus; involucri exterioris squamis haud ciliatis interiores vix sequantibus; ligulis 7-8 elongatis; acheniis radii calvis ala lobata, disci linearibus longiuscule biaristatis.— Only a single specimen was collected, of a slender annual, 6 or 7 inches high, hardly sufficient for.

description, but interesting from the resemblance of the marginal achenia to those of the foregoing plant in the wing, as far as can be judged from the immature state. The disk-achenia, and indeed the whole structure, except the fertile achenia, accord with *Bidens*.

64. *POROPHYLLUM GRACILE*, Benth. Bot. Voy. Sulph. p. 29. The specimens accord with Bentham's description, except that the involucre is five or six (instead of four) lines in length. Into this my *P. Greggii* appears to pass, with involucre from six to eight lines in length, and with mostly rostrate achenia.

65. *DYSODIA SPECIOSA* (sp. nov.): fruticosa, glabra, valde ramosa; ramis apice nudis monocephalis; foliis oppositis trisectis, segmentis petiolulatis rotundatis argute inciso-dentatis vel trifidis lobis incisissimis dentatisve, dentibus nonnullis glandula grossa infraterminali instructis; involucre bracteis subulato-setaceis grosse uniglandulosis cincto, squamis linearibus subulato-acuminatis, ligulis involucrum longe superantibus; acheniis glaberrimis. — Frutex vel suffrutex ut videtur ultra-bipedalis, ramis patentibus, ramulis floridis herbaceis gracilibus in pedunculum 1 - 3-pollicarem sub capitulo leviter incrassatum desinentibus. Foliola 4 - 6 lin. longa, membranacea, nunc rigidula, glabra vel tenuissime puberula, aut rotundata grosse inciso-dentata, aut 3-5-fida lobis argute incisissimis. Petioli et petioluli interdum lobulis dentibusve parvis 1 - 2 instructi. Capitulum fere pollicare. Bractea tenuis, aristata, involucrum dimidio breviores. • Involucrum squamulae 17 - 20, rigidae, sub acumine setaceo grosse uniglandulose, inferne glandulis 2 - 4 juxtamarginalibus elongatis saepe notatae. Ligulae 14-16, conspicuae, aurantiicae; oblongae, semipollicares. Eceptaculum breviter hirsutum. Pappus albus; 10-paleolatus, paleolis laevo-linearibus 7-9-setosis. — A striking species, helping to connect *Clomenocoma* with *Dysodia*. But the involucre is as uniserial as in other *Dysodice*. So it also is in *D. montana* (*Clomenocoma montana*, Benth. PL Hartw. p. 86,351), which Bentham is disposed to refer to *D. grandiflora* of De Candolle. It is, I think, distinct from, though strictly congeneric with, that species.

66. *GNAPHALIUM LEUCOCEPHALUM*, Gray, PI. Wright, 2, p. 99.

67. *MALACOTHRIX PARVIFLORA*, Benth. PL Hartw. p. 321 ?

68. *MACREIGHTIA INTRICATA* (sp. nov.): tenuiter sericeo-puberula, mox glabra; foliis coriaceis cuneato-oblongis retusis leviter triplinerviis parvis (6-12 lin. longis).—Intricato-ramosus, ramulis rigidis. Pedunculi fructiferi 3 lin. longi, solitarii. Bacca globosa, magnitudine pruni, calyce crasso-coriaceo trilobo stipata, 6-sperma. — The flowers

are unknown ; but the plant must be a *Macreightia*, and the most northern species of the genus.

69. DICLIPTERA RESUPINATA, Juss.; Nees. in DC. Prodr. 11, p. 474; Torr. Bot. Mex. Bound, p. 125.

70. SEUROGRAPHIS CALIPORNICA, Gray in Torr. Bot. Mex. Bound. Surv. p. 125. *Beloperone Californica*, Benth. Bot. Voy. Sulph. p. 38. This is very variable in the foliage and pubescence; the leaves on some specimens less than an inch, on others over two inches long; the inflorescence, calyx, &c. sometimes cinereous-puberulent, sometimes conspicuously glandular-pubescent. The corolla is minutely puberulent or glandular. The pedicels vary from one to three lines in length. Sterile base of the capsule twice the length of the seed-bearing portion. Seeds turgid-lenticular, with a very smooth testa.

71. HYPTIS LANIFLORA, Benth. Bot. Sulph. p. 42, t. 20. The figure does not represent the wool of the calyxes and pedicels half dense enough: it forms a wide white *nimbus*, more than thrice the breadth of the enclosed flower, the hairs of which, moreover, are beautifully and dendritically branched. — *Hyptis Emoryi*, Torr., from the interior Californian desert, on the upper Colorado, is an allied species, but with furfureous-canescens and barely serrulate leaves, and the branched wool of the calyxes also short and furfureous.

72. HYPTIS TEPHRODES (sp. nov.): herjjacea ? erecta, pube brevissima molli undique canescens; foliis lanceolatis acutis obtuse serrulatis in petiolum brevem attenuatis, floralibus subulatis parvis; verticillastris plurifloris laxis approximatis in racemos vel spicas crebriores paniculatas confluentibus; bracteis minutis setaceis; calycibus cum pedicello subaequilongo lana brevi nivea dense vestitis, tubo aequali oblongo-campanulato dentibus setaceis aequalibus; corolla vix calyce longiorc.— Folia utrinque tomento appressissimo albido mollia, obsolete venosa, caulina 2-pollicaria, 4—6 lin. lata; ramealia decrescentia linearia. Paniculae floribundae, aphyllae. Calycis fructiferi tubo vix sesquilineam longo. — A well-marked species of this great genus, of the same section with *H. albida*, to which it is considerably related. In both the pubescence of the calyx is dendritic. "

73. TOURNEFORTIA VELUTINA, H. B. K. Nov. Gen. & Sp. 3, p. 79; t. 201.

74. HELIOTROPIUM CURASSAVICUM, Linn.

75. ERITRICHIMUM (RUTIDOCARYUM) HELIOTROPIOIDES, Torr. Bot. Mex. Bound. Surv. p. 140. *Antiphytum helitropioides*, A. DC. Prodi\*. 10, p. 122.

76. ERITRICHUM ANGUSTIFOLIUM, Torr. in Pacif. R. R. Rep. 5, p. 363. Accords with no. 500 of Coulter's Californian collection, which is referred to this species by Dr. Torrey. No. 85 of a former collection of Xantus, made in the State of California, is a different species, near to or a variety of *E. frassisepalum*, Torr.

77. BUDDLEIA CROTONOIDES (sp. nov.): tomento albido denso; foliis e basi subcordata ovato-oblongis seu ovato-lanceolatis sensim acuminatis vel acutatis creberrime crenulatis, venis subtus prominulis reticulatis; ramis teretibus; panicula densa pyramidata; capitulis floribusque tomentosiss sessilibus; corolla calycem vix superante. — Frutex. Folia 3 - 4-pollicaria, dense ac molliter tomentosa, tomento albo in costa venisque mox fulvello, venulis subtus conspicuis versus margines sete reticulatis. Corollae sicut calyces extus dense tomentosae. — Related to *B. Humboldtiana* and *B. cordata*, but distinct in the woolliness, the terete branches, &c. The tomentum probably falls with age from \* the upper face of the leaves.

78. EUSTOMA EXALTATUM, Griseb. in DC. Prodr. 9, p. 51.

79. QUAMOCLIT COCCINEA, Moench.

80. IPOBLYPTIS (PHARBITIS) NIL, Roth.

81. IPOBLYPTIS SINUATA, Ort. A form with the division of the leaves nearly entire.

82. JACQUEMONTIA ABUTILLOIDES, Benth. Bot Voy. Sulph. p. 34.

83. EVOLVULUS ALSINOIDES, Linn.

84. SOLANUM ELEAGNIFOLIUM Cav. Ic. t. 243; Dunal in DC. Prodr. 13, p. 290. & *Hindsianum*, Benth. 1. c.

85. PHYSALIS GLABRA, Benth. Bot. Voy. Sulph. p. 39. But the leaves are not thickish.

86. DATURA DISCOLOR, Bernh.; DC. Prodr. 13, p. 541. *D. Thomasii*, Torr. in Pacif. R. R. Rep. 5, p. 362, & Bot. in Mex. Bound. Surv. p. 155. *Stramonium Curassavicum*, &c, Herm. Par. Bot p. 233, cum ic. Cinereo-pubescent. Corolla quam *D. Stramonium* longior. Capsula mox nutans, aculeis gracilibus scqualibus pubescentibus ultrapollimaribus horrida. — I have little doubt that this is the West Indian *D. discolor*, although the name is not appropriate to it. The plant of Professor Thurber from Corralitas, mentioned by Dr. Torrey, is, I suppose, *D. quercifolia*, H. B. K., which has also been collected by C. Wright (no. 527) and others, on the Rio Grande in New Mexico. This bears an erect fruit, the spines of which are unequal (the larger an inch or more in length), compressed, and with dilated bases, glabrous or nearly so.

87. NICOTIANA MEXICANA, Schlecht. in *Linnaea*, 15, litt. p. 95? Belongs to the section *Tabacum*; perhaps the same as *N. caudata*, Nutt. PL. Gamb.

88. NICOTIANA IPOMOPSISFLORA, Dunal. (M09. ^nd Sesse. Ic. Mex.) in DC. Prodr. 13, p. 559. *K fabacam, mva. T.??* Benth. PL Hartw. "no. 205. *If. trigonophytta*, Dunal. in DC. 1. c. p. 562. *U N. multi- flora*, Nutt. PL Gamb.?" (sed ubi?) Torr. in Pacif. R. R. Rep. 5, p. 362? — A common North Mexican species extending into the United States, rather variable, but well marked.\* When fully developed the fruiting racemes are long, virgate, and unilateral, and the corolla (6 or 8 lines long) is white or greenish-white, or yellowish, with a small five-angled border. The whole plant is viscid. It is no. 579 of Coulter's Californian, and 1255 of his Mexican collection. It occurs in Wright's first Texan-New-Mexican collection without a number (unless the number is lost from my set), in his later collection it is no. 1607. Wright also collected it in Texas as early as the year 1848; also Lindheimer, in his coll. 1850 (300), «*N. rupicola*, Lindh. mscr."; Dr. Gregg in Mexico (no\* 61, and without a number); Thurber in Sonora (no. 987); and Dr. Bigelow in the interior of California. I believe it is also Berlandier's no. 1361, from San Louis Potosi; but the specimens (in fruit) are too poor to determine. No. 75 of Xantus's Fort Tejon collection is of a different but allied species, perhaps *N. sordida*, Lehm. I cannot find any "*N. muUiflora*" in Nuttal's paper on Gambell's collection.

89. LTCIUM BREVIPES, Benth. Bot. Voy. Sulph. p. 40; Miers, 111. S. Amer. PL 2, p. 117, t. 69.

90. VALLESIA DICHOTOMA, Ruiz & Pav. ex Benth. Bot. Voy. Sulph. p. 33. Leaves lanceolate-oblong, even the nascent ones glabrous.

91. ASCLEPIAS SUBULATA, Decaisne?; Torr. in Pacif. R. R. Rep. 5, p. 362, t. 7, & Bot. Mex. Bound, p. 164.

92. BOERHAAVIA.ERECTA, Linn. A slender form, not uncommon in Sonora, Western Texas, &c.

93. BOERHAAVIA SPICATA, Chois. ?; Torr. in Bot. Mex. Bound, p. 171. This is most allied to *B. Wrightii*. The lowest leaves are ovate or oblong and obtuse, but the upper ones narrower and euspidate-acute, often attenuate-acuminate, the margins mostly very\* undulate, the surfaces brown-dotted. Nothing is more variable than the size of the perianth in this genus. Instead of being small, as in the specimens

described by Dr. Torrey, in the present specimens when well expanded they are three lines in diameter; the fruit from 1<sup>^</sup> to 1J lines long, usually obtuse, sometimes truncate at the summit; pedicels half a line or a line long. The stamens are 3 or 5.

94. ERIOGONUM ANGULOSUM, Benth. in Linn. Trans. 17, t. 18.

95. ANTIGONON LEPTOPUS, Hook. & Arn. Bot. Beech. Voy. p. 308, t. 69. In some specimens all the upper leaves are sessile, and the rest short-petioled. Sepals rose-red.

96. STEGNOSPERMA HALIMIFOLIUM, Benth. Bot. Voy. Sulph. p. 17, t. 12. In flower and fruit. But the kernels of the mature seeds have been destroyed by insects, so that the form of the embryo cannot be made out. The ovary shows the rudiments of the dissepiments at the summit of the cell. The five arilli cohere so that, after dehiscence, the contents of the capsule fall as a globular mass.

97. CHENOPODIUM ALBUM, Linn.

98. CELOSIA FLORIBUNDA (sp. nov.) : caule herbaceo (vel suffruticoso?) ramoso fere glabro; foliis coriaceis deltoideo-ovatis nunc subhastatis trilobisve basi in petiolum decurrentibus subtus tomentulosis puberulisve reticulatis; spicis subdensifloris paniculatis, paniculis in thyrsum amplum corymbiformem confertis; floribus plerumque digynis; sepalis albidis ovalibus obtusissimis ecarinatis obsolete 3-5-nerviis bracteas uninerves triplo superantibus; ovulis seminibusque 3 - 4; utriculo calycem adaequante. — Bami valid!, striata. Folia cum petiolo 4-6-lin. longo 2 - 3-pollicaria, crassa, scabrida, mucronata, ovata seu ovato-lanceolata, nunc integra,\*mnc subtriloba vel subhastata, lobis rotundatis. Thyrsus maxime floribundus densus. Flores sessiles, vix sesquilineam longi, scarioso-albi, denique fusciscentes. Stamina ima basi monadelphia. Utriculus ovoideus, circumscissus. — This would appear to be allied to the Arabian and Abyssinian *G. popuHfolia*.

99. AMBLOGYNE (SARRATIA) FIMBRIATA. *Sarratia* *mBerhndieri*, var. *Jimbriata* (& var. *denticulata* ?), Torr. in Bot. Mex. Bound, p. 179.

100. AMBLOGYNE (SARRATIA) TORREYI. *Sarratia* *Berlandieri* & var. *emarginata*, Torr. 1. c, non Moq.\*

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\* Moquin-Tandon's first thoughts, which were to combine his *Sarratia* and *Amblogyne*, seem to have been the best, and, in the next general revision of the order, when the subdivisions come to be grounded upon characters of more consequence than transverse dehiscence or the want of it, will probably be acted upon. *Amblogyne* will thus form a natural and pretty well defined genus, distinguished by the nature of the sepals of the female flowers, their union at the base, which hardens more or

101. *FR<ELICHA INTERRUPTA*, Moq. in DC. Prodr. 13, 2, p. 421.  
 102. *MOZINNA CANESCENS*, Benth. Bot. Voy. Sulph. p. 52, t. 25.  
 103. *CNIDOSCOLUS ANGUSTIDENS*, Torr. Bot. Mex. Bound, p. 198.  
 104. *RICINUS COMMUNIS*, Linn. Cultivated?  
 105. *APHORA SERRATA*, Torr. in Bot. Mex. Bound, p. 197.  
 106. *EUPHORBIA HINDSIANA*, Benth. Bot. Voy. Sulph. p. 51, t. 24.

Without flowers or fruit.

The following determinations and notes upon *Euphorbia* are communicated by Dr. Engelmann.

107. "*EUPHORBIA LEUCOPHYLLA*, Benth. Bot. Voy. Sulph. p. 50.

less, and the separation of the fructiferous calyx from its insertion with the achenium enclosed. The known species may be disposed as follows: —

AMBLOGYNE, Raf. (*Amblogyne & Sarratia*, Moq.)

§ 1. AMBLOGYNE VERA. Scpalaf. fecm. inferne modice connata, fructifera urceolata- sou infundibuliformi-conniventia apice patentia. Utriculus haud seu vix circumscisse dehiscens.

1. A. PÓLYGONOIDES, Raf. (*A. pohjgonoides & Sarratia Berlandieri*, Moq. in DC. Prodr. 13, p. 268, 270.) Sepala ? subspathulato-linearia, snbaequalia, triner- vata, nervis simplicibus. — Berlandier's specimens of no. 2276 [= 859], on which Moquin founded his *Sarratia Berlandieri*, are very poor, and perhaps did not really afford a circumscissile dehiscence. In these, and in much better specimens of the game species from Bexâr (Berlandier's 2411 = 981) I find the utricles to open irreg- ularly or vertically near the base; and the plant clearly belongs to *A. polygónoides*. — The *Amarantus polygonoides* of Wight's Icones Ind. Or., t. 512, is no more an *Amblogyne* than his' t 719. The former probably represents *Euxolus polygamus*.

2. A. URCEOLATA. (*Amaranthus urceolatus*, Benth. Bot. Voy. Sulph. p. 158. *Sarratia urceolata*, Moq. í. c.) Sepala ? inrequalia, infra laminam spathulato-orbi- culatam [pinnato-] nervosam (nervis ramosis viridibus) 2 exteriora subangustata tricarinata, 3 interiora valde angustata unicarinata. — Bentham makes no mention of a circumscissile dehiscence in this species, nor indeed does Moquin.

Var. OBCORDATA : lamina sepalorum emarginata fere obcordata. *Amblogyne po- lygonoides*, Torr. in Bot. Mex. Bound, p. 170, quoad pi. coll. Wright, no. 1746. — This, I suppose, is a variety of *A. urceolata* (which I have not seen), with the char- acters of which it well accords, except that the lamina or dilated summit of the sepals is strongly notched (otherwise quite entire), and nearly obcordate in shape. The utricles are not circumscissile. The pinnately-teined or nervose dilated lamina, and the great contraction below of three of the sepals, at once distinguish this from *A. polygónoides*.

§ 2. SARRATIA. (*Sarratia*, Moq. pro parte.) Sepala fl. foem. basi tantum con- nata, fructifera pi. m. patentia. Utriculus circumscisse dehiscens. — Caules erecti.

3. A. FIMBBIATA (*Sarratia Berlandieri*, vsx. *fimbriata*, Torr. 1. c) : caule ramis- que virgatis; foliis lineari-lanceolatis; glomerulis globosis in axillis foliorum sessi- libus et supærae in spicam subaphyllum congestis\* seu approximate; bracteis calyce

These specimens, from the original locality of the species, perfectly agree with Bentham's description, but would be called rather grayish-hoary than snow white; the leaves are very deeply and almost pectinately dentate, supported by extremely short petioles; the appendages of the dark red or almost black glands are very unequal, as they commonly are in *Anisophyllum*, and in no species more so than in *E. adenoptera*, Bertol. (*K dioica*, H. B. K.), the posterior ones being always the largest; in the specimens before me the posterior appendages are one line broad and half as long, the anterior ones scarcely more than half a line broad and somewhat shorter; they are always crenate or

hrevioribus muticis; sepalis § obtusis, ? basi connatis subaequalibus e basi angusta (lininervi sea in latioribus obsolete trinervi) in laminam flabellatam tenuiter scariosam radiato-nervosam ambitu fimbriato-incisam (fructif. patentissimam) maxime cuncato-dilatatis. — Valley of the Rio Grande near El Paso, and on the San Pedro, W. Texas, Wright, 582, pro parte. On the Gila River, Schott. Lower California, Xantus, supra, 99. — Nearly dioecious; the female plant only collected, among the flowers of which a male flower, with five narrowly-oblong and obtuse-sepals, may rarely be detected. Female sepals more connate at the base than in any of the following.

4. *A. TORREYI* (*Sarratia Berlandieri*, cum var. *emarginata*, Torr. l. c, non Moq.): *Uioica*; foliis ovato-oblongis seu oblongo-lanceolatis; glomerulis paniculato-spicatis et axillaribus; bracteis sepalisque masculis cuspidato-acuminatis; sepalis ? ima basi coalitis subaequalibus obovato-spathulatis uninerviis, nervo simplici seu leviter pinnatim ramoso, apice rotundato integerrimo retuso vel emarginato. — On the Mexican border from the Rio Grande (Dr. Bigelow, Dr. Parry, Ac.) to Lower California, Xantus, supra, no. 100. A variety with linear or oblong-linear leaves and virgate spikes was collected near the sources of the Nebraska, by Mr. Henry Engelmann. — I have not seen Dr. Torrey's *S. Berlandieri* var. *denticulata*, with<sup>1</sup> narrow leaves and cross-denticulate sepals, gathered by Thurber at Santa Cruz, Sonora, which seems to connect the present species with *A. fimbriata*.

5. *A. SCARIOSA* (*Amarantus scariosus* Benth. l. c. t. 51, *Sarratia scariosa*, Moq. l. c), from Western Tropical America, I have not seen. From the figure and description it is apparently most nearly related to the foregoing species, but is a much coarser plant, with the "habit and inflorescence of *Amarantus retroflexus*," aristate bracts surpassing the flowers, deeply emarginate sepals to the female flowers and obtuse ones to the male flowers, which is far from the case in *A. Torreyi* if the male specimens in the Lower Californian collection really belong to that species.

6. *A. BQUARRULOSA* (*Scleropus Sffuarrubsus*, Andenss. ined., from the Galapagos) is another species with the broadly ovate or rhomboid-obovate lamina of the female sepals all abruptly contracted into narrow claws.

The genus *Scleropus* was evidently founded upon an abnormal character, a thickening of the peduncle and pedicels which occurs in various *Amantacea*. Schrader's *S. crassixs* is an *fiuxolus*. A part of no. 58 & Wright's Texano-New Mexi-



even deeply incised, the posterior more so than the anterior ones.\* Ovary and capsule together with the styles hairy, but the stipe glabrous: styles longer than ovary, distinct, about two thirds divided: stigmas scarcely clavellate. Seed oval, sharp angled, slightly undulate, nearly 0.5 line long.

108. "EUPHORBIA SETILOBA, Engelm. in Bot. Williamson, Pacif. R. B. Rep. 5, p. 364. Identical with the plant from the lower Colorado, described in the report above cited. Root thick, but evidently annual; many stems from a few inches to a span long, almost verticillate from the very base, an arrangement which is very striking in the Californian *E. polycarpa* and the European *E. Chamęsyce*, but not so distinct in most other *Anisophylla*. Lower leaves coarsely serrate; upper ones entire; in the Colorado plant all nearly entire. Involucra minute, scarcely a third of a line long; the glands perpendicular, not horizontal, dark red, with conspicuous white lacinate appendages. Male flowers 5 - 8; in the original specimens scarcely ever more than 3. Ovary and capsule covered with short pubescence (not hispid); styles nearly | line long, very slender, their branches remarkably club-shaped; seeds scarcely 0.4 lines long, sharp angled, acute, transversely rugose.— Distinguished from the closely allied *E. polycarpa* by the slit in the posterior part of the involucre, the shape of the appendages, and the more acute and much more rugose seeds.—*E. setiloba* has also been collected by Dr. Newberry in the sandy deserts west of the lower Colorado river.

109. "EUPHORBIA POLYCARPA, Benth. Bot. Voy. Sulph. p. 50. No doubt identical with the original form, collected in the same neighborhood, but with rather larger leaves than Bentham describes. The specimens referred here by me in Bot. Mex. Bound, p. 186, undoubtedly belong here, as also *E. ocellata*, Nutt. in Hb. Hook., from San Diego, Coulter's no. 1448 in Herb. A. Gray, and specimens collected by Dr. Newberry near Los Angeles and in the Mohave desert. Mr. Boissier, however, distinguished, and perhaps justly, Wright's no. 1854, from

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can collection is *Amarantus Blitum*, var. *gręceizans*, in this *Scleropus* condition. As specimens of the same species were mixed with no. 859 in Berlandier's reliquiaę, which number is the equivalent of his 2279, this may have been what Moquin took for *Scleropus crassipes* in De Candolle's herbarium (Prodr. 1. c. p. 271), from that collection.

\* These petaloid appendages vary, in different specimens, from almost entire or crenulate to lacinate-multifid. — A G.

the San Pedro River in Arizona, under the name of *E. micromera*, in DC. Prod, ined., by the very small involucre (0.2 lines long), the entire absence of appendages on the small yellow, not purple, glands, and the extremely short styles with subglobose stigmas. The length of the styles in these *Euphorbia*, however, is not a very safe character, as this specimen from San Lucas, and some others from Arizona and the Colorado desert prove: they have suberect styles shorter than the ovary (only about  $\frac{1}{2}$  line long), while most forms from the State of California have elongated styles with divaricate clavate branches, twice as long as the ovary. My remarks about the variability of the plant may be extended to the shape of the leaves, which are usually oval, oblong, or oblong-linear, and obtuse at the base, but in specimens collected by Dr. Newberry at Laguna I find them almost orbicular and deeply cordate at the base. The stipules are divided on the upper, and united on the lower side of the stem, lanceolate-subulate, mostly entire and ciliate, in the specimen from San Lucas, however, glabrous. Stem and leaves usually glabrous, sometimes with a few scattered hairs, or entirely pubescent. The pubescent forms have always very narrow appendages, and the pubescence extends even to the ovary and capsule. The seeds are 0.4 line long, sharp-angled, with the sides almost smooth, or usually more or less distinctly undulate.

110. "EUPHORBIA HTPERICIFOLIA, Linn., var. COMMUNIS, Engelm. in Bot. Mex. Bound, p. 188. *E. Preslii*, Gussone Fl. Sicul. 1, p. 531; Boiss. in DC. Prod. ined. — Boissier's weighty authority has not convinced me that the Linnsean *E. hypemcifolia*, with smaller flower-heads, smaller capsules, and smaller and paler seeds, is distinct from our common northern var. *communis*. This latter has become naturalized in Italy, where it has been described under different names (*E. androscemifolia*, Presl, *E. trinervis*, Bertol., and *E. Preslii*, Guss.); nor can I distinguish *E. lasiocarpa*, Klotzsch, from the West Indies and South America, by any character besides the pubescent capsules. Intermediate forms unite all these forms.

111. "EUPHORBIA GTMNOCLADA (sp. nov.): fruticosa? ramis basi lignescentibus teretibus gracilibus strictis glabratis; foliis ramcis ternatis internodio elongato multoties brevioribus linearibus seu oblanceolato-linearibus integris carnosulis (siccitate conduplicatis) subtus puberulis supra subnudis in petiolum brevissimum attenuatis; cymæ terminalis umbelliformis puberulae radiis ternis iteratim dichotomis; pedicellis bracteas anguste lineares et involucre magna aequantibus; involucri

hemisphaerici extus intusque minute puberuli dentibus orbiculato-ovatis fimbriatis dentatisve, glandulis 5 transversis bilabiato-cyathiformibus appendice iis duplo latiore (alba seu rosea) orbiculata integra suffultis; bracteolis paucissimis linearibus fimbriatis; florum masculinorum numerosissimorum stipitibus demum exsertis; flora foemineo breviter stipitato erecto glaberrima; stylis distinctis § bifidis ovario sequilongis; ramis clavatis divaricatis; capsulae coccis globosis; seminibus ovatis obscuris depresso-tuberculatis ecarunculatis. — Base of stem unknown, probably fruticose; the slender branches below ligneous; internodes 2 - 3 inches long. Leaves very deciduous, on the branches in threes, 4 - 7 lines long [the larger almost an inch long], and 1 - 1½ lines wide, on a petiole less than a line long. Cyme 1 - 1½ inches in diameter. Involucres with the large appendages 4 or 5 lines wide. Bracteoles very few (probably 5) outside of the 20 or 30 male flowers. Styles scarcely half a line long. Capsule 2½ lines in diameter; cocci with a slight groove on the back: seeds about 1½ lines long, blackish-brown, covered with flattened tubercles. — Distinguished from the closely allied Mexican *E. peganoides*, Boiss. Cent. Euph. p. 21, by the small size of the bracts, the pubescence of the involucre, the shape of the glands, the large and entire appendages, and the short stipe of the ovary. The seeds of *E. peganoides* are unknown.\*

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\* Notes to the *Euphorbia* of the Botany of the Mexican Boundary Survey, by the author, Dr. Engelmann.

Page 185. *E. petaloidea*, y. *Nuttallii* is distinguished by Mr. Boissier (Cent. Euph. p. 10) under the name of *E. zygophylloides*, no doubt correctly. Another of Mr. Boissier's new species, *E. polyclada*, from Texas, sent by Wright and Lindheimer, seems to be only a smaller flowered form of *E. petaloidea* with narrower appendages and smaller seeds.

P. 186. *E. cinerascens*, p. *appendiculata* must give way to the earlier name of *E. melanadenia*, Torrey in Bot. Whipp. p. 135. — ~~*E. cinerascens*~~ will have to be named *E. melanadenia*, p. *subinappendiculata*.

P. 187. *E. inaequilatera*, Sonder. A careful examination of the original specimen of *E. serpyifolia*, Pers. Syn. 2, p. 14, preserved in Herb. De Candolle (a fragment of which has been kindly communicated to me), proves that this is the type of the American forms, referred by me to *E. inaequilatera*; they will therefore have to bear Persoon's name. Mr. Boissier, discriminating perhaps too nicely, considers the Asiatic and African forms as distinct, and comprises them under the name of *E. sanguinea*, Hochst., to which *E. inaequilatera* and many other synonymes are referred.

The following two new species, of the section *Tithymalus*, were collected by Dr. Newberry in the recent expedition under Lieutenant Ivcs: —

112. *Folia pinnata Palmae cujusdatn.*
113. *COMMELTNA VIRGINICA*, Linn.
114. *ANTHEPHORA ELEGANS*, Schreb. *Gram.* 2, t. 44.
115. *QENCHRUS TRIBULOIDES*, Linn., var. *C. pauciflorus*, Benth. *Bot. Voy. Sulph.* p. 56. *C. echinatus*, Benth. *PL Hartw.* no. 246. Apparently not distinct from the common plant of the eastern side of North America.
116. *MUHLENBERGIA CALAMAGROSTOIDES*, H. B. K., ex Benth. *PL Hartw.* p. 347. *M. longiseta* Benth. 1. c. p. 28.
117. *BOUTELOUA POLYSTACHYA*, Thurber. *Chondrosium polystachyum*, Benth. *Bot. Voy. Sulph.* p. 56. *01 subscorpioides*, C. Müll, in *Bot. Zeit.* 1856, p. 347. To this belongs no. 754 and 2021 of Wright's Texano-New-Mexican collection, and 792 of Coulter's Californian collection.
118. *DACTYLOCTENIUM JEGYPTIACUM*, Willd.
119. *Gram. nov.* of uncertain genus, the single specimen mislaid.
120. *VILFA VIRGINICA*, P. de Beauv. Only sterile plants.
121. *BRIZOPYRUM SPICATUM*, Hook. & Am. *Bot. Beech. Voy.* p. 403; Munro in Benth. *PL Hartw.* p. 342. Female specimens with the spikelets an inch and a half long, quite unlike any *Uniola spicata*, Linn., met with on the eastern coast of the United States.

*EUPHORBIA SCHIZOLOBA* (Engelm. in Lieut. Ives's Rep.): perennis, erecta, glaberrima, glaucescens; foliis breve ovatis integris breviter cuspidatis in petiolum, brevem attenuatis; umbellae trifidae bracteis inferioribus rhombeis, superioribus transversis cuspidatis; involucri glandulis stipitatis crenatis incisive nee cornutis, lobis glandulosis emarginatis; stylis ovario longioribus basi connatis.—East of the Lower Colorado, lat. 35°, alt. 2000 feet. Dr. J. S. Newberry, in Lieutenant Ives's Exped., March 26, in flower. — Amply distinguished from *E. montana* and other allied species by the peculiar shape of the glands and lobes of the involucre. Stems 8-12 inches high. Leaves 5-7 lines long and 3-4 lines wide. Fruit and seeds unknown.

*EUPHORBIA LURIDA* (Engelm. I.e.): perennis, multicaulis, glaberrima, junior tota lurida; foliis oblanceolatis integris basi angustatis subsessilibus patulis; ambelloe 5-fidae bracteis cuspidatis, inferioribus obovatis, superioribus suborbiculatis; involucri glandulis transversis crenatis, lobis ovatis membranaceis; stylis ovario multo brevioribus vix basi connatis.—Base of the San Francisco Mountains, lat. 35°, alt. about 7000 feet; in flower at the end of April. Dr. J. S. Newberry. — From the nearly allied *E. esulceformis* it is distinguished by the absence of horns on the glands, &c. Stems of the very young specimens six inches high. Leaves 5 to 8 lines long and 1½ to 2 lines wide. Fruit and seeds unknown.

4. *A Cursory Examination of a Collection of Dried Plants made by L. C. ERVENBERG around Wartenberg, near Tantoyucd, in the Ancient Province Huasteca, Mexico, - in 1858 and 1859.* By ASA GRAY.

This collection, being made by a person of limited botanical knowledge, contains a number of plants which are common weeds in most warm regions, but also a fair number of new or little known species, — enough to show that this district of country, in which Mr. Ervendberg resides, would well reward a proper botanical exploration, which it is the object of this notice to encourage him to undertake. This Mr. Ervendberg is fully disposed to do, if the possessors of herbaria could be sufficiently interested in this regard, by subscribing for his collections at the usual rates, to defray the necessary expenses. Supplied with proper appliances and facilities, Mr. Ervendberg would make a good, as he is a zealous, collector. The numbers (in parentheses) are those affixed by the collector and under which the specimens have been distributed.

The enumeration, beginning with the *Polypetalce*, follows something like the Candollean order.

*Clematis sericea*, H. B. K, a glabrate form (214); *Argemone Mexicana*, L. (292); *Bocconia frutescens*, L. (202); *Cardamine hirsuta*; L. (188) ; *Cleome polygama*, L. (149) ; and a single specimen of some ether species (136); male specimens only of what seems likely to be a new species of *Mayna* (273); *ProcMa Crucis*, L., and fine and abundant specimens of the following: —

*Banara Mexicana* (sp. nov.): foliis glabris oblongis seu ellipticis breviter obtuse acuminatis a basi biglandulosa 5-costatis; panícula laxa, ramis elongatis pedicellisque velutino-puberulis; perianthio canescente.—"A tree in woods"? flowers April to May, white," rather large; the sepals, or outer divisions of the softly canescent perianth, from 2½ to 3 lines long, strictly valvate in aestivation. Mr. Bcntham, who has just revised this genus, informs me that he has another Mexican species, *B. dioica*, from near Vera Cruz, but that belongs to another group (121, 247).

*Casedria hirsuta*, Sev.? (328) and *C. nitida*, Jacq. (338). *Jonidium longifolium*, Mog. & Sesse, but with much shorter peduncles than that species is described (210).

*Poli/gala paniculata*, L. (187); and a *Securidacu*, without fruit, ap-

pears to be the *S. volubilis*, L. (119); there is also just the northern *Hypericum Canadense*, L. (218).

A broad-leaved *SteUaria* (194) is perhaps a variety of the South American *S. cuspidata*; *Drymaria cordata*, Willd. (228) could not fail to be in the collection; but a less familiar plant accords with *Glinus Gambessedii* of Fenzl, and no less with *G. parviflorus* of Wallich (271).

The Malvaceae of the collection are some common species of *Sida*, viz. *S. urens*, L. (297), *paniculata* (203), *carpinifolia* (220), *rhombifolia* (296), and *Elliottii*, Torr. & Gray (176); *Malvaviscus arboreus*, Cav. (289); *Malvastrum trictispidatum*, Gray (290, 291); *Anoda hastata*, Cav. (331); *Abutilon* (*Wissadula*) *periplocifolium*, Don (151), a form with narrow and tapering leaves, and slightly and bluntly pointed carpels; the "corolla flesh-color" according to the collector's memorandum; also *A. (Wissadidd) mucronulatum* (152), that is, *Wissadula mucronulata*, Gray, Rel. Berland., mscr., & Torr. in Bot. Mex. Bound, p. 39, the flowers of which are said to be "golden yellow." It is no. 3109 of Berlandier's collection, also from Tantoyuca. But if *W. hirsuta*, *rostrata*, and other plants recently referred by Grisebach to *A. periplocifolium* really belong to one species, it may well include the present plant also, which is, perhaps, *Sida hemandioides* L'Her. There is, finally, a true *Abutilon* (161), the species undetermined for the want of fruit, and the following: —

*Abutilon notolophium* (sp. nov.): fruticosum; foliis lato-cordatis acuminatis integerrimis supra puberulis subtus ramis calycibusque furfuraceo-tomentulosis ssepius ferrugineis; pedunculis axillaribus folium subacquantibus et corymbosis ad apicem ramorum; floribus magnis; calyce quinquangulato; capsula (immatura hirsuta) polycocca, coccis compressis truncatis muticis dorsb toto alatis 4-5-spermis demum bivalvibus, ala bipartibili chartacea margine muricato-denticulata, denticibus fasciculo pilorum terminatis. — Hills at Tantoyuca, Mexico, Jan. 1831 ("flores lutei"), coll. Berlandier 743, 2163.-r. Leaves 3 to 6 inches in diametér. Peduncles 2 to 3 inches long, one-flowered. Calyx an inch long, apparently strongly 5-angled, or as if crested at the base, 5-cleft. Petals an inch and a half long, broadly obovate, veiny. Carpels more than 20, forming a depressed-globular umbilicate. fruit of an inch in diameter, separable at maturity, glabrous except on the back; the proper cell small (about 2 lines broad and 3 lines long), and lunate, chartaceous, but the whole produced into a dilated crest or wing.

of 3 lines or more in width, which splits into two in dehiscence. Seeds superposed in a single series, puberulent.

Of Bombaceae, Byttneriaceae, Tiliaceae, &c, there is *Eriodendron anfractuosum*, DC. (361) ; and specimens with male flowers of a tree apparently allied to *Myrodia* (373) ; *Melochia pyr amida*, L. (269) ; the ever-recurring *Waltheria Americana*, L. (356) ; *Guazuma tomentosa*, Kth. (131) ; *Triumfetta semitriloba*, L. (145) ; a form of *Helio-carpus Americana*, L. (225) ; and *Corchorus pifolobus*, Link (the *C. siliquosus* of Torrey and Gray's Flora, &c), mixed with *C. siliquatus*, L. and *C. villosissimus*, St. Hil. (196, 197).

*Amoreuxia Wrightii*, Gray, PL Weight, 2, p. 26 occurs in a single specimen (124).

*Oxalis corniculata*, L. (347) could hardly fail to be present.

*Vitis Caribcea*, DC. (120, 376), *Gouania Domingensis*, L. (279), and a dubious, perhaps unpublished *Euonyx* (139), are solitary representatives of their respective orders.

The Mülpihiaceae are represented by *Galpimia glauca*, Cav. (130, 233), *Malpighia glabra*, L. (183), a *Stigmaphyllon* allied to *S. puberum* (323), and a variety or near relation of *Heteropteris cotinifolia*, Juss. (209).\*

*Spondias lutea*, L. (353), *Bursera gummifera*, Jacq. (344), and *Idea Copal*, Rich. (185) represent the Terebinthaceae; and *Ilourea glabra*, H. B. K. (171), the Connaraceae.

The Leguminosae are *Crotalaria sagittalis*, L. (30), *O.-incana*, L. (33, 295), *O. anagyroides*, H. B. K. (26); and *C. striata*, DC. (22); *Indigofera subulata*, Vahl (20, 27) ; *Eysenhardtia amorphoides*, H. B. K. (15, 230); *Dalea nigra*, Mart. & Gal., which is Bentham's *D. lasiostachya* and *D. elegans* of Seemann (7), and the following apparently undescribed species, which abounds in Berlandier's collection : —

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\* I append characters of a Mexican Maple, specimens of which were distributed among Berlandier's *relijuv*. It is the only Mexican species known to me, and belongs to the same group with *A. saccharinum*. \*

*Acer Mexicanum* (sp. nov.): glabratum; foliis subtus pallidis dilatato-cuneatis alte trilobis basi truncatis vel subquinculobis basi magis rotundatis, lobis parce repandoinuatis margine integerrimis; floribus umbellato-corymbosis simul cum foliis evolutis poljggamis; pedicellis filiforraibus barbatis; calyce campanulato subdentato (petalis nullis ?); staminibus 8; fructibus mox glabris, alis parvulis semi-obovatis basi apugustatis arrectis. — " Nuevo Leon, in ruderatis, Junio, 1843," Berlandier, coll. no. 3122. Leaves 2 inches in diameter. Wings of the fruit 8 or 9 lines long but probably not full grown.

*Dalea thyrsoiflora* (sp. nov.) : fruticosa, cinereo-pubescentis; caulibus erectis paniculato-ramosis ; foliolis 3 - 5-jugis (seu fol. supr. 1 - 2-jugis) ovalibus membranaceis subtus ramulisque grosse nigricanti-glandulosis; spicis axillaribus et terminalibus breviter pedunculatis thyrsoideo-paniculatis confertis brevibus (nunc inferne sublaxifloris); calyce cum bractea oblongo-ovata acuminata tubo aequilonga grosse glanduloso, dentibus subulato-setaceis villosis demum patentissimis apice unctis tubo sublongioribus. — Monterey and San Fernando in the northern part of Mexico, and farther south from Victoria to Tula, coll. Berlandier, no. 763,846, 1386,2183, 2266. — Shrub 10 feet high, according to Ervendberg; the branches herbaceous. Leaves pale and dull. Leaflets 3 to 6 lines long, obtuse at both ends, copiously dotted underneath with dark glands. Spikes very numerous, on short and slender, often branching peduncles, forming a leafy crowded panicle, the flowers often scattered on the lower part of the rachis, or a few glomerate in the axils of the uppermost and reduced leaves. Flower about 3 lines long; corolla apparently flesh-color or ochroleucous, scarcely exceeding the lower tooth of the calyx. Legume villous.\*

Also *Tephrosia cinerea*, Pers. (19) and 2 | *Schiedeana*, Schlecht. (307), but with axillary racemes and more acute calyx-teeth.

*Diphy&a Carthaginensis*, Jacq. ? (23): the pedicels are long, and the leaflets are emarginate, as in Seemann's specimens from Panama;

\* The other *Daleas* of Berlandier's collection are : —

*Dalea frutescens* Gray (1887); *D. tuberculata*, Lag. (783, 1238, 2203), agreeing with Lagasca's character "foliis canescentibus" better than with De Candolle's; *D. pidchella*, Moric. (782,1337,2202); *D. leucostoma*; Schlecht. ? but more pubescent, and with fuscous spikes, perhaps Lagasca's *D. virgata*, which is imperfectly characterized (837, 2257 and 761, 2181); *D. triphylla*, Pav. (1214); *D. laxiflora*, Pursli, which is mainly Moric&nd'a *D. penidllata* (1747); *D. pogonathera*, Gray (613, 2023); *D. lasiathera*, Gray (1014, 2444); *D. nana*, Torr. (2053); *D. auroa*, Nutt. (953, 2383, and a very silky variety, 1016, 2446); and the following, which I am unwillingly obliged to describe as new : —

*Dalea Berlandieri* (sp. nov.): fruticosa, erecta, glaberrima, ramosissima; ramulis gracilibus vix glandulosis; foliolis 2-3-jugis parvis obovato-oblongis cuneatisve rectis subcrassis glaucescentibus subtus rhachique grosse glandulosis; spicis villosis laxifloris ; bracteis carnosulis ovato-lanceolatis sensim acuminatis carinatis oiliatis calyce brevioribus deciduis; dentibus calycis e basi lata aristatis villosissimis infra medium denticulis 2 setaceis plerumque instructis tubo campanulato pubescente grosse glanduloso subduplo longioribus; petalis rubescentibus. — In the mountains near San Carlos, Tamaulipas, Berlandier coll. 942, 2372. — Petiole and rachis 2-5, leaflets 1-3, lines long. Calyx teeth in fruit 3 lines long.



but the latter are from 13 to 19 in number. And the pedicels of Coulter's plant, *D. sennoides*, Benth., are sometimes nearly twice the length of the calyx\*

*Harpalyce arborescens* (sp. nov.): foliolis ovali-ellipticis utrinque rotundatis vel retusis glabratis subtus resinoso-atomiferis; labiis calycis obtusis (18).—The same species, but with adult leaves, which are more coriaceous, I have from Coulter's Mexican collection, ticketed *Harpalyce formosa*. If Mr. Bentham had possessed this when he wrote his little paper on *Harpalyce* in the third volume of Hooker's Journal of Botany, probably he would have distinguished it from the original species, still known only by Mogino and Sesse's drawing. The tapering of the leaflets to the base might indeed have been charged to the rudeness of the drawing, but the drawing plainly represents an herb, while Coulter's and the present specimens are ligneous. Ervendberg's memorandum states that his were taken from "a small tree, growing on high and dry land." The specimens are poor, with very few flowers; these accord throughout with the genus, except that the obovate vexillum bears a pair of small and rather obscure inflexed auricles. The ten stamens are monadelphous, with the tube cleft to the base: the anthers are linear and basifixed.

*Zornia dipkytta*, Pers., var. *reticulata*, Griseb. (12); *Stylosanthes g?-acilis*, H. IS. K.? (11); *Eskynomene Americana*, L. (16); *Desmodium triflorum*, DC. (32, 34), *D. barbatum*, \*Benth. (31), *D. incanum* or *adscendens*, DC. (43), and two undetermined species (29 and 299). *Pisiddia Mrythrina*, L. (9); some Dalbergieous tree, but the specimens imperfect (28).

*Centrosema Virginianum*, Benth. (39) and *C. Plumieri*, Benth. (36, 362); *Phaseolus Truxillensis*, II. B. K. (41); *Stenohbium cceruleum*, Benth. (38), and some apparently common *Galactia* (40); *Rhynchosia Caribaa*, DC, with some *i?. minima* (35), and *E. reticulata*, DC. (37, 42, 311).

*Cassia hirsuta*, L. (21), *C. obtusifolia*, L. (24), *G. Humboldtiana*, DC. (25), and *C. pateUaria*, DC. (14).

*Guilandina glabra*, Mill. (229); *Gasparea latifolia*, the *Bauhinia latifolia*, Cav. Ic. t. 405, the same as Berlandier's no. 2189.

*Neptunia lutea*, Benth. (3); *Prosopis (Algarobia) dvlcis*, H. B. K., the same as Hartweg's no. 70 (319); *Mimosa Jloribunda*, II. B. K. -(1), and

*Mimosa Ervendbergii* (sp. nov.): M. rubicauli simillima, sed villosopubescens, aculeis minoribus magfo retrorsis arm at a, seta^ interpinnas

manifesto, foliola paullo majora mucrone cuspidata, calyx corolla usque ad medium quadrifida dimidio tantum brevior, lobis\* hispidulis. Fructus ignotus (2). This is said to be "a shrubby plant, six feet high, growing in the savannas near Wartenberg"; therefore doubtless indigenous. But its resemblance to the Indian *M. rubicaulis* is striking. In the absence of fruit the points above mentioned are all that are observed. The adult leaflets are 4 or 4½ lines in length.

*CaUiandra Houstoni*, Benth. (5) and *C. tetragona*, Benth. (8); *Leuccena pulverhnta*, Benth. (6), mixed with some specimens of *Acacia villosa*, Willd., and *A. glabrata*, Schlecht. Perhaps Lagasca's prior name of *A. penicittifera* belongs to and should be revived for this species (including *A. cuspidata*, Schlecht., *A. hirta*, Nutt, and *A. Texensis*, Torr. & Gray). The unapt name of *A. cuspidata* has been given by Cunningham to a received phyllodineous species. *Acacia spadicigera*, Schlecht. (343) was collected with male flowers only, in a cylindrical-oblong spike, the stamens monadelphous. To this species, rather than to *A. spfuerocephala* (if the two are really distinct), should be referred Berlandier's no. 2145, gathered between Tampico and Tula, with mature fruit only. The pod is similar to that of *A. Farnesiana*, only even more thickened, oblong or ovoid-oblong, straight and pointed, 1½ to 2 inches long, the x-val and turgid seeds imbedded in pulp.\*

*Pithecoloum lanceokUum*, Benth. in Hook. Lond. Jour. Bot. 3, p. 198 (17); *Inga leptoloba*, Schlecht? in flower only (4), and *Leriocarpa*, Benth., perhaps also *l. Xalapensis* (10).

The only Rosaceous plant is a *Rubus*, said to climb 50 feet high, with the main stem an inch thick. It does not well agree with any species in the late Dr. Liebmanh's revision of Mexican and Central American Rubi; perhaps it is a form of *R. fagifolius*, Schlecht., with the leaves silky-pubescent underneath.

There are two species of *Eugenia* (193 and 312), the former agreeing with no. 133 of Coulter's collection, from Xalapa.

The Melastomaceae are an *Arthostemma* (159), *Clidemia pauciflora*, DC.j\* (138), and *Gonostegia Xalapensis*, Don, with the flower-buds conspicuously acuminate (207).

*Lythrum alatum*, Pursh (300) resembles some of the northern varie-

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\* Berlandier's no. 3144 is *Lysiloma desmostachya*, Benth., in fruit. The pods are remarkably large, being from 5 to 7 inches long, 1½ to 2 inches broad, the flat, chartaceous or coriaceous-membranaceous valves neatly falling away from the scarcely thickened persistent margin.

ties; (*Enothera tetraptera*, Cav. (201) and (*E. rosea*, Ait. (367) are common Mexican plants.

*Mentzelia aspera*, L. (206) is in all collections; *Gronovia scandens*, L. (149) is not so common, nor is *Turnera Pumilea*, L. (134).

*Passiflora foetida*, L. (158<sup>b</sup>), *P. serratifolia*, L. (226), and *P. diffbrmis*, H. B. E. (211); *Lagenaria vulgaris*, Ser. (318); *Sicyos angulatus*, L. (306), an *Elaterium* ? with only male flowers (258), and male flowers only of another Gucurbitacea (354).

There are four species of *Begonia* (261, 268, 334, 370), which will soon be determinable by the forthcoming (15th) volume of De Candolle's Prodrömus.

*Eryngium fctidum*, L. (260) and *Helosciadium leptophyllwn*, DC. (190, 256, 257) are the commonest subtropical weeds.

*Loranthus Schiedeanus*, Cham. & Schlecht. is the only representative of that order.

The Rubiaceas are a doubtful *Spermacoce* (181) ; *Diodia villosa*, DC. (255) ; *Richardsonia scabra*, St. Hil (238) which, by the way, inclines to be naturalized in the United States, and is probably Pursh's *Spermacoce involucrata*; *Geophila reniformisy* Cham. & Schlecht. (232) ; the common *Chiococca racemosay* Jacq. (241) ; *Psychotria moUiSy* Poir. ? (246) ; *Randia XahpensiSy* Mart. & Gal. ? (320) ; flowers of another *Randia* mismatched with leafy branches of a *Oasearia* (329) ; *Bouvardia ternifoliay* Schlecht. (105) ; *Oldenlandia* (*Gerontogea*, Cham. & Schlecht.) *microtheca*, DC. (200), and fine specimens of the following apparently new species : —

*Exostema Mexicanum* (sp. nov.) : foliis ovalibus acuminatis basi rotundatis vel obtusis breviter petiolatis membranaceis insigniter pinni-^ nerviis ramisque glabris; cyma corymbosa composita floribunda floribusque cinereo-puberulis; pedicellis ovario clavato longioribus; ealycis limbo brevi quinquefido; corollse (albae?) lobis tubo sequilongis. — Arbor effcta; foliis pallidis semipedalibus, corollis pollicaribus, aestivatione generis, i. e. quincuncialiter imbricatis, nee valvatis,\* antheris anguste linearibus basifixis. Filamenta epigyna, a corollas libera (125).

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\* Weddell, in his tabular synopsis of the *Eucinchonece* assigns an aestivation of the valvate type to *Exostema*; but it is not so in the genuine Caribacan species, nor in the present one, which is a manifest congener of *E. Peruvianum*. I know not Bentham's *E. occidentale*, in which the estivation of the corolla is said to be valvate. The wonder is that the manifestly imbricative [estivation in *Exostema* could have

*Mitreola petiolata*, Torr. & Gray occurred in the collection without a number. *Vateria scandens*, L. (357) is one of the commonest of Tropical American plants.

The Compositae of course are numerous. We have *Vernonia Deppeana*, Less. (46), *V. Schiedeana*, Less., ex Schultz Bip. (51), *V. stHogosa*, Schultz Bip. in coll. Linden, mixed with *V. canescens*, H. B. K. (47), and *V. liatroides*, DC, which is 229 of Coulter's collection (70); also *Elephantopus tomentosus*, L. (79, 335); *Elephantosis angustifolia*, DC. (60); *Distreptus spicalus*, Cass. (237); and *Lagascea latifolia*, DC. (317).

*Pectis Seemanni*, Schultz Bip. in Bot. Voy. Herald, p. 309 (137).

*Pectis latisquama*, Schultz Bip. in coll. Mex. Schaffn., var. *Berlandieri*: caule pedunculisque elongatis; foliis interdum pinnatifidodentatis; involucri squamis minus latis spathulatoobovatis. — Pappus in the ray commonly multisetose like that of the disk, but sometimes scanty. This is no. 3159 of Berlandier's collection, from Nueva Leon (63).

*Calestina ageratoides*, var. *latifolia*, DC, apparently *G. corymbosa*, DC also (100).

*Isocarpka oppositifolia*, K. Br., the *Dunantia Achyranthes* of De Candolle (72).

*Stevia paniculata*, Lag., DC, which is the *& rhombifolia* and *S. organoides*, H. B. K., and *S. nepesafolia*, DC. (Berlandier's no. 2273), not of H. B. K. (50). #

*Brickellia Cavanillesii*, Benth., the same as no. 1247 of Berlandier's collection (310).

*Eupatorium divergens*^ Less., which is probably no more than a variety of *E. conyzoides* (54); *E. graciliflorum*, DC, from the character, but the heads are 15-flowered (44); *E. wcefolium*, L. var. 0. DC, with the tips to the scales of the involucre green and decidedly squarrose-spreading; the same as no. 1948 of Fendler's Venezuelan collection (53); *E. collinum*, DC (52); *E. quadrangulare*, DC, with the flowers more developed than in Berlandier's collection from the same district (340); *E. pycnocephalum*>Jess. (*E Schiedeana*, Schrad. &c) according to Dr. Schultz (57); *E. Berlandieri*, DC (56); and *Qritonia dakoides*, DC, or *Eupatorium sessile*, Schultz Bip. (88,341).

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been Overlooked. This rectification of the character leaves my genus *Badusa* to be distinguished almost alone by the dorsifixed and at length versatile anthers, which will hardly be deemed sufficient.

*Mikania suaveolens*, H. B. K., which is *M. gonoclada*, DC. (82); *M. Houstoni*, Willd., or a plant well agreeing with the character of that species, and with the points mentioned by Bentham in *Plantae Hartwegianse*; but Ervendberg notes it as an erect plant, and the branches are herbaceous (87, 222).

*Aster (Oxytripolium, Nutt.) divaricatus*, Torr. & Gray (81); *Erigeron scaposum*, DC. (60); *E. (Ccenotus) linifolium*, Willd. (93); and a species not unlike *E. (Polyactidium, DC.) delphinifolium*, but with entire leaves (69).

*Solidago Canadensis*, L., var. *procera*, Torr. & Gray (62); *Heterotheca Chrysopsidis*, DC. (71).

*Baccharis carulescens*, DC, a narrow-leaved variety, which is also *B. Alamani*, DC. (48); *B. rhexioides*, H. B; K. (44).

*Pluchea subdepurrens*, DC.? var. *canescens*; probably a variety of the plant of Xantus, no. 53, from Lower California (p. 160), referred to *P. subdecurrens*; but the leaves are larger (3 inches long by half an inch or more in width), the stem more winged, and both clothed with a tender white woolliness, which, being easily detached, is probably deciduous (343); also the very common *P. odorata*, Cass, (50), *Pterocaulon virgatum*, Efc. (59), and *Salmea scandens*, DC. (49, 316).

*Polymnia maculata*, Cav., which is apparently only a variety of *P. Uvedalia* (206); *Melampodium heterophyllum*, Lag. (80); *M. divaricatum*, DC. (86), and

•*Melampodium gracile*, Less. var. *oblongifolium*: foliis oblongis seu lanceolatis nunc subintegerrimis (*M. oblongifolium*, DC.) nunc sinuato-lobatis vel panduratis (92). — This is from the same district as Berlandier's plant on which *M. oblongifolium* was\* founded, and is clearly of the same species; but the cauline leaves are mostly sinuate or panduriform, and, although they are not rhomboidal, the plant is pretty clearly a form of *M. gracile*.

*Ambrosia artemisicefolia*, L., one of the commonest weeds (188, 180).

*Melananthera hastata*, Rich., a very small-leaved form, apparently *M. oxykpis*, DC. (77).

*Gymnolomia ? patens* (sp. nov.) : vix pubescens; caulibus herbaeis; ramis gracilibus patentissimis oligocephalis; pedunculis filiformibus; foliis membranaceis ovatis vel subcordatis caudato-acuminatis argute serratis trineerviis, petioli gracili; involucris vix biserialis squamis lanceolato-subulatis disco brevioribus; paleis receptaculi submembrana-

ceis rectis complicatis corolla paullo brevioribus achenia compressa calva implectentibus (95). — This is apparently a congener of Bentham's *Andrieuxia Quitensis* (an unfounded genus, as *A. Mexicana* is a *Heliopsis*) , and of his *Gymnopsis ? Costaricensis*, as well as of Steetz's *G. vulcanica*, although the broader and emarginate-truncate young achenia are much compressed, and not in the least tetragonal. There is no trace of a pappus. Not to multiply genera upon inconsiderable characters, these should probably all be referred to *Gymnolomia*, Kunth (*Gymnopsis*, DC, excl. *Aldama*). Heads in the present species 3½ lines long; rays 6 to 8, yellow, 4 or 5 lines long.

*Aldama* ( *Gymnopsis*, DC.) *Schiedeana* (98) ; var. *foliis elongato-lanceolatis* (99) ; and *A. uniserialis*, Gray, Pl. Wright., no number.

*Simsia hgasceformis*, Benth. Pl. Hartw. p. 19, an DC? (378).

*Oyedcea ovcdifolia* (sp. nov.): scabrida ; foliis ovalibus utrinque acutis obsolete denticulatis scabris; involucre disco dimidio breviori, squamis appressis inappendiculatis rotundatis. — Folia submembranacea, 4-pollicaria, triplinervia, rete venarum laxa; petiolo brevi. Capitula iis *O. verbesinoidis* dimidio minora (97).—This is a true *Oyedaa*, the species well marked by the short involucre, the rounded and obtuse scales of which altogether want the foliaceous tips. Rays, achenia, and pappus much as in *O. verbesinoides*, but smaller. The plant was found on the road between Wartenberg and Huaulta, and is said by the collector to " climb high up on trees ": there may have been some mistake about this, through some transposition of memoranda.

*JBidens tcreticaulis*, DC, forma foliolo terminali angustiore (67).—Lessing may have been right in referring this to *B. sguarrosa* (which have, as collected by Miss Alderson at Caracas, and which is also Fendler's no. 696), the principal difference being in the smaller size and greater number of the heads. The achenia are similar, and in both ciliate with strong divergent bristles down their whole length. For " apice ciliatis " De Candolle probably meant " , versus apicem," but the filiation extends to the base in Berlandier's as well as in the present specimens. There is, however, in *B. sguarrosa* a crown of erect bristles fringing the apex of the achenium, between the awns, of which there is no trace in *B. tcreticaulis*\*

*Verlesina persiccefolia*, DC (84, 91), in which, as in Berlandier's original specimens, the leaves are not " elongato-lineari-lanceolatis " (as indeed the dimensions assigned by De Candolle testify), but oblong-lanceolate or oblong, tapering to both ends.

*Verbesina microptera* DC, only a variety of *V. Virginica* L., (58).  
*Stemmodontio scaberrima*, Casa. in *Act. Sci. Nat.* 46, p. 107. *Buphthalmum seabrum*, Cav. *Weddia hispida*, H. B. K. *Lipochceta Texana*, Torr. & Gray, *Fl. N. Ani. & Bot. Mex. Bound*, p. 92. *Wrightia Texana*, Schultz Bip. in *But. Voy. Herald*, p. 304. A form with small heads (89).—Doubtless this is the plant upon which Cassini founded his genus *Stemmodontia*, in the description of which he even indicates the appendages on each side of the base of the achenium. So that *Wrightia* of Schultz must give place to *Stemmodontia*, Cass.

An undetermined, apparently new Composita, with the aspect and fertile ligules of *Verbesina*, but with a chaffy pappus (78). Also *Oligoneuron Tamjuncum* DC- (80).

*Dioscorea pubescens* Lag., a mere variety of *D. carysmithroides*, Lag. (379); *Tagefes lucida*, Cav. (94), and *T. pedunculata*, Lag. (377); and a variety of *Powphyllum ellipticum*, Cav. (75).

*Cucurbitaria urticifolia*, DC. (9G) ; *Tridax procumbens*, L. (61); *Selenium microcephalum*, DC. (7(!); also a remarkable plant, which, not to multiply genera on single species, I am disposed to append to *Bahia*, viz.:—

*Bahia*? (*Atristemma*: *eligulata*, anisopappa) *nepetifolia* (sp. nov.) : erecta, tomentella, eorymboso-ramosa, foliis oppositis deltoideo-ovatis v. subcordatis grosse obtuseque dentatis incisive subtus albo-tomentosis, petiolo gracili ; capitulis conferte corymbosis ; involucri squamis nivalilanceolatis ; corollis atris ; pappi paleis 3 ad latus externum linearibus tubum corollae adaequantibus, 8—4 ad latus interius brevibus.—Folia 1-2-pollicaria, petiolo 1-pollicari. Pedicelli 1-12 lin. longi. Capitula 4 lin. longa, multiflora, homogama. Involucrum laxum, squamis circ. 12 utrinque angustatis dorso carinatis extus tomentosis disco paullo brevioribus. Achenia gracilia, basi longe attenuata, hirsuta, corollis omnibus (tubulosis 5-dentatis (ut videtur albis) longioribus) Pappi paleae fere enerves (f. 5).—Technically this might well enough be taken as the type of a new genus ; but if it had rays it would certainly be referred to *Bahia* proper, of which it has the habit and whole general structure. The white, or possibly flesh-colored flowers, with a glandular tube, &c, show an affinity to *Floerkea* ;—but the opposite leaves, and the capitate tips of the branches of the style (which accord with *Bahia* § *Eriophyllum*) are quite different. The extraordinary reduction of the palea & the pappus on the side toward the centre of the receptacle is constant

*Gnaphalium polycephalum*, Michx., is the only Gnaphalineous plant in the collection.

*Erechthites hieracifolia*, Raf., agreeing with *E. Miradorensis*, Schultz Bip. PL Lind. (360); *Neurolcena lobata*, R. Br. (66), and *Neurokena* (*Schistocarpha*) *Lindenii*, Schultz Bip. in PL Lind. ined. (45, 272); *Gynoxys Berlandieri*, DC. (79), which according to Weddell's views would be referred to *Senecio*, notwithstanding the style; *Senecio lobatus*, Pers., which is not only *S. Mississippianus*, DC, but probably also *S. Tampicanus*, DC, not of Gray, PL Wright. (90).

*Lenã nutans*, DC (73) and *L. integrifolia*, Cass. ? (74) ; also *Pinaropappus roseus*, Less. (64):

*Lobelia Cliffortiana*, Willd., both smooth and hairy forms, the capsule nearly all inferior (249,308), and *L. cardinalis* L., a variety with almost entire leaves (160).

*Ardisia Pickeringia*, Torr. & Gray in DC Prodr. Said by Mr. Ervehdberg to be common in all the woods and prairies. Accords very well with the plant of Key West. Corolla sometimes with a completely convolute aestivation, rarely quincuncial (216).

*Jacquinia racemosa*, A. DC. ? a form with oblong-lanceolate leaves, 1 £ to 3£ inches in length, the tube of the corolla not exceeding the calyx (245, 369).

*Plumbago scandens*, L. (213).

*Plantago Virginica*, L., a fertile form with the lobes of the corolla connivent over the fruit; *P. jioccosa* of Decaisne being the same with the lobes of the corolla spreading (182).

The Bignoniaceae are *Bignonia Andrieuxii*, DC? (166) ; *Amphilophium molle*, Cham. & Schlecht., a mere variety of *A. paniculatum*, (113); *Tecoma stans*, Juss. (103); *T. leucoxydon*, Mart, (also *Tabebuia rosea*, DC. ?), said to be "a large tree with rose-red flowers, called Palo de Rosa" (329) ; an undetermined flowering plant of the order " (195, 326) ; *Martynia diandra*, Glox (114).

The Acanthaceae are a nearly stemless form of *Elytraria caulescent*\*, Ledeb. (173) ; *Blechnum Brownei*, Juss. (294); *Dicliptera assurgens*, Juss. (264); *Rhytiglossa dasyclados*, Nees ? (349) ; *Cryphiacanthus angustifolius*, Nees? (109, by error distributed as 104); and *Drejera Wittdenowiana*, Nees, the lower lip of the corolla merely three-lobed at its summit (333).

The Verbenaceae are *CaUicarpa acuminata*, H. B. K. (212) ; *Lantana odorata*, L. (162 in part) ; a variety of *L. canescens*, Kunth (107) ;



/and an undetermined *Lantana* said to climb 15 or 20 feet high and to have orange-yellow flowers (351); *Lippia dulcis*, Trev. (330); *L. stcechadifolia*, H. B. K (162<sup>a</sup>, 313) ; *L. callicarprefolia*, H. B. K. (278); *L. myriocephala*, Cham. & Schlecht. (288); *L. geminata*, H. B. K.\* (162 in part); *Tamonea scabra*, Cham. & Schlecht. (110); *Priva eckinata*, Juss. (148); *Bouchea Ehrenbergii*, Cham., a stout form (280), and a variety with lacinate-toothed leaves (102) ; *Stachytarpha dichotoma*, Vahl (150) ; *Petrea arborea*, H. B. K., but it is scandent, " ascending to the tops of the highest trees " (342) ; *Verbena Aubletia*, L. (236), and *V. Ehrenbergiana*, Schauer? (153).

The Labiatae are *Ocimum micranthum*, Willd. (117, 252); *Hyptis capitata*, Jacq. (309); *IT. suaveolens*, Foit. (108) ; *H. spicata*, Poit. (118); *If. spicigera*, Lam., to which belongs Anderson's *H. subverticillata*, from the Galapagos (116) ; *Micromeria Xalapensis*, Benth. (106); *Hedeoma Drummondii*, Benth. (141, 366), and *ScuteUaria microphyUa*, M09. & Sesse ? (242).

The Borraginaceae are *Cordia ferruginea*, Roem. & Schult (170) ; *Heliotropium inundatum*, Sw. (165); *H. phyllostachyum*, Torr. Bot. Mex. Bound, p. 137, which is apparently *If. myosotoides* of Chapman's Flora S. U. S., and probably some old tropical species (129) ; *Heliophytum Indicum*, DC. (164) and *IT. parvijlorum*, DC. (163).

The Scrophulariaceae are *Angelonía angustifolia*, Benth. (104); *JRuselia.sarmentosa*, Jacq. (223, 263), and *R. juncea*, Zucc. (115); *Stemodia parvtiflora*, Ait. (248) ; and *S. peduncularis*, Benth., which I suppose is also *S. Joruttensis*, H. B. K., and probably a variety of *S. trifoliolata*, with peduncles an inch or an inch and a half long (267) ; *Caprarfa biflora*, L. (184); *Pogostoma saxifragcefolia*, Schrad. (111) ; *Scoparia dulcis*, L. (253, 305) ; *Buchnera lithospermifolia*, H. B. K., too near *B. elongata* (117, 365); and *Lamourouxia cordata*, Cham. & Schlecht. (112).

The Solanaceae are a single and poor specimen of *Solanum Jamesii*, Torr., perhaps *S. appendiculatum*, Dunal (175) ; Dunal's *S. torvum*, var. *ochraceo'ferrugineum* (285) ; & *verbascifolium*, L. (301) ; a single specimen of *S. scabrum*, Vahl.; *S. 'volubile*, Sw. ? (270) ; *S. quadriflorum*, Mart. & Gal.? (126); & *nudum*, H.B. K? (352); some common *Physalis* (215); *Oestrum dumetorum*, Schlecht. (322); *Datura Stramonium*. L. (293) ; and *Nicotianaplumbaginifolia*, Viv. (262).

\* Dr. Torrey's *Lippia Berlandieri*, in Bot. Mex. Bound., as to the specimens of Wright, &c, is not the real one, but is *L. graveolens*.

The Polemoniaceae, *Gilia incisa*, Benth., before known in Mexico as far south as Monterey (235, 250); *Lceselia coccinea*, Don (381).

The Hydroleaceae, *fydrolea spinosa*, L. (128); *Nama Jamaicensis*, L. (189); and *Wigandia macrophyUa*, Cham. & Schlecht. (155), the latter apparently a good species. In De Candolle's Prodrumus, for "foliis plusquam pollicaribus," we should read "foliis plusquam 15-pollicaribus."

The Convolvulaceae are *Calonyction speciosum*, Chois. (350); *Jacquemontia hirsuta*, Chois. (157<sup>b</sup>); and *Evolvulus linifolius*, L. (169).

The Gentianaceae, *Eustoma exaltatum*, Griseb. (259, 315); and *Erythraea Chiknsis*, Willd. ? (186, 265), doubtless the Mexican plant of Hartweg's collection, but probably not the Chilian; the collector notes the flowers of 265 as golden-yellow.

The Apocynaceae are *Eauwolfia heterophyUa*, R. & S., var. *puberula* (374); the smooth variety of *Tkevetia Yccotli*, DC, but with the veins of the leaves nearly inconspicuous (327); an *Echites* ? in flower only (240), and another species, an *Amblyanthera* of Müller Argov., apparently a new species, in foliage, calyx, and very torose slender fruit very much resembling *E. tmuicaulis* of Spruce from the Amazon (a variety of *Amblyanthera versicolor*, Mull. Argov.), but the leaves are pubescent beneath, and with a deeper basal sinus, the corolla only half as long, its tube fusiform, the throat above the constriction not wider than the body below, a squamula under each lobe of the calyx (217); also

*Prestonia Mexicana*, A. DC. (127). In addition to the flowering specimens, we have in the collection a pair of follicles of this species, which help to complete the generic character. They are quite different from those of *Hcemadictyon*, as described by Muller in the Flora Braziliensis, but more like those of *If. Mexicana*, as described by De Candolle from Mogino and Sesse's figure. They may be thus characterized: Folliculi oblongo-conici, 3-pollicares, basi fere pollicem lati, prurienti-hirsutissimi, pericarpio crasso. Semina oblonga, sursum attenuata, apice comosa, testa fere suberosa.

The common *Asclepias Ourassavica*, L. (132), represents its order, along with a plant which must be *Sarcostemma elegans*, Decaisne. But the leaves are rather broadly cordate or oblong-cordate, and tipped with a conspicuous cusp, the lobes of the corolla minutely puberulent within (174).

But the most interesting plant of the collection, and for which I am now enabled to complete the character, is the

*Cyrtanthus Americanus* (R. Br.) : dioica; floribus arete sessilibus ebracteolatis, masculis e bractea paullo remotis; perianthio profunde 8-9-fido patentissimo, aestivatione contorto-imbricata; columna et stylo modice elongatis; cuspidi connectivi antheris aequilonga; placentis 14-16 integris? (101). These specimens are very interesting, both as furnishing the female flowers and the habitat of this plant, both before unknown. They were collected by Mr. Ervendberg at Wartenberg, in wet places in the woods. The male plant from Mr. Barclay, which Mr. Brown examined, was in all probability also Mexican. As to the male flowers, the only thing of any importance to add to Mr. Brown's brief account is, that they are supra-axillary, being at a small distance above their subtending bracts. These bracts appear to be much more thick and coriaceous (as also is the perianth) than in *Hypocystis*. The flowers also are larger, and the perianth more deeply cleft. The latter when fully developed is half an inch long, and rotately campanulate; in aestivation only one lobe is exterior and one interior, the others overlapping one another in the convolute manner. The staminal column becomes a line and half long, rather longer than the anthers. These are from 8 to 10 in number; their fleshy connective in some blossoms appear to be as much combined as in *Hypocystis*, while in others, probably older ones, they are less combined above, as Brown describes them, and radiate-spreading. The cusp terminating the connective is fleshy, and of the same nature as that of the other species, but is prolonged and subulate, usually as long as the anther itself. The female flowers collected are in an advanced state. The globose and very closely sessile gravid ovary is close to the subtending bract; the style between 1½ and 2 lines in length; the stigma radiate, but obscurely lobed. A cross-section of the gravid and enlarged ovary shows from 10 to 14 thin lamellar placentae projecting far into the cell, and three to five smaller ones, only slightly projecting, all apparently simple (not lobed), and not approximate in pairs, covered with linear-oblong ovules; and moreover the parieties between the placentas are ovuliferous as (apparently) Hooker figures them in *G. dioicus*. No one can examine the flowers without being struck (as were Linnaeus, Jussieu, and Brown) with their affinity to Aristolochiaceae.

The common *Boerhaavia erecta*, L. (156), and *Pisonia aculeata*, L. ? the species uncertain for want of fruit (331), represent the Nyctagineae; and *Coccoloba Humboldtii*, Meisn. (364) the Polygonaceae.

The Phytolaccaceae are *Rivina kevis*, var. *pubescens*, Griseb., the if.

*humilis*, L. (142, 302, 339), and the interesting *Agdestis clematidea*, Moq. & Sesse (146), of which Berlandier's no. 2367 is the female\* plant, in fruit. Concerning this genus, see Grisebach, Erlaut. PL Amer. Trop. p. 4.

*Anredera scandens*, Moq. (227), and the following Amarantaceae (all common weeds, except the first), *Telanthera gracilis*, Moq. (287); *AU temanthera Achyrantha*, R. Br. (179); *Iresine celosioides*, L. (221); *Gomphrena globosa*, L. (140); *Cyathula achyranthoides*, Moq. (254); *Achyranthes aspera*, L. (359); *Chamissoa cdtissinia*, H. B. K.; *Amarantus paniculatus*, L. (283).

The single Laurineous plant in the collection is an interesting and little-known one, viz. *Misanteca capitata*, Schlecht., with flowers and fruit. It well accords with the published description, except that the cupule of the fruit (which is said to be red, and is probably somewhat fleshy when fresh) is not sulcate, and its border is evenly truncate. The fruit itself seems to be a nut rather than a berry, as may also be inferred from the fact that the collector took the tree for an Oak. It is "a tall tree" (375).

The Euphorbiaceae are *Acalypha alopecuroides*, Jacq. (304); an undetermined *Oroton* (192), *O. Ekuteria*, L., or near it (199, 243), and the male of *C. trichocarpum*, Torr. Bot. Mex. Bound., p. 196 (167); *Dalechampia scandens*, L. (158<sup>a</sup>), and another species allied to *D. convolvuloides* (348), an *Euphorbia* near to or identical with *E. hexagona*, Nutt. (157<sup>a</sup>); *E. pilulifera*, L. (133); and *E. dioica*, ILB. K, which is *E. adenoptera*, Bertol., and, according to Dr. Engelmann, *E. anceps*, Benth., and *Anisophyllum densiflorum* of Klotzsch and Gärke, in their recent dissection of the natural Linnaean genus (251).

The Urticaceae are *Pilea microphylla*, Liebm. (*P. muscosa*, Lindl., &c. 172); an undetermined *Ficus* (332); *Dorstenia Cmtrayerva*, L. (198), and *D. excentrica*, Moricand (123); the interesting *Gastilhoa elastica*, Cerv. (371); and a *Celiis* (nearly of the section *Mertensia*, H. B. K.) which appears to be new, but which I am unwilling now to describe as such (321).

There is a common *Cattitriche* (143); an *Artanthe* (234); *Peperomia fterlandieri*, Miq. (358); a *Salix* (178); *Myrica Xalapensis*, H. B. K. (204); and a *Quercus*, the same as Berlandier's no. 2194 (346).

The Endogenae of the collection are very few, consisting of the inflorescence of a "Palm, 30 or 40 feet high, with flabelliform leaves, used for covering roofs, and a sweet, edible fruit," apparently the same

as Berlandier's 3207, probably *Sabal umbraculifera*, Mart. (314) ; two *Gannacece* (274, 282) ; *Bomarca hirtetta*, Herb., (205) ; a *Tittandsia* (276) and a *Bromelia?* (372) ; *Pontederia sagittata*, Presl. (277) ; *Smilax mollis*, H, B. K. (325), *S. platycentra*, Schlecht. ? but nearly unarmed (244, 336, 337), and another, perhaps the male of *S. glaucocarpa*, Schlecht. (363) ; a *Tradescantia* (275) ; *Eleocharis geniculata*, L. (208) ; *Panicum divaricatum*, L. (281) and *P. hirtellum*, L. (266).

The Ferns, separately numbered, are, *Polypodium incanum*, Sw. (8), *P. repens*, Sw. (16), *P. decumanum*, Willd. (15), and/\*, *lycopodioides*, L. (9) ; *Gymnogramme (Hemionitis) palmata*, L. (6) ; *Gheilanthes elongatay* Willd. (19) ; *Adiantum Chilense*, - var. *hirsutum*, Hook. (11), and *A. tenerum*, Sw. (17) ; a variety of *Pteris aquilina*, L., nearly *P. caudata* (4), and *P. grandifolia*, L. (5) ; *Asplenium pumilum*, Sw. (10) ; *Phegopteris tetragona*, Mettenius (2, 13, 14) ; *Aspidium trifoliatum*, Sw. (1) ; *Anemia adiantifolia*, Sw. (3) ; and *Lygodium Mericanum*, Presl. (7).

5. *Note on the Genus Graphephorum, Desv., and its Synonymy.* By ASA GRAY.

This communication announced the discovery by Dr. Charles Pickering, in August last, at the Falls of the Riviere du Loup, in Lower Canada, of the "*Aira melicoides*" of Michaux, on which Desvauz and Beauvois founded the genus *Graphephorum*; also that the *Dupontia Coohyi*, of the second edition of Gray's Manual of the Botany of the Northern United States, proves to be a large variety of the same species. Carrying out the view indicated in the Manual, Dr. Gray proposes to dispose the genus — so extended as to include *Dupontia*, R. Br., *Scolochloa* of Link, and *Arctophila* of Ruprecht—as follows: —

Genus GRAPHEPHORUM, Desv., Beauv.

- Graphephorum*, "Desv.," Beauv. *Agrost.* p. 76, 1. 15, f. 8 (1812); "Desv. *Jour. Bot.* ann. 1813, p. 71"; Kunth, *Enum.* 1, p. 250, & *Suppl.* p. 193, t. 14, f. 9 (pistillum et squamulse) = *?. melicoides*, Desv. {*Aira melicoides*, Michx.}
- Dupontia*, R. Br. *App. Voy. Parry*, p. 190 (1824) = *D. Fischeri*, R. Br.
- Scolochloa*, Link, *Hort. Berol. Descr.* 1, p. 136 (1827) = *S. festueacea*, Link (*Arundofestucea*, Willd. *Festuca borealis*, Mert. & Koch. *F. arundinacea*, Lilijb.)
- "*Dupontia* et *Arctophila* (sub *Poa*) Rupr. *Fl. Samoij.* (in *Beitr. Pflanz. Russ. Reiches* 2), p. 62, 64, t. 6 (1845) = *Spp. plur.*
- Flumina*,\* Fries, *Summ. Veg. Scand.* 1, p. 247 (1845 s. 1846) = *F. arundinacea*, Fries, lieu *Festuca borealis*, Mert. & Koch.
- Scolochloa* (*UnY*), *Dupontia* (R. Br.), et *Colpodium* § *Arctophila* (*C. fulvum* at *C. pendulinum*), Griseb. in *Ledeb. Fl. Ross.* 4, pp. 385, 386, 393 (1853).

§ 1. Paleae firmiores, inferior nervis 7 prominulis: glumse flores 3-4  
acquantes. — SCOLOCHLOA.

1. G. FESTUCACEUM. *Arundo festucæa*, Willd. *Festuca borealis*,  
, Mert. & Koch.; Hook. Fl. Bor. Am. 2, t. 231. *Scolochloa festucæa*,  
Link, Griseb. *Fluminia arundiñæa*, Fries.

§ 2. Rhachis spiculac etiam barbata; glumse scabrae, inaequales, flores.  
3 - 4 subaequantes. — GRAPHEPHORUM, Desv.

2. G. MELICOIDES, Beauv. 1. c. *Aira melicoides*, Michx.

Var. MAJOR. *Dupontia Cooleyi*, Gray, Man. Bot. N. U. S. ed. 2, p.  
556. (Caryopsis libera!)

§ 3. Paleae tenuiores; glumae flores 2 - 3 subaequantes. — DUPONTIA.

3. G. FISCHERI. *Dupontia Fischeri*, R. Br. *Poa {Dupontia} pel-*  
*ligera*, Rupr. 1. c.

Var. PSILOSANTHUM. *Poa (Dupontia) psilosantha*, Rupr. 1. c. *Du-*  
*pontia psilosantha*, Rupr. 1. c. t. 6; Griseb. 1. c.

§ 4. Glumae spicula 2 - 7-flora breviores; flores parvuli. — ARCTO-  
PHILA.

4. G. FULVUM. *Poa fulva*, Trin. *Poa (Arctophila) ftdva, sclero-*  
*clada, latiflora, Sf pcecilantha*, Rupr. ex Griseb. *Glyceria fulva*,  
Fries. *Golpodium (Arctophila) fulvum*, Griseb.

5. G. PENDULINUM. *Poa pendulina*, Fl. Dan. t. 2343. *Poa (Arc-*  
*tophila) deflexa, remotiflora, fy similis*, Rupr. *Glyceria pendulina*,  
Lcestad. *Colpodium (Arctophila) pendulinum*, Griseb.

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Four hundred and ninety-second meeting.

February 4, 1861. — MONTHLY MEETING.

The PRESIDENT in the chair.

In accordance with the vote passed at the last preceding  
monthly meeting (*vide* p. 112), the Academy convened at the  
house of the venerable Josiah Quincy, upon the occasion of his  
entering his ninetieth year. The Academy by its President  
offered an appropriate address to Mr. Quincy, who responded  
in some interesting remarks, and the Academy was addressed  
upon the occasion by the President of Harvard University, the  
Hon. James Savage, and Professor W. B. Rogers.

Four hundred and ninety-third meeting.

March 12, 1861. — MONTHLY MEETING.

The PRESIDENT in the chair.

Professor Horsford exhibited excellent drawings, by Mr. Hand, of New York, of magnified dissections and preparations of the grain of wheat, especially of the coats and superficial portion or *bran*, which has been long since ascertained to contain the principal part of the gluten, this indicating the importance of retaining as much of the bran in the bread as possible.

Professor O. W. Eliot read the following paper: —

*On the Chromate of Chromium, and analogous Chromates, with a New View of the Constitution of the Black Oxide of Manganese.* By PRANK H. STORER and CHARLES W. ELIOT.

#### I. CHROMATE OF CHROMIUM ( $\text{Cr}_2\text{O}_3$ $\text{CrO}_3$ ).

1. When a solution of monochromate of potash is mixed with a solution of any ter-salt of chromic oxide, the mixture immediately becomes brownish red, a bright brown precipitate subsides, and when this precipitate has been completely deposited, the liquid separated by filtration will present the clear yellowish-red color of bichromate of potash. The chrome salt may be chrome alum, or sulphate of chromic oxide, or hydrated sesquichloride of chromium, and, if a sufficient excess of chromate of potash be added to the solution, the precipitate and the filtrate will present the appearances described. This filtrate may be evaporated and crystallized; the resulting crystals will be a mixture of bichromate of potash and of sulphate of potash or chloride of potassium, as the case may be: often crystals of monochromate of potash will also present themselves. We prepared the precipitate for analysis by mixing a solution of chrome alum with an excess of monochromate of potash. The brown precipitate was washed with cold water: the color of the wash-water, at first bright yellow, became gradually paler, but never colorless. Twice in the course of the seven days during which the washing was continued, the precipitate was transferred from the filter to a mortar, stirred up with water, and thrown upon a\* fresh filter. This pro-

**BOTANICAL CONTRIBUTIONS,**

**BY ASA GRAY.**

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**Extracted from the Proceedings of the American Academy of Arts and Sciences,  
Vol. V., November 13, 1861.**

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**[Issued January, 1862.]**



## BOTANICAL CONTRIBUTIONS.

*(Continued from page 192, 1860.)*

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1. *Notes upon a Portion of Dr. Seemann's recent Collection of Dried Plants gathered in the Feejee Islands.* By ASA GRAY.

Dr. Berthold Seemann, who, as the naturalist of a former expedition in the Pacific of the British surveying ship *Herald*, had acquired a high reputation in scientific exploration, has recently visited the Feejee Islands, under a commission from the British government, to examine the productive resources and capabilities of that interesting group of islands. While attending to this duty he was able to gather specimens of above eight hundred and fifty species of dried plants; and a list of them, with such determinations as he could hastily make, was published by him, in the number for the 15th of September last of the well-known botanical periodical, the *Bonplandia*/of which Dr. Seemann is the editor. It being very desirable that this collection should be critically compared with that made by the Pacific Exploring

Expedition under Captain Wilkes, the Phaenogamous portion of which has mainly been elaborated by me, Dr. Seemann kindly communicated to me as full a set as possible of the plants he collected. Having collated the portion belonging to the orders which have been elaborated and published by me, I here offer some brief notes upon that portion of Dr. Seemann's collection, — following the order of his list, and mentioning only those species which suggest some remark.

No. 4. "*Polyalhia Vitiensis*, Seem." was not supplied to me; and, on the other hand, Dr. Seemann does not enumerate my *Richella monospeima* nor *Uvaria amygdalina*.

12. "*Agatea violaris*, A. Gray," is the var. j3 of this interesting species, a form with still broader leaves.

23. "*Hibiscus Storckii*, Seem." appears not to be sufficiently distinct from *H. Rosa-Sinensis*.

24. "*Paritium purpurascens*, Seem." The living plants may furnish good characters to distinguish this from *P. tiliaceum*, but they are not apparent in the dried specimen supplied.

39. "*Grewia Mallococca*, Linn, f." The specimen accords with *G. persicifolia*, Gray, Bot. Expl. Exped., which, however, may be only a variety of Forster's species.

41. "*Trichospermum Richii*, Seem." = *Biclidocarpus Richii*, Gray, l. c, Mr. Bentham having shown that the latter belongs to Blume's little-known genus, which was wrongly placed in the *Flacourtiaceae*, and so overlooked.

45. "*Ternstroemiacearum*, nov. gen. Seem." There is nothing answering to this in the American collection.

47. "*Calophyllum polyanthum*, Wall. ? " = *Q. spectabile*, Bot. Expl. Exped. Our specimen from the Mangsi Islands must be Miquel's *C. dasypodum*; and all are perhaps *C. lanceolatum*, Bl.

46. "*Calysaccion obovale*, Miq." To this apparently belongs the foliage which I had referred to *Garcinia Mangostana*.

50. "*Garcinia (echinocarpa) f*" is in the American collection too imperfect for determination.

53. "*Pittosporum Pickeringii?*" is that species, apparently, although it is in fruit, while the American collection has flowering specimens only, and with much longer peduncles.

54. "*P. Richa?*" (in fruit only) appears to be that species.

55. "*P. Brackenridgei?*" This is not our plant, but answers to *P. Richii* in the flowering state.

56. "*P. tobiroides*." Not our species of that name, but it is our *P. Brachenridgei*

59. "*Aglaia f basiphylla*" This is by no means that species, but it accords with an imperfect specimen (with young fruit only) mentioned in the, Bot. Expl. Exped., p. 238. Perhaps it is a mere variety of Seemann's no. 60, *A. edulis*.

67. ?*Cupania apetala*, Labill." The foliage resembles that of *01 leptobotrys*, Gray, but the inflorescence and fruit are different, and accord with Labillardiere's plate.

68. "*Cupania Vitiensis*, Seem." is doubtless a broad-leaved form of *C. falcata*, Gray, 1. c, and of Seemann's no. 70.

73. I have not seen.

74 = 69. *Cupania rhoifolia*. Gray.

76. "*Vitis saponaria*, Seem." is the same as *Gissus geniculata* ? of our collection from the Feejees.

79. "*Smythea Pacifica*, Seem. gen. nov." To all appearance this is a *Ventihgo*, with a particularly broad fruit. This is only partly grown in the specimen communicated,\* which differs from my *V. Vitiensis* in the pubescent flowers crowded in sessile fascicles. M. Tulasne's *V. cernua*, from Rawak, excepting "stylo in basi pubente," well accords with *V Vitiensis*, of which the fruit alone can determine whether Bentham's *V. leiocarpa* is really distinct, the difference in the inflorescence being unreliable.

81. "*Alphitonia zizyphoides*" is that species, which Remy collected in the Sandwich Islands also. My *A. franguloides* is evidently a mere variety of it.

82. \* *Gouania Richii*" is probably that species; but the fruit in Seemann's specimen is less winged, and there are other slight differences.

83. 84. Destitute of flowers and fruit, and altogether dubious.

85. "*Rhamnea* " appears to be an undescribed *Colubrina*.

90. "*Melicope* ?" is a form, with narrower leaflets, of what I had called *Euodia drupacea*, Labill. ?

102. "*Zantkoxydon varians*, Benth." is perhaps my *Acronychia heterophyUa*, without flowers or fruit.

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\* Dr. Seemann's plate of this plant in a later number of the *Bonplandia* shows nothing inconsistent with this opinion, unless the figures 7 and 8 are intended to represent a fruit dehiscent in the manner of *Hippocratea*.

107. "*Tephrosia purpurea*, Pers." Also *T. piscatoria*, Pers.
113. "*Stronglodon ruber*, Vog." is interesting as making known the fruit of this plant, an oval and turgid legume, with two large seeds like those of *Canavalia*.
123. "*Rhynchosia minima*" is not that species, nor of the genus, having a pluriovulate ovary and I believe monadelphous stamens. It is probably a *Hedy&area*.
- T27. "*Pongamia piscatoria*, Seem." is *Derris tdiginosa*, Benth.
133. "*StorckieUa Vitiensis*, S&em. gen. nov." is entirely new to us, and not in the American collection.
156. "*Eugenia confertiflora*" is hardly the plant of the 'American Expedition, the leaves being larger and less pale beneath, the flowers apparently larger, the calyx-tube longer and striate-angled. But the materials for complete comparison are wanting.
162. "*E. rivularis*, Seem." does not well agree with any of ours; and the same may be said of 163, an unnamed *Eugenia*.
166. "*Nelitris fruticosa?* as to the specimen furnished, is *N. Vitiensis*.
168. "*Acicalyptus myrtoides?* completely as it accords in foliage with our plant of that name, is very different in the flower-buds, and somewhat so in the inflorescence. The characters of the two species may be expressed thus: —
- A. myrtoides* (Gray, Bot. Pacif. Exped., 1. p. 551, t. 67): alabastris elongato-oblongis acute quadrangulatis, operculo subulato; floribus deplanato-cymosis plerisque pedicellatis.
- A. Seemanni* (*A. myrtoides*, Seem, non Gray) : alabastris clavatis inferne tantum tetragonis, operculo late conico breviter apiculato; floribus subthyrsoideo-cymosis plerisque sessilibus iis *A. myrtoidis* multo minoribus.
- 170,171. "*Metrosideros*" seem to be only slender forms of 169, which is *M. collina*, Gray, but of the var. *ghberrima*.
172. "*Memecylon Vitiense*" is the var. j3. of our collection.
173. «*Astronia Pickeringii* " is not that plant, but, as well as can be made out from the incomplete fruiting specimen, *Astronidium parviflorum*, Gray.
177. "*Medinilla*" accords with the specimen of *M. rhododilcena*, Gray. Seemann's 175, so named, was not communicated, nor was 178.
181. "*Melastomacea*." This, with fruit only, accords with some undetermined foliage in the American collection.

182. "*Melastomaceae*" seemingly a *Medinilla*, is none of ours.

184. "*Crossostylis biflora*, Forst." is by no means that plant, but a new species of our allied genus. It should bear the name of

*Haplopetaln Seemanni*: a *H. Richii* differt foliis majoribus obovatis subtus cum ramis novellis molliter pubescentibus; alabastris hirsutis; calycis segmentis petalisque saepius 5; styli lobis 7.

196. "*Spiraanthemum Vitiense*" is not that species, but apparently a new one, much nearer *S. Samoense*.

198. "*Weinmannia*" is new to our\* collection, unless it be a variety, of 197, *W. affinis*, of which 199 and 200 are obviously mere varieties.

206. "*Plerandra Pickeringii*" is hardly that species, but appears to be identical with 209, a new species of *Plerandra*. I have no specimen Of 207. ;

208. "*Araliaceae*" is also polyandrous, and is a remarkable new *Plerandra*, if its separate stigmas or short styles will allow.

213. "*Calycosia Mlnei*, A. Gray," is the species described under that name in the Proceedings^ of the Academy, 4, p. 307, but with longer leaves. Drupe pyriform.

215. "*Dolicholoum fongissimum*, Seem." may be a good species, but is not unlikely to be a variety of *D. latifolium*, Gray, with less ample leaves more downy underneath. The specimens of the two are not complete or full enough to settle this question.

216. "*Myrmecodia Vitiensis*, Seem.," is evidently *Hydnophytum longiflorum*, Gray, 1. c, with shorter leaves.

217. "*Lindenia Vitiensis*, Seem." was not met with in the American Expedition.

218. "*Gardenia Vitiensis*, Seem." This is quite different from the only *Gardenia* from the Feejee Islands in our collection, that being a small-leaved form of *G. Taitensis*.

220. "*Canthium Harveyi*" is not at all the species published under that name, but apparently a form of 221, *O. lucidum*. Hook, and Arn.

223. "*Morinda*" is *M. myrtifolia*, Gray, 1. c, with larger leaves; perhaps a mere variety of *M. umbellata*,

224. "*M. sp. fol. pubescentibus*," not communicated, is probably *M. mottis*, Gray, 1. c.

226. "*M. phiUyreoides*, Labill." was not communicated. There is nothing answering to that species in the American collection.

236. "*Styhcorone corymbosa*, Labill." is *Psychotria Forsteriana p. Vitiensis*, Gray, 1. c.

240. "*Randia f*" Not in the American collection. Perhaps a *Gynopachys* or *Griffithia*.

243. "*Psychotria calycosa*, A. Gray," is not that species, but *P. macrocodyx*, Gray, 1. c.

246. "*P. Vitiensis*, Seem." is *P. calycosa*. Gray, but with the limb of the calyx less lobed.

247. "*P. ? speciosa*, Forst." It may be that plant and *Cephaelis fragrans*, Hook, and Am., but the character fails to accord. Certainly it is no *Psychotria*, and is *Ixora (Phylleilema) Vitiensis*, Gray, 1. c.

248. "*Psychotria?*" Foliage only, not identified.

249. = *P. platycocca*, Gray, the inflorescence undeveloped.

250. = *P. insularum*, Gray, probably; the materials scarcely sufficient.

251. = *P. Pickeringii*, Gray.

252. = *P. Pickeringii*, a narrow-leaved variety, or else an allied new species.

253. "*Psychotria*" is apparently a new species, very much like *P. JUipes* (the fruit of which is unknown) ; but the calyx is truncate.

254. = 244 in flower, viz. "*P. cottina*, Labill.," which it well may be.

255. \* *P. aff. P. turbinatce*, A. Gray," is new to me, and more like *P. Brackenridgei*, Gray, the flowers of which are unknown. The long corolla of the present species is quite unlike the other Oceanic species.

256. "*RuUacea*, n. gen. ?" is probably a *Oanthium*, near *O. lucidum*.

257. "*Vangueria ?*" Flower-buds too young for investigation. It resembles, but is not identical with, *Guettarda (Guettardella) Vitiensis*, Gray, ined., of which the fruit only is known.

258. "*Psychotriacearum*, gen. nov." Although the corolla is wanting, the plant may be confidently referred to *Ixora*.

259. "*RuUacea*, gen. nov. ?" Apparently a *Psychotria*, in flower only, near *P. Brackenridgei*, Gray, which is known only in fruit.

260. "*JRubicea*." New to me: — perhaps a *Griffithia*.

261. "*Erigeron Bonariensis*, Linn." In my view the original *E. Bonariense* of Linnaeus, or Dillenius, is the *E. spiculosus*, Hook. & Arn., and *E. spinulosum*, DC. The present plant is *Erigeron albidum*. Gray, ined., the well known *Gonyza albida*, Willd., *C. erigeroides*, DC., *C. floribunda*, H. B. K., &c.

268. "*WoUastonia strigulosa*, DC." This is rather *W. Forsteriana*, DC, which should include *W. insularis*, and has awnless achenia and

the involucre shorter and more imbricated (the scales ovate or oblong and obtuse) than *W. strigulosa*, DC. which (in part), along with *W. scabriuscula*, *glabrata*, and *canescens*, DC., I refer to *W. Mflora*.

300. "*Geniostoma crassifolium*, Benth." is also *G. rupestre* var. *puberulum*, Gray, in Proceed. Amer. Acad. 4, p. 321, a form of 301.

304. "*Gartnera*, sp." is a new *Geniostoma*, with small leaves.

303. "*Gartnera pyramidalis*, Seem." is *Couthovia corynocarpa*, Gray.

305. "*G. barbata*, Seem." is a *Couthovia*, which, if truly distinct from the preceding, should be named 01 *Seemanni*. The materials collected by Dr. Seemann, comprising flowers and fruit, confirm the genus *Couthovia*, and fix its position in the vicinity of *Strychnos*, calling, however, for some extension of the character of Bentham's third tribe. There are indications of dimorphism, or incipient difference in sex, in the flowers examined. Some corollas of *C. corynocarpa* are beardless, or nearly so, and have the anthers almost sessile in the throat, while others of the same cyme are conspicuously bearded in the throat, and their equally subexserted anthers are borne on filaments of their own length, inserted some way down on the tube. The style is sometimes slender and exserted, sometimes shorter or very short; the ovary in the latter is certainly fertile.\*

306. "*Fagraea viridiflora*, Seem." This wholly accords with *F. gracilipes*, Gray, l. c, which was thought to have white or cream-colored corollas.

307. "*Fagraea Vitiensis*, Seem." is not in the collection of the American Expedition.

\* COUTHOVIA, Gray, Bot. Amer. Expl. Exped., ined., & Proceed. Amer. Acad. 4, p. 324.

Calyx quinquepartitus, segmentis imbricatis rotundatis crassis, marginibus tenuibus. Corolla brevis, quinquefida, sestivatione revoluta. Stamina 5, tubo vel faucibus inserta: filamenta brevia vel brevissima: antherse oblongae. Ovarium biloculare, ovatum, stylo apiculatum: stigma subcapitatum, bilobum. Ovula in placenta medio dissepimento adnata plurima, amphitropa. Fructus clavatus, drupaceus, basi attenuatus, sarcocarpio tenui, putamine lignoso percrasso, 2-1-loculari, 2-1-sperm. a. Semina . . . Arbores Vitienses, glabri, stipulis *Labordece*, foliis subcoriaceis penninerviis obovatis, cyma terminali e radiis 2-4 apice multifloris, floribus parvis hand pedicellatis, corolla fere *Strychnarum* breviflorarum.

1. C. COETNOOAKPA: calycis segmentis ciliolatis; antheris oblongis utrinque emarginatis.

2. C. SEEMANNI: calycis segmentis margine glaberrimis; antheris subsagittatis; corolla fere eximie albo-lanata, an semper? An forma precedens?

The remaining Monopetalae will be annotated, when needful, in the following article.

2. *Characters of New or Obscure Species of Plants of Monopetalous Orders in the Collection of the United States South Pacific Exploring Expedition under Captain Charles Wilkes, U. S. N. With occasional Remarks, &c.*  
By ASA GRAY.

Characters of the new or more interesting *Composite*, *Lobeliaceae*, and *Scrophulariaceae* of this collection were communicated to the Academy a year ago, and printed in the Proceedings, Vol. V. p. 115, *et seq.* The *Rubiaceae* and *Loganiaceae* were similarly discussed at earlier periods (Proceedings, Vol. IV., April, 1858, and September, 1859).

*Calyceae.*

**BOOPIS CRASSIFOLIA** (*Adcarpa crassifolia*, Miers in Ann. & Mag. Nat. Hist. 1860, p. 402): glaberrima; caule (spithamaeo ad pedalem) ramoso ascendente; ramis ad apicem usque foliosis; foliis carnosis, caulinis sessilibus plerumque subamplexicaulibus lanceolatis seu lingu-  
latis repando-denticulatis; capitulis breviter pedunculatis; involucre subcarnoso alte 5 - 7-fido, segmentis oblongis; filamentis vix basi monadelphis; acheniis fere pentapteris; calycis lobis maturis scarioso-cartilagineis dorso eximie carinatis intus concavis margine tenui eroso-denticulatis pi. m. difformibus, nunc late triangulari-ovatis acutis brevibus, nunc ovato-lanceolatis vel subulatis achenium dimidium adaequantibus; paleis receptaculi filiformibus apice spathulatis. — Rio Negro, North Patagonia, on the sandy shore. — I do not remember the state of Tweedie's specimen (from Maldonado) in the Hookerian herbarium, with which ours was long since compared. But probably it is not in fruit; else Mr. Miers would not have referred to *Acicarpha* a plant in which the calyx-lobes are certainly paleaceous and (although the narrower ones are rigid) not spinescent, and the achenia not at all concreted. He would more probably have found a place for it in his genus *Anomocarpus*, formed of some species of *Calycera*. Although I refer it to *Boopis*, notwithstanding some difformity in the calyx-lobes of different flowers, and the approach to a subulate character in the narrower ones, I am inclined to think that even *Boopis* is likely to be reduced to a mere section of the original genus *Calycera*.



Mr. Miers has adopted Brown's very qualified recommendation to change the orthography of Jussieu's *Acicarpha* to *Acicarpa*. But surely *carpha* may as well refer to calycine as to bracteal chaff, and the substituted name has no great advantage in etymological appropriateness.

*Valerianacea.*

VALERIANA PTCNANTHA (sp. nov.): herbacea, glaberrima, nana, multiceps e caudice crasso; foliis carnosis haud ciliatis, radicalibus lineari-spathulatis, caulinis 2 vel 3 verticillatis oblongis sessilibus versus medium scapi simplicissimi 1 - 4-pollicaris ; floribus scarioso-bracteatis in capitulum demum oblongum arete congestis; acheniis anguste ovato-oblongis lateribus enerviis; pappo 5 - 7-radiato, setis basi connatis. — Alpamarca, high Andes of Peru.

VALERIANA GLOBULARIS (sp. nov.): herbacea, depressa, cespitosa, glabra; caudice crasso; foliis omnibus radicalibus subcarnosis anguste spathulatis vel sublinearibus basi attenuatis integerrimis; scapo nudo 1 - 3-pollicari capitulum globosum scarioso-bracteatum gerentibus; acheniis ovalibus lateribus enerviis; pappo 10-12-radiato, setis basi connatis. — Var. scapo brevissimo. — Casa Cancha, high Andes of Peru.

VALERIANA RHIZANTHA (sp. nov.) : glabra; radice crassa fusiformi foliis rosulatis spathulato-rotundatis carnosis capitulum florum arete sessile depressum circumdantibus coronata; pappo cupulato brevissime 5-radiato, radiis dentiformibus nudis per anthesin involutis.—Alpamarca, high Andes of Peru. " Succulent and said to be esculent; root fusiform," very large ; " leaves an inch in length and breadth, obtuse, surrounding a central cake of flowers, all even at the surface and densely congested." Pickering, adn. Bracts scarios, not connate. Setae of the pappus reduced to short, dentiform, naked processes on the border of a cup like that of many Valerians, within which they are inrolled in the usual manner. So that this species militates strongly against Persoon's genus *PhyUactis*, as recently restored and extended by Weddell.

*Ericacece.*

VACCINIUM MADERENSE, Link, and the allied *V. Arctostaphylos*, enumerated by Klotzsch (in *Linnaea*, 24, p. 65) among the "*non satis nota*," having simply five-celled berries, awnless anthers, and at length campanulate corollas, belong to the section *Vitis-IdtBa*, notwithstanding their deciduous leaves.

VACCINIUM CEREUM, Forst., of Tahiti, appears to me specifically distinct from the following, of the Sandwich Islands, which Ghamisso and Schlechtendal, and afterwards Sir William Hooker, have combined with it. *V. cereum*, besides its more urceolate corolla, has shorter and bibracteolate peduncles, acute calyx-lobes, the anthers mucronulate at the base and their tubular horns not much surpassing the dorsal awns. The Sandwich Island *Vaccinia* have ebracteolate pedicels; and their very various and diverse forms appear to be reducible to two species, as follows: —

VACCINIUM RETICULATUM, Smith (*V. cereum*, Cham. & Schlecht. and Hook. Ic. PL t. 87), — the *Ohelo* of the Hawaiians, — an extremely polymorphous species. Its anthers are wholly mucicous at the base, the corolla cylindraceous when fully developed, and much exceeding the obtuse lobes of the calyx. A small-leaved and lucid form of it is *V. Macroeanum* of Klotzsch, which differs little from

Var. DENTATUM: (*V. dentatum*, Smith), in which the corolla is sometimes shorter.

Var. CALYCINUM, the *F. calycinum*, Smith, described as having deciduous leaves, appears to be only a thinner-leaved form of *V. reticulatum*, growing in the shade of thick forest, and is connected with the ordinary state by various intermediate forms, among which is *V. Meyenianum*, Klotzsch. The dorsal awns of the anthers are sometimes very short or obsolete.

Var. ? LANCEOLATUM, from the tabular summit of Kauai, is quite uncertain, the flowers being unknown; but it resembles the var. *dentatum*, except that the leaves are nearly lanceolate.

VACCINIUM PENDULIFLORUM, Gaud, is distinguished, not so much by its longer peduncles drooping in fruit and narrower acutish calyx-lobes, as by the shorter, nearly campanulate corolla, not much exceeding the calyx, and a strong cusp at the base of the anther. This last is represented in fig. 4 of Gaudichaud's plate, but is not referred to in the diagnosis, nor noticed by Dunal. Our collection (which has a form of *K reticulatum* with equally long and pendulous peduncles) has of this species only the

Var. BERBERIFOLIUM : foliis obovatis seu obovato-oblongis eximie reticulatis margine dentibus spinuloso-setaceis crebris pulcherrime pectinatis; pedunculis folia vix excedentibus. — E. Maui, on Mouna Haleakala, and apparently on the mountains of Oahu. Anther bearing at its base a cusp or strong mucro, like that represented in Gaudi-

chaud's figure of the anther of *V. penduliflorum*. Striking as are the very reticulated and spinulosely-serrate, Barberry-like leaves, these are not diagnostic of the species, since the teeth are not prolonged in the plant figured by Gaudichaud, and, on the other hand, this foliage is imitated in some specimens from Mouna Kea, which have roundish calyx-lobes and no basal cusp to the anthers, therefore belonging to the var. *dentatum* of the preceding species.

Nuttali's genus *Metagonia* is equivalent to Klotzsch's sections *Macropelma*, *Disterigma*, *Neurodesia*, and a part of *Vitis-Idcea*, including a variety of species, which, however distributed, cannot be properly separated from *Vaccinium*. The dorsal awns are not always erect in the section *Macropelma*; in our specimens of *V. cereum*, from Tahiti, they are sometimes (perhaps abnormally) reflexed.

Our collection has nothing answering to the *Epigynium? Vitiense*, Seem., no. 284 of his Feejee collection.

GAULTHERIA (DIPLYCOSIA) LUZONICA (sp. nov.): foliis ovalibus utrinque acuminatis supra glabris subtus ramisque novellis parce strigoso-hispidis; pedunculis fasciculatis petiolo longioribus; bracteolis connatis orbiculatis. — Luzon, in the Majajai Mountains; in fruit.

#### *Epacridece.*

The pollen in all the following species of *Cyathodes* is four-lobed, in the manner of *Ericacece*, to a suborder of which the *Epacridece* should be reduced.

CYATHODES POMARJE (sp. nov.): fruticosa, erecta; foliis subpatulis oblongo-linearibus mucronatis margine integerrimis (novellis prope apicem ciliolatis) subtus glaucis multinervibus, nervis extimis subramosis; sepalis bracteolisque rotundatis subciliolatis; corolla; tubo calycem bis superante, lobis imberbibus; stylo subulato ovario 5-7-loculari triplo longiore. — Society Islands, on the mountains of Tahiti. Dr. Pickering in his notes does not distinguish this from the plant gathered on Eimeo, which is not well to be discriminated from the following species; while this has larger flowers as well as leaves, the tube of the corolla exerted beyond the calyx, and a longer style. Mr. Brown long ago alluded to a Tahitian *Cyathodes* (Prodr. p. 539), but it seems to have been unnoticed from the time of Cook's voyages down to our own Expedition. The two brought by our collectors appear not to be uncommon; so it is remarkable that nothing of the kind was collected by Bertero or Moerenhout; at least none is mentioned in Guillemin's

*Zephyritis Taitensis*. The common Hawaiian species having been dedicated to a celebrated king of those islands, this may bear the name of the gentler Tahitian queen, *Pomare*.

The various forms from the Sandwich Islands, including one of the Society Islands, appear to be reducible to two species : —

CYATHODES TAMEIAMELE (Cham.) : fruticosa; foliis patulis oblongis cuneato-obovatis linearibusve saepius abrupte mucronatis margine ad apicem ciliolatis subtus glaucis multinerviis, nervis saepius ramosis, floralibus par vis; sepalis bracteolisque orbiculatis ciliolatis; corollas tubo calycem haud excedente, lobis aut barbatis aut imberbibus; stylo crasso ovario 5 - 8-loculari aequilongo.

Var. a. CHAMISSOI ((7. *Tameiameia*, Cham., Hook. & Am., DC.): corollae lobis intus pi. m. barbatis. — Oahu, &c.

Var. 3. BROWNII (C. *Banksii*\* (Gaud.?) & *Macrceana*, DC.): corollae lobis imberbibus. — Maui, Kauai, and especially Hawaii.

Var. y. SOCIETATIS : corollae lobis intus parcissime barbatis; foliis plerisque linearibus. — Eimeo, and probably Tahiti. — This is most probably the Tahitian plant mentioned by Brown ; while to our var. j3 may belong both the Sandwich Island species to which he alludes.

CYATHODES DOUGLASHII (sp. nov.): fruticosa; foliis suberectis oblongis seu lanceolatis acuminato-cuspidatis margine plerumque hispidulo-ciliolatis subtus pallidioribus vel glaucis 5 - 9-nerviis, nervis ssepiissime simplicissimis; sepalis bracteolisque ovatis obtusis ciliatis; corollas tubo calycem aequante, lobis intus barbatis; stylo subulato ovario 6-loculari bis terve longiore. — Hawaii, on Mouna Loa and Mouna Kea; also Maui, on Mouna Haleakala.

Var. j8. STRUTHIOLOIDES : foliis erectis lanceolatis seu ovato-oblongis; sepalis acutis ! Mouna Kea, high in the pastoral region; and perhaps a form on the mountains of Kauai, without flowers or fruit.

None of the various specimens here combined accord with the *C. Banksii* so imperfectly characterized by De Candolle. For, although the leaves are more or less erect, and rarely glaucous-white beneath, they are rough and ciliolate or serrulate on the margins, and with a pungent point; their nerves usually all simple. Also the larger flowers and longer style should distinguish all forms of this from the preceding species, unless that is even more polymorphous than I have supposed. As to the style in this and allied species, I should rely more upon it if I did not entertain some suspicion of dioecio-dimorphism in the genus.

The *Leucopogon* of the Feejee Islands, which Dr. Seemann has referred to *L. Cymbulce*, Labill., of New Caledonia (in *Bonplandia*, 1861, p. 257, no. 285), I had characterized as *L. Vitiensis*,

*Styracacece, incl. Symplocinece.*

There is no *Styrax* in the collection of the American Expedition. One would be much disposed to adopt the division, not, with Miers, into three genera, but into two, viz.: 1. *Styrax*, and 2. *Strigilia*, Cav., including *Cyrta*, Lour. Between the latter I can perceive no essential distinction. Bentham, however, appears to be justified in his conclusion, "that *Styrax* as a whole is far too natural to be thus broken up into distinct genera. The degree of adherence of the ovary and of the persistence of its dissepiments is variable in species otherwise closely allied," — and the same remark applies to the aestivation and texture of the corolla. It is remarkable that Miers should have referred that most true *Styrax*, *S. Japonica*, to his genus *Cyrta*, and have excluded from the latter *S. Benzoin*.

STMPLOCOS SPICATA, Roxb. To this Indian, South Chinese, and Archipelagic species Dr. Seemann refers one which he, as well as our naturalists, collected plentifully in the Feejee Islands, — probably with good reason, although our specimens have for the most part the leaves entire or nearly so, and a shorter inflorescence. It runs into several varieties, one with very large leaves.

*Ebenacece\**

DIOSPTROS SAMŌENSIS (sp. nov.): ramis novellis vix puberulis; foliis glabris ovato-oblongis obtuse acuminatis basi acutis laxe venosis (3 - 6-poll.) ; pedunculis masculis 3 - 9-floris, fcemineis solitariis unifloris petiolum subaequantibus; calyce 4-fido sericeo-puberulo, lobis obtusissimis, foemineis rotundatis basi intus quasi coronatis corollam extus sericeam 4-fidum adaequantibus; staminibus 8 - 9; ovario hirsute\* 8-loculari; fructu globoso. — Tutuila and Savaii, Samoan or Navigators' Islands; "in woods, and also sometimes planted."

MABA FOLIOSA (Rich, in herb.): foliis confertis lato-ellipticis utrinque rotundatis basi cordatis brevissime petiolatis glabris (poUicaribus vel sesquipollicaribus), novellis cum ramulis fructibusque olivaeformibus ferrugineo-tomentosis; pedunculis fructiferis brevibus 1 - 3-floris ; calyce trilobo.—Muthuata and Ovolau, alt. 2,000 feet, Feejee Islands.

MABA ELLIPTICA, Forst., which apparently includes *M. major*,

Forst., and which varies considerably in the shape of the leaves (in one form lanceolate-oblong and more or less acuminate), was gathered at the Tonga or Friendly, and the Samoan or Navigators' Islands, with the nascent leaves and shoots fulvous-hirsute, as described; while the Feejean collection has apparently the same species with the young parts glabrous. To this last may probably be referred all three *Mabce* of Dr. Seemann's collection.

MABA SANDWICENSIS (A. DC.) : foliis lato-lanceolatis oblongis seu ovalibus coriaceis pallidis venuloso-reticulatis glabratis, novellis cum ramulis fioribusque sericeo-pilosis; floribus in • axillis subsessilibus, masculis 15 - 17-andris calyce alte, trifido, foemineis——; fructu ovali calyce breviter trilobo stipato. — Ludit foliis nunc utrinque acutiusculis vel obtusiusculis, nunc basi rotundatis, nunc utrinque rotundatis basi retusis, sesquipoll. ad 4-poll. — Oahu, Hawaii.

*Sapotacee.*

SERSALISIA GLABRA (sp. nov.) : foliis obovato-oblongis basi attenuatis coriaceis glabris, venis reticulatis; pedicellis in axillis fasciculatis petiolo duplo longioribus; corolla calyce subsericeo paullo longiori campanulata 5-fida glabra, lobis rotundatis filamenta sterilia subulata multo superantibus stylo gracili aequilongis.—Woolongong, New South Wales. There is a specimen of this in the Hookerian herbarium from Mr. Backhouse ; also a related one from Fraser, which is perhaps the & *laurifolia* of Richard, and one from Cunningham, named *Mimusops myrsinoides*) may be the same thing.

ISONANDRA ? RICHII (sp. nov.): undique glabra; foliis chartaceis obovatis apice rotundatis nunc retusis basi acutis; pedicellis calyce 4-fido plusduplo longioribus; filamentis barbatis. *JBassia retusa*, Rich, in herb. — Tongatabu. Only a single and not very perfect corolla is extant from which to determine the genus. As that appears to be four-cleft, like the calyx, and with a fertile stamen in the sinuses, as well as one before each lobe, and there are no appendages, I refer the plant to *Isonandra*, notwithstanding the bearded filaments.

BASSIA AMICORUM (sp. nov.): foliis obovatis seu ovalibus retusis glabris viridibus (3 - 6-poll.) ; pedicellis elongatis; corolla glabra 6-partita (semipollicari) calyce 6-nervi plusduplo longiore; staminibus 18 ; filamentis subulato-filiformibus antheris lincari-sagittatis cuspidatis sequilongis. — Tongatabu, on the shore. Mr. Rich supposed this to be Forster's *B<sub>m</sub> obovata*, from Tanna; but that has the leaves less veiny,

more tapering at the base, and somewhat pointed at the apex, shorter pedicels, much smaller flowers, and the corolla (probably more than six-cleft) pubescent externally.

SAPOTA ? PYRULIPERA (sp. nov.): glabra; foliis oblongo-lanceolatis utrinque subacuminatis pallidis subcoriaceis tenuiter transversim venosis (3 - 5-poll. longis); calyce 5-partito; fructu pyriformi parvo (semipollicari) pedunculo paullo longiori semine unico obovato turgido repleto. — Ovolau, Feejee Islands. Flowers unknown.

SAPOTA ? VITIENSIS (sp. nov.): glabra; foliis oblongis seu obovato-oblongis obtusis vel retusis subcoriaceis reticulatis (4 - 6-poll. longis) basi in petiolum longiusculum attenuatis; fructu subsessili globoso 3-4-sperma (pollicem diametro). — Ovolau, Feejee Islands, on the coast.

A third Feejean species was gathered on Vanna-levu, the materials wholly insufficient for determination.

SAPOTA SANDWICENSIS (sp. nov.): foliis elliptico-oblongis basi acutis tenuiter transversim venosis et reticulatis mox glabris, novellis ramulisque pube tenui rufa seu albida tomentulosis, petiolo gracili pedicellis longiore; floribus pentameris; corolla glabra calycem vix superante, lobis ovatis acutiusculis; staminibus sterilibus spathulato-lanceolatis cum 5 fertilibus subinclusis; ovario 5-loculari. — Var. a. foliis obtusissimis 3 - 6-pollicaribus, petiolo saepe sesquipollicari. £. foliis 1£ - 3-pollicaribus saepe acutiusculis. — Sandwich Islands: mountains of Oahu, where it was also collected by Remy (no. 478) in fruit. jß. Hawaii and Lanai, Remy (no. 475, 476). A genuine *Sapota*, of De Candolle's second section. Fruit like a small apple. Seeds albuminous. Ovules ascending.\*

#### *Primvlacee.*

LTSIMACHIA HILLEBRANDI, Hook. f. (sp. nov.): fruticosa, glabrata, ramosa; ramis undique foliosis; foliis alternis nunc verticillatis ellip-

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\* The doubtful plant from Kauai mentioned in Dr. Pickering's printed Notes (p. 403), in connection with the above "Chrysophylloid" tree, proves to be a *Xylosma* (in fruit only), and one which was likewise gathered by Remy (no. 536) in Hawaii, but with less rigid and coriaceous leaves. I think it is not distinct from *X. orbiculatum*, Forst., which, along with *X. Lepinei*, and perhaps *X. goniocarpum* and *X. integrifolium*, of Clos's monograph, may be safely combined with *X. suaveolens*, Forst. The leaves of the original species are similarly reticulated, but the finer meshes are not sufficiently exhibited in Plate 4 of the Botany of the Exploring Expedition.

ticis oblongis lanceolatisve saepius acutatis vel acuminatis subcoriaceis laxe reticulato-venosis; pedunculis ex axillis superioribus nutantibus unifloris ferrugineo-pubescentibus ; fioribus 5 - 8-meris; corollae subrotatae lobis late obovatis sepala ovato-lanceolata acuminata fere duplo excedentibus; filamentis basi monadelphis styloque gracilibus.—Sandwich Islands.

Var. a. foliis ellipticis seu elliptico-lanceolatis basi in petiolum angustatis. *L. Uillebrandi*, Hook. f. in litt. — Oahu and Maui.

Var. )3. DAPHNOIDES : foliis oblongis arete sessilibus et crebris. — Kauai.

Var. y. ANGUSTIFOLIA : foliis lineari-lanceolatis creberrimis. — Maui, coll. Remy.

A truly shrubby *Primulacea*, attaining several feet in height, but a genuine *Lysimachia*.

There are specimens in our collection from the Sandwich Islands, and much better ones in Remy's, apparently referable to *Lysimachia lineariloba*, Hook. & Am., from the Loo Choo Islands. At least, no notable difference appears between them and fine specimens gathered by Mr. Wright, both in the Loo Choo Islands and in Japan,—the more luxuriant forms of which accord with *L. lubinioides*, Sieb. & Zucc. But Zuccarini's *L. lineariloba* from Bonin must be different, being said to have lanceolate acute sepals, and pedicels scarcely two lines long. His description of *L. lubinioides* applies to our plant, except that the style is not short, nor are the filaments, even in his own plant, monadelphous at the base. The divisions of the corolla are spatulate, not linear, so that the specific name is deceptive, the stem is herbaceous, and the thickish leaves by no means "*impunctate*!"

#### *Myrsinaceae*,

M<sup>^</sup>ESA PICKERINGII (sp. nov.): foliis lato-lanceolatis oblongisve subintegerrimis mox glabris, nascentibus ramulisque pilosulis; racemis axillaribus simplicibus rariusve compositis gracilibus; calyce cum bracteis ovata-subulatis hirsuto, lobis ovatis acutis corollae tubum subaequantibus ; drupis ovoideis. — Viti-levu, one of the Feejee Islands. — Differs from *M. nemoralis* (which we have from the Samoan and Friendly Islands) in the hairy pubescence of the inflorescence, especially of the calyx, narrower leaves, smaller flowers, and narrower and acute bracts and bractlets. The latter is completely glabrous, with the bracts, bractlets, and calyx-lobes (especially the latter) broadly ovate



and obtuse. To *M. nemoralis* probably belongs a portion of no. 286 of Dr. Seemann's collection. The remainder, with ferrugineous-puberulent inflorescence, is something different, but hardly *M. Indica*.

*MJESA PERSICJEFOLIA* (sp. nov.) : glabra; foliis lato-lanceolatis integerrimis, venis transversis; paniculis axillaribus folio sub-brevioribus; floribus parvis; bracteis bracteolis calycisque lobis ovato-acutis; corollae tubo campanulato calyce paullo longiori; drupis ovoideo-globosis brevissime pedicellatis. — Mbuā or Sandalwood Bay, &c, Feejee Islands. No. 287 of Dr. Seemann's collection, in his list referred to "*M. Indica*, var." is perhaps a form of this species; but the pedicels are longer, the leaves broader, of thicker texture, and the primary veins much more ascending.

*MJESA CORYLIFOLIA* (sp. nov.): foliis ovatis cordatis repando-dentatis cum ramis paniculisque (terminalibus et axillaribus folium adaequantibus) dense mollissime pubescentibus superne mox glabratis; pedicellis flore haud longioribus; bracteis bracteolisque ovato-subulatis parvis; calycis lobis triangulari-ovatis villosis tubum corollas brevi-campanulatae fere aequantibus; drupis ovoideis puberis. — Mountains of Muthuata, Feejee Islands. "*M macrophylla*, Wall.?" no. 288 of Seemann's list, is this species in fruit. The specimens of our Expedition are in flower only.

*MYRSINE MYRSICIFOLIA* (sp. nov.): glaberrima; foliis subspathulatis seu oblongis basi cuneatis in petiolum attenuatis integerrimis apice saepius retusis utrinque crebre punctulatis, venis vix perspicuis; floribus tetrameris sessilibus; calycis lobis lato-ovatis obtusissimis; corolla quadripartita; drupis globosis. Muthuata, Feejee Islands. Eimeo, Society Islands. Drupe closely sessile or nearly so,—by which this species may be distinguished from any form of *M. capitellata* (including *neriifolia*, *Korthahii*, *foe.*); but the discrimination of some forms of this from *M. crassifolia* may be more difficult. The fruiting specimens of Seemann's no. 289 are ambiguous between these two; the female flowering ones, and also no. 290 (foliage only) belong to *M. myricifolia*.

*MYRSINE ? BRACKENRIDGEI* (sp. nov.) : glabra; foliis membranaceis oblongis utrinque acutis vel acuminatis petiolatis margine integerrimis vel undulatis; pedicellis filiformibus fructu globoso 3 - 5-plo longioribus; calyce 5-lobato, lobis rotundis ciliatis. — Mountains of Ovalau, Feejee Islands. In fruit only; probably of this genus.

*MYRSINE TAITENSIS* (sp. nov.): glaberrima; foliis crasso-coriaceis

oblongo-ellipticis seu ovalibus integerrimis utrinque obtusis brevissime petiolatis supra nitidis crebre costato-venosis, venis venulisque reticulatis prominulis; pedicellis fructu longioribus; calycis fructiferi lobis 4 triangulari-ovatis acutiusculis.—Mountains of Tahiti, Society Islands. Flowers not seen.

From the Sandwich Islands I have seen nothing answering to *Myrsine Gaudichaudii*, A. DC, with sessile fruits and triangular acute calyx-lobes, but the collection comprises various forms of *M. Sandwicensis* and *M. Lessertiana*, the latter mostly with obovate- or cuneate-oblong and obtuse, or even retuse, leaves, the largest 5 or 6 inches in length. Their scanty flowers enable me to ascertain that the petals are distinct to the base and valvate in aestivation. De Candolle's tribe *Embeliece* manifestly should be suppressed, and his two suborders certainly do not merit such a rank.

ARDISIA ? CAPITATA (sp. nov.) : arborea ? glabra; foliis ad apicem ramorum crassorum congestis obovato-spathulatis ultrapedalibus subcoriaceis integerrimis reticulato-venulosis basi in petiolum brevem crassum angustatis; pedunculis axillaribus compressis simplicissimis capitulum strobilaceum gerentibus; bracteis magnis squamaceis persistentibus. — Ovalau, Feejee Islands. — *A. grandis*, Seemann, no. 293 (in fruit only), considerably resembles this in foliage, but has thyrsoid panicles.

*Oleacee.*

OLEA SANDWICENSIS (sp. nov.) : laevis; foliis lato-lanceolatis oblongisve acuminatis integerrimis petiolatis supra lucidis subtus pallidis; racemis axillaribus brevibus; corolla profunde quadripartita; staminibus (an semper ?) 4; ovario conico; drupa ovoidea (in stirp. angustifol. oblonga). — Oahu, Sandwich Islands; also in Remy's collection from Kauai (no. 479), and a narrow-leaved form, with the immature fruit similar to a common olive, from Molokai (no. 482). Leaves resembling those of *Laurus nobilis*. The four stamens, although unusual in the family, are not unprecedented, being occasionally met with in *Chionanthus*.

Blume, followed by Endlicher and De Candolle, attributes to *Chionanthus* and *Linociera* an exalbuminous seed and a thick embryo; and De Candolle founds a tribe thereupon. But this is not the case in the original species,—*C. Virginica*, as I had long ago noted, and *C. (Linociera) ligustrina*, as Charles Wright had observed upon the living plant

in Cuba, and I have verified in the dried specimens, having the albumen and flat cotyledons of *Oka*. I have no ripe fruit of the Asiatic species, but Dr. Hooker informs me that they are truly exalbuminous in *C. montana*, *purpurea*, *tyc*, and also in the West Indian (*C. compacta*; — from which it would appear that this character is here not even of generic importance.

*C. Virginica* is occasionally three-seeded.

#### *Jasminaceae.*

JASMINUM TETRAQUETRUM (sp. nov.): erectum, glabrum; foliis oppositis unifoliolatis, articulo petioli obscuro, foliolo ovato-lanceolato seu ovato acuminato basi acutiuscula trinervi; pedunculis brevibus paucifloris; calyce fructifero tetraptero, alis angustis deorsum in pedicellum longe clavatum decurrentibus sursum in dentes lineari-subulatos verticales tubum 2-3-plo superantes productis. — Feejee Islands, on the mountain summit back of Muthuata. In fruit.

*J. simplicifolium*, Forst. (*J. australe*, Pers., and by some clerical mistake "*J. gracile*, Forst.," in Dr. Seemann's list) was collected on the Feejee and other islands; and *J. didymurh*, Forst. (= *J. divaricatum*, R. Br. and *J. parviflorum*, Decaisne) on the Tonga and Samoan, as well as the Society Islands. <

#### *Apocynaceae.*

ALTXIA BRACTEOLOSA (Rich, in herb. Ex. Exped.): subscandens, glaberrima; foliis plerumque ternis oblongis vel sublanceolatis nunc obtusis nunc acumine obtuso apiculatis caudatisve basi acutis vel rotundatis supra nitidis transversim lineatis sublonge petiolatis; cymis axillaribus plurifloris brevissime pedunculatis petiolum vix superantibus; pedicellis brevibus arete imbricato-bracteolatis; bracteolis ovato-triangularibus dorso carinatis intus concavis ciliolatis sepalis consimilibus; corolla lutea longius tubulosa; stigmatibus imberbi; ovariiis glaberrimis, drupis subglobosis breviter stipitatis. — Navigators', Tonga, and Feejee Islands.

Var. 9. MACROCARPA: fructu olivaeformi maximo (sesquipollicari) e drupellis 2-3 conflatis. *A. macrocarpa*, Rich, in herb. Feejee Islands.

Var. y. ANGUSTIFOLIA: alte scandens; foliis minoribus angustioribus etiam sublinearibus. *A. stettata*, Seem, in Bonpl. 1861, p. 257, no. 310. Tonga and Feejee Islands.

Var. *y.* PARVIPOLIA: foliis minoribus ellipticis (1J-2-poll.); pedunculis paucifloris nunc elongatis, fructiferis petiolo bis longioribus. Feejee Islands.

The other species of the collection are *A. stettata*, from the same groups of islands, and from Tahiti and Eimeo; *A. scatidens*, only from the latter; and the Sandwichian *A. oliveformis*, Gaud., to which must be referred *A. sulcata*, Hook. & Am., and may be referred a small-leaved variety, *myriUifolia*.

CERBERA ODOLLAM, Gaertn., from Tahiti, &c. (where it is not indigenous), must be Forster's and Guillemain's (*7. Manghas*).

CERBERA LACTARIA, Hamilton (*C. Odolhm* of Dr. Seemann's collection) comes from Tongatabu and the Feejee Islands. So also does

OCHROSIA PARVIFLORA, Hensl. (*Cerbera*, Forst.): it is named *O. elliptica* by Seemann, and perhaps it is Labillardiere's plant. To the lamented Prof. Henslow's account may be added, that the ovaries are not really united except at their apices, that the ovules are eight, four on each margin of the suture, amphitropous, the micropyle superior.

OCHROSIA SANDWICENSIS, A. DC. is not in the collection of the Expedition, but is in Remy's collection; the flower-buds almost an inch long, the narrow lobes of the corolla rather longer than the tube, which is glabrous within. Ovules 3 or 4 in each ovary. Seeds pel-tate on each face of the nearly complete false partition, exalbuminous? Eadicle inferior!

LTONSIA L-fVis (sp. nov.): glabra; foliis ovatis subcordatis acutato-acuminatis; calycis lobis triangularibus acutis brevibus; corolla fere glabra fauce tantum annulatim barbata; squamis nectarii discretis glaberrimis ovarium subaequantibus; capsula cylindrica leviter bisulcata. — Feejee. Islands. This is probably the *Echites scabra?* of Dr. Seemann's collection, no. 315, of which I have seen no specimen; but it differs from the New Caledonian plant (judging from Labillardiere's figure) in the pointed leaves, the general smoothness, smaller and acute calyx-lobes, glabrous nectary and ovary, terete capsule, and nearly glabrous corolla, within having a bearded ring instead of five vertical bearded lines. Of his *Lyon&ia*, Brown well remarked that it is *Parsonsice nimis affinis*. The best distinction is to be found in the thickish lobes of the corolla, essentially or nearly valvate in aestivation; so that here, rather than in *Parsonsia*, belongs *P. ventricosa* of F. Mfiller.

ALSTONIA, R. Br., subgen. DISSURASPERMUM. Semina undique sequaliter et creberrime ciliato-plumosa, haud vero comosa, basi apiceque in acumen vel caudam producta, cauda superiori apice bifida: albumen tenuissimum. Corollae lobi lineari-lanceolati, aestivatione sinistrorsum (sensu Candollii) convoluti: faux barbata. — Frutices vel arbusculae insularum, foliis oppositis, petiolis angustissime marginatis basi p. m. dilatatis, cymis patentibus.

A. (DISSURASPERMUM) COSTATA, R. Br. (*JZchites*, Forst.) Society Islands. Brown's doubt whether the cilia which fringe the seeds were elongated at the base and apex into a coma, evinced his usual caution. In fact, the seeds are not properly comose at all, but equally ciliate-fringed all round, the tails short, flat, and equally fringed with the rest of the margin, the lower one entire and rather blunt, the upper notched or bifid. The rudiments of one or both of these tails are to be seen in *A. ophioxylides*, F. Müll., in which the hairs extend both ways into a coma. Forster's description of the seeds "*marginē cylindrica*" is, I presume, a lapsus for "*marginē ciliata*"

A. (DISSURASPERMUM) PLUMOSA, Labill., to which must belong our specimens from the Samoan and Feejee Islands, is more closely related to the foregoing than would be inferred from Labillardiere's plate, as that does not well represent the stigma (indusiate-appendaged below, and with sharper lobes above), nor the calyx, which is five-parted to the base. But the seeds are not badly figured, except that the long tails are flat in our specimens, rather than exactly filiform. These two species might be wholly detached from *Alstonia* with better reason than *Blaberopus* has been.

#### *Asclepiadaceae.*

TYLOPHORA SAMŌENSIS (sp. nov.) : herbacea, volubilis, fere glabra; foliis cordatis acuminatis membranaceis; pedunculis filiformibus petiolo apice glandulifero longioribus; umbellis plurifloris; corollas virescentibus; coronae stamineae foliolis sub carnosis lineari-oblongis apice acutiusculo antheras adaequante tantum a gynostegio liberis; polliniis obovato-oblongis adscendentibus brevissime stipitatis. — Savaii, one of the Samoan Islands. Follicles 6 inches long, slender, smooth.

TYLOPHOLA BRACKENRIDGEI (sp. nov.) : volubilis, glabrum; foliis ovatis subcordatis mucronatis; pedunculis petiolum apice haud glanduliferum subrequantibus; umbellulis plurifloris; floribus carneis undique glabris; porona staminea e glandulis seu gibberibus carnosis lateraliter

compressis usque ad apicem acutum adnatis (in sicco subulatis) anthera brevioribus; polliniis ovalibus juxta medium stipiti brevi flexuoso affixis adscendentibus. — Ovolau, Feejee Islands. Stigma depressed. Immature follicles smooth, short, acuminate-rostrate. Probably this is a congener of Endlicher's *Hybanthera Uglandulosa*, the pollen-masses of which are probably not so pendulous as is represented. The structure of the androecium is very similar, but the coronal appendages are transversely dilated at the base, thence gradually tapering to an acute summit, the whole perfectly adnate to the back of the anther. In Dr. Wight's *Iphisia* (*T. Iphisia* and *T. Govanii*, Decaisne) I find the same structure, the fleshy appendages equally adnate and laterally compressed.

GYMNEMA SUBUNDUM (sp. nov.): volubile, undique glabellum; foliis membranaceis ovato-lanceolatis seu ovato-oblongis basi rotundatis vel subcordatis; pedunculis petiolum adoequantibus; umbella saepius bifida; corolla rotata 5-partita imberbi squamulis fere obsoletis sinus instructa; gynostegio brevissimo. — Mountains of Muthuata, Feejee Islands. — To *Gymnema* both *Gongronema* and *Bidaria* must doubtless be restored. The aestivation of the corolla, said by Blume to be valvate, is convolute, as described by Decaisne, in all the species I have examined, but in most of them the margins so slightly overlap that the aestivation might readily be taken for valvate.

GYMNEMA STENOPHYLLUM (sp. nov.): fruticosum, erectum (3-6-ped.), ramosissimum, fere glabrum; foliis coriaceis linearibus basi attenuatis marginibus revolutis, costa subtus pilosula; pedunculis axillaribus brevissimis; corolla rotata alte 5-fida inappendiculata, lobis extus glabris intus tenuiter barbatis; gynostegio brevissimo; polliniarum stipitibus gracilibus spiraliter contortis. — feejee Islands, on the barren upland of Muthuata. This has recently been collected by Dr. Seemann (no. 322), who has obtained it with young follicles. These are slender, almost as much so as the leaves, and smooth. The pollinia accord with the character of *Sarcolobus*, Ri Br., but they are not "apice lateraliter pellucidae," as Miquel has it. Dr. Seemann takes this for a new genus, and indeed, as the genera are arranged by Decaisne, it does not accord throughout with either *Bidaria*, *Gongronema*, or *Gymnema* proper, while the erect habit is also peculiar. But if the two former genera be restored to *Gymnema*, the present plant could not well be excluded.

HOYA BICARINATA (sp. nov.): scandens; foliis glabellis subcarnosis

planis obscure penninerviis ovalibus seu ovatis brevissime abrupteque acuminatis basi rotundatis subcordatisve, lamina supra petiolum hirtellum glandulosa; pedunculo pedicellis haud longiori; sepalis lineari-oblongis; corollae albae extus glabrae intus puberulae lobis ovatis acutis planis; coronae stamineae foliolis incrassatis, disco obovato concavo angulo interno longiuscule acuminato, marginibus haud revolutis, dorso eximie bicarinato. — Samoan, Tonga, and Feejee Islands. This may be Forster's *Asclepias volubilis* (non Linn.), from Tanna. It is the *Hoya Bittardieri*, no. 319, of Dr. Seemann's list; but hardly that of Decaisne. For the pieces of the staminal crown are strikingly acuminate, instead of "angulo interiore obtuso."

HOYA DIPTERA, Seemann, no. 320, we have also from the Feejee Islands, along with other indeterminable specimens equally without flowers or fruit.

*Convolvulaceae,*

JACQUEMONTIA SANDWICENSIS (*Convolvulus ovalifolius*, Hook. & Am., non Vahl. *Ipomoea ovalifolia*, Chois. pro parte): villosopubescent, nunc glabrata; caulibus e radice tuberosa procumbentibus; foliis carnosulis obovatis cuneato-oblongisve emarginatis vel obcordatis breviter petiolatis; pedunculis folium sequantibus 1 - 3-floris; sepalis 3 exterioribus ovatis obtusis herbaceis, 2 interioribus multo minoribus oblongo-lanceolatis acuminatis; corolla calyce duplo longiore. — Sandwich Islands; common. Root, according to Dr. Pickering, tuberous and edible. Stigmas elongated-oblong, flattish.

BONAMIA MENZIESII (sp. nov.): caule lignoso decumbente; ramis volubilibus, junioribus herbaceis cum foliis ellipticis utrinque obtusis vel retusis (supra mox glabratis) aurato-tomentulosis; pedunculis axillaribus unifloris recurvis, fructiferis deflexis; sepalis rotundatis coriaceis sericeis; stylis 2 basi connatis; capsula ovoidea coriacea evalvi; seminibus baccatis. — Sandwich Islands, where it was discovered by Menzies.

Var. j3. foliis oblongis seu ovato-lanceolatis acutis vel acuminulatis. *Convolvulus ovalifolius*, var. ? Hook. & Am. — Maui, Remy, no. 420.

We have abundant ripe fruit and a few flower-buds. Remy's no. 420 had dropped the corollas, but exhibited the styles. Corolla silky externally. Ovary 2-celled, each cell biovulate. Stigmas capitate. Seeds 4 or only 2, with a baccate-fleshy purple or crimson episperm, covering a hard seed-coat. If Brown has rightly stated the difference

between *Bonamia* of Thouars and his *Brewenà*, the two genera cannot be maintained, and the older genus of Thouars must also include *Stylisma*, Raf. Traces of the fleshy episperm are perceptible in *B. Roxburghii* and in our *B. (Stylisma) humistrata*.

*Hydrophyllaceae.*

The study of a *Niama* from the Sandwich Islands led to the examination of all the species known to me, with the following result:—

NAMA, Linn.

§ 1. Folia in caulem alato-decurrentia, obovata vel spathulata, pube molli villosa seu pilosa: rami procumbentes.

1. N. JAMAICENSIS, Linn.: pube brevi; foliis late obovatis spathulatis; pedunculis brevissimis vel calyce brevioribus; capsula oblonga demum patente vel reflexa. — Key West, *BhdgetU* Mexico and Texas, *Berlandier* coll. no. 2049, 2062, 2298; Drummond, coll. 2, 316; *Lindheimer*, no: 476, 642 (the latter with very large leaves); *Wright, Gregg, Ervendberg*, no. 189.

2. N. BIFLORA, Chois.: villosa; foliis spathulato-oblongis; pedunculis plerisque in pedicellos filiformes (fructif. semipollicares et ultra) bifurcatis; capsula brevi. — Mexico, between Victoria and Tula, *Berlandier*, no. 2200, not 220 as recorded in DC. Prodr.

§ 2. Folia in caulem haud decurrentia, saepius cinerea, nee incana:

\* Omnia in petiolum sat manifestum attenuata: radix dura, lignosa, perennis?

3. N. ORIGANIFOLIA, H. B. K.: molliter cinereo-pubescent, cespitoso-diffusa; foliis parvis (adjecto petiolo 3 - 6 lin. longis) obovatis seu spathulato-oblongis, venis subtus prominulis; floribus saepius geminis; pedunculis calyce brevioribus; capsula ovali-oblonga.—*N. origanifolia* & *N. rupicola*, Chois. Hydrol. & in DC. 1. c. JV. *subincana*, Willd. in Roem. & Schult. 1. c. — *N. dichotoma* var. *parvifolia*, Torr. Bot. Mex. Bound, p. 147. — This occurs in *Berlandier's* collection as no. 2254, collected "between Santander and Victoria," Mexico, upon which specimens I suppose that *Choisy's N. rupicola* is partly founded. The *N. origanifolia* figured and described by Kunth is, I presume, of the same species. But the plant, as I suspect from the inspection of *Berlandier's* specimens, is not truly fruticulose, but is



rather an annual, with the base indurated, as is common in these dry regions late in the season. Dr. Torrey's fine specimens, from Santa Rosa, Chihuahua, Dr. Bigelow, and Monterey, Edwards and Eaton, accord with Berlandier's.

\*\* *Folia sessilia vel basi attenuata vix petiolata (radix annua) :* '

+• *Pube molli saepius pi. m. viscosa cinerea vel hirsutula: sepala (modo generis) sursum dilatata.*

4. N. UNDULATA, H. B. K. *Pube molli et hirsutula cinerea; foliis margine saepe undulatis, superioribus oblongis basi lata arete sessilibus, inferioribus oblanceolatis deorsum longe attenuatis; floribus breviter pedunculatis vel subsessilibus plerisque lateralibus; capsula elongato- seu lineari-oblonga. Var. j3. (Macrantha, Chois. Hydrol. t. 2, f. 1): foliis caulinis basi vix attenuatis; pedunculis nunc brevibus nunc gracilioribus calyce aequilongis. — Mexico and S. Texas. To this I refer Berlandier's no. 2116 (the var. £.), 1095, 1435, 2111, 2120, 2195, 2215, 2328, 2525, and some specimens collected by Dr. Gregg. A fragment from California, collected by Mr. Wallace, seems also to be of this species. So is a plant collected at Fort Yuma by Major Thomas, in herb. Torr.*

5. NAMA DICHOTOMA (Chois.): *viscoso-pubescens; foliis spathulato-oblongis oblanceolatisve basi attenuatis subsessilibus; floribus plerisque in dichotomiis sessilibus vel pedunculis calyce dimidio brevioribus; capsula ovato- seu breviuscule oblonga. Hydrolea dichotoma, Ruiz & Pav. Fl. Per. 3. p. 22, t. 244. — Taking Spruce's no. 5802, from the Equatorian Andes, to represent Ruiz and Pavon's plant, with the alar flowers sessile and the corolla not exceeding the calyx, I refer to it Coulter's no. 91G from Mexico, and his no. 463 from California; in both of which the flowers in the forks are sometimes nearly sessile, and sometimes short-peduncled, or short-peduncled lateral flowers come from the reduction of one fork to a short peduncle; and the corollas are twice as long as the calyx. But all the species appear to vary in this respect.*

6. N. SANDWICENSIS (sp. nov.): *pube brevi hirsutula cinerea; foliis spathulatis deorsum attenuatis; pedunculis terminalibus demumque lateralibus saepius bifurcatis calyce fructifero longioribus; capsula ovali. — Sandwich Islands: Oahu, Macrae, Nuttall, Remy, DO. 425. Sand-hills of Maui, Dr. Pickering and Mr. Breckenridge. Kauai, Nuttall. Very much branched; the leaves soon revolute, 4 - 6*

lines long. Flowers small. Flower-stalks in fruit from 3 to 6 lines in length, divergent.

\*- ~~tr~~ Hispida: sepala sursum vix ampliata.

7. N. HISPIDA : setis albis rigidis undique hispida; foliis oblongo-linearibus seu spathulatis; floribus terminalibus demum lateralibus subsessilibus saepe geminis vel subscorpioideo-seriatis; sepalis angustissime linearibus; capsula oblonga. *N. Jamaicensis*? Engelm. & Gray, PL Lindh. 1. no. 130, non Linn. *N. dichotoma*, Torr. Bot. Hex. Bound. Surv. p. 147, excl. var. *N. biflora*, var. *spathulata*, Torr. in Pacif. R. R. Surv. 5. p. 362. Texas and the Mexican borders of the Rio Grande; Coll. Berlandier, no. 2385, 2443, 2486, and perhaps 1420; Drummond, III. no. 195 ; II. 309 ; Lindheimer, no. 130, and in later collections; W. Texas and New Mexico, Wright, no. 493, 494, 495, 1585, 1586; Fendler, no. 643. Less hispid forms probably referable to this species are from New Mexico or Arizona, no. 1584, Wright; from the mountains of San Antonita, New Mexico, Dr. Bigelow, and the same from Fort Tuma, California, Major Thomas, and from the same district by Fremont; also Arizona, Thurber.

§ 3. Folia haud decurrentia, abrupte longius petiolata, subtus pube sericeo-villosa argenteo-incana; pedunculi cymoso-pluriflori, floribus pedicellatis pro genere maximis, corolla f-pollicari.

8. N. SERICEA, Willd.; Roem. & Schult. Syst. 6. p. 189. *N. longiflora*, Chois. Hydrol. p. 20, t. 2, f. 2, & in DC. Prodr. Mexico: Coll. Coulter, no. 914, 915.

\*\*\* Species dubia.

N. HIRSUTA, Martens & Galeotti, ex Walp. Repert. 6. p. 565. Oaxaca, Mexico.

#### *Borraginaceae.*

HELIOTROPIUM ANOMALUM (Hook. & Am.): fruticosum, depressum, strigoso-incanum; foliis confertis lineari-lanceolatis basi attenuatis spathulatis; cymis pedunculatis glomerulifloris; calycis lobis inaequalibus imbricatis 2 exterioribus ovatis seu oblongis, ceteris linearibus; corollae tubo extus strigoso-sericeo calyce bis longiore; antheris apicibus br<sup>^</sup>issime barbuiatis primum cohaerentibus, nuculis 4 rarius 5-6 scabris. *Lithospermum incanum*, Forst. *Pentacarya heliötropioides*, DC. — Coral Islands, and Sandwich Islands.

Var. *p.* ARGENTEUM : pube molliore densiore nitente incanum; floribus paullo majoribus. — Sandwich Islands

The anomaly of five nucules to the fruit, which suggested Hooker's specific as well as De Candolle's generic name, is so far from constant, that I could not detect a single instance in a long suite of specimens, although Dr. Pickering appears from his notes to have been more lucky. I have found six nucules; but a supernumerary carpel is not so extraordinary; and this suggests that the five nucules, when this number occurs, result from the abortion of one cell or half-carpel. In all essential respects this species is a *Heliotrope*, in which genus even the inequality of the sepals is not altogether unexampled.

Without hesitation, we may reduce to the genus *Heliotropium* Nuttall's *Euploca* (as I had already indicated), Endlicher's *Schkidenia* (*Preslea*, Mart), and De Candolle's *Pentacarya*, and (with Fresenius) associate *Tournefortia* with it rather than with *Jehretia*. But the plant which (in Mem. Amer. Acad. n. ser. 6. p. 403) I had inadvertently referred to *Heliotropium*, viz. *H. Japonicum*, is only a variety (with broader leaves and longer style) of AmmanVs *Arguzia* (*Tournefortia Arguzia*, DC), a connecting link between *Heliotropium* § *Heliophytum* and *Tournefortia*.

Considerations analogous to those which forbid the dismemberment of *Heliotropium* point, though perhaps less directly, to the reunion under *Goldenia* of several plants which have been distinguished as genera.\*

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\* If we retain under *Coldenia* both *Stegnocarpus*, DC. and *Tiquilia*, Pers. (which is *Galapagoa*, Hook, f.), and add *Eddyia*, Torr. (and even *Ptilocalyx*, Torr.), a well-marked genus, of uniform floral characters and not incongruous in habit, will be the result. Otherwise we shall have four or five genera for barely twice as many species. The genus may be thus disposed in sections: —

#### COLDENIA, Linn.

I. Fructus e nuculis 4 trigonis dorso convexis intus faciebus planis arete conjunctis, crassis, crustaceis.

U EUCOLDENIA, DC. Styli 2, breves. Fructus globoso-quadrilobus: nucula geminatim subconnatae, demum partibiles. C. PROCUMBENS, Linn.

2. STEGNOCARPUS, DC, Torr. Stylus bifidus. Fructus globosus in nuculas 4 secedens. C. CANESCENS, DC. *Stegnocarpus canescens*, Torr. in Pacif. R. R. Rep. 2, p. 169, t. 7.

II. Fructus alte quadrilobus, e nuculis 4 (vel abortu paucioribus) ovatis peritris angulo interno basi styli mediante tantum connexis, pericarpio tenui.

3. EDDTA, Torr. Stylus superne bifidus. Nucula tenuiter crustacee, papilloso-scabra. C. HIBPIDISSIMA, Torr. 1, t. 9.

**CORDIA ASPERA** (Forst.) : pube ferruginea hirsuta, demum glabrescens; foliis membranaceis ovatis acuminatis asperulis supra glabratis, serraturis subulatis; floribus parvis cymoso-glomeratis; calyce ovato-cylindraco ferrugineo-villoso 10-striato, dentibus 5 minimis subulatis; corollas tubo calycem vix superante lobis sestivatione inflexis et corrugatis longiore; drupa ovata acuta nuda, putamine 1 - 2-spermo. — Tonga, Feejee, Samoan, and some of the Coral Islands. A distinct and genuine *Cordia*, but the specific name is unfortunate, for the leaves are by no means rough. — This is no. 336 of the Feejee collection of Dr. Seemann, referred by him to *C. Sprengelii*, DC, but it does not accord with Sprengel's detailed description.

*Labiata.*

**GARDOQUIA PILOSA** (sp. nov.): fruticosa; foliis lato- seu rhombeo-ovatis petiolatis subserratis lineato-venosis haud coriaceis puberulis subtus vix canescentibus; verticillastris multifloris; calycis hirsuti pedicello longioris dentibus subulatis, fauce intus nuda; corollis "coccineis" pilosis calyce (semipollicari) triplo longioribus. — Andes of Peru at Baños. Resembles *G. rugosa* in the foliage, but the flowers are much larger the corolla elongated, &c. It needs to be compared with *G. pulchella*, H. B. K.; but the branches are glabrous, and the leaves not tomentose beneath, nor coriaceous.

**SPHACELE HASTATA** (sp. nov.): herbacea; foliis amplis hastatis creberrime crenulatis utrinque cauleque cano-tomentulosis, floralibus oblongo-lanceolatis sessilibus; cymis laxis multifloris thyrsum elongatum efficientibus; corollis "purpureis" tubulosis calyce triplo longiori-

- 
4. **TIQUILIA**, Fers. Stylus bifidus vel divisus. Nuculus laves, nitidus, tenuissime crustaceus. Embryo generis, i. e. cotyledones planae, integre. C. **DICHOTOMA**, Lehm. C. (*Galapagoa*, Hook, f.) **DARWINI & FUSCA**.
  5. **TIQUILIOPSIS**. Corolla tubus basi intus 5-squamatus. Nuculae fere membranaceae. Cotyledones bipartitae, radicae utrinque accumbentes. Ciet. *Tiquilio* R. C. **NUTTALLII**, Hook. Kew Jour. Bot. 3, p. 296. *Tiquilia parvifolia*, Nutt. in herb. Hook. *T. brevifolia*, Nutt. herb, ex Torr. Bot. Mex. Bound., p. 136. *T. Oregona*, Torr. Bot. S.Pacif. Exped. (Calif. & Oregon), 1.12.

**PTILOCALYX**, Torr. in Pacif. R. R. Rep. 1. c, t. 8, where it is admirably figured, may be regarded as a *Stegnocarpus* with all but one of the cells of the ovary sterile—these appearing as lateral vestiges on the cross-section of the monococous coriaceous fruit. In this view it is not likely to stand as a genus, unless *Tiquilia* also does. Those who regard the reduction here foreshadowed as too great, might be better satisfied with three genera, viz. *Coldenia*, *Ptilocalyx*, and *Tiquilia*,

bus; genitalibus sublonge exsertis.— Sandwich Islands, on Mouna Ha-leakala, East Maui, alt. 5,000 - 7,000 feet. A most striking and distinct species: corolla an inch long, somewhat pubescent.

PHYLLOSTEGIA, Benth. An examination of the now extant materials of this Sandwichian genus leads to the suppression of four of Bentham's species, and the establishment of as many new ones. Two of the latter constitute a peculiar section, and *P.floribunda* may be taken for another. The sections, and a key. to the species, may be presented as follows: —

- § 1. GENUINE. Racemi verticillastriflori, nempe verticillastri 6 - 20-flori in racemo caulem terminante dispositi, vel infimi (nunc lusu omnes) axillares. Corollas albae.
- Calycis lobi tubo aequilongi foliacei, amplissimi: hirsutissima. *P. vestita.*
- Calycis lobi tubo pi. m. breviores :
- Fructiferi ampliati, explanato-patentes, foliacei. Pedicelli calycem sericco-pubescentem subaequantem. *P. grandiflora.*
- Fructiferi haud explanato-patentes (*P. racemosa* forte excepta).  
Glabra: pedicelli graciles.
- Verticillastri pluriflori, haud pedunculati. *P. brevidens.*
- Verticillastri 6-flori, cymulis saepius pedunculatis! *P. glabra.*
- Hirsutissima: pedicelli breves. *P. hirsuta.*
- Molliter pubescens seu villosa.
- Pedicelli graciles calyce saepissime longiores: pili patentem. *P. parviflora.*
- Pedicelli calycem cum corolla strigoso-pubescentem subaequantem. *P. clavata.*
- Pedicelli brevissimi plurimi.
- Calycis lobi subulato-lanceolati tubum subaequantem. *P. stachyoides.*
- Calycis lobi ovati, obtusi, tubo breviores. *P. racemosa.*
- k 2. LATERI FLORAE. Racemi simpliciflori (pedicellis solitariis), breves, ex axillis foliorum inferiorum. Corollae violacae, parvae.
- Lobi calycis hirsutissimi, tubo sequilongi, lineares. *P. floribunda.*
- § 3. HAFLOSTACHTJE. Spica simpliciflora terminalis, nuda. Corolla alba, tubo longo, lobis subaequalibus crispis. Folia subtus cano-tomentosa.
- Folia basi sat cordata: calycis dentes angusti, acuti. *P. haphstachya.*
- Folia basi vix cordata: calyx repando-truncatus. *P. truncata.*

PHYLLOSTEGIA VESTITA, Benth. (racemo laxiore folioso,) takes in *P. dentata*, Benth., racemo denso nudo, foliis floralibus plerisque calyces fructif. haud superantibus.

PHYLLOSTEGIA GRANDIFLORA, Benth. To this, I suspect, belongs Gaudichaud's *Prasium macrophyllum* also, but not Bentham's *Phyllostegia macrophylla*, at least as to Macrae's plant, from which his de-

scription is principally drawn, and which I take for a form of *P. parviflora*.

**PHYLLOSTEGIA BREVIDENS (sp. nov.):** glabra; foliis ovalibus argute dentato-serratis; racemo laxo brevi simplici, verticillastris multifloris; calyce quasi truncato, dentibus brevissimis obtusis erectis; corollas tubo dorso pubescente calyce duplo longiore (semipollicari). — Hawaii, in the forest of Mouna Kea, alt. 3,000 feet. Inflorescence as in *P. grandiflora* (except in the smoothness), i. e. the pedicels sessile or nearly so; but more numerous, from 7 to 11 in each cymule.

Var. ? 3. **AMBIGUA :** calyce glaberrimo magis dentato, dentibus tubo quadruplo triplove brevioribus; corollae tubo calyce triplo longiore (subpollicari) ; foliis subtus nunc parce pilosis. — West Maui. This is ambiguous between *P. brevidens* and *P. grandiflora*, having the corolla about the size and shape of the latter, and most of the leaves are sparingly pilose beneath. But the latter are sharply serrate, the calyces, pedicels (about 5 in each cymule), &c. are perfectly glabrous, and the calyx-teeth, although manifest and of the same form as those of *P. grandiflora*, are much shorter and hardly spreading. There is reason to suppose that this may be the same as a specimen which Menzies collected on Maui, which is preserved in the herbarium of the British Museum, and which Bentham referred to his *P. Chamissonis*. In which case, if of a distinct species, as is likely, it should be named *P. Menziesii*.

**PHYLLOSTEGIA GLABRA (Benth.) :** undique glaberrima; foliis ovatis serratis basi rotundatis vel truncatis; racemo laxo thyrsoido, cymulis plerisque pedunculatis trifloris; lobis calycis parvulis breviter lanceolatis tubo dimidio brevioribus, fructiferis vix ampliatis subpatentibus; corollae tubo calyce 2 - 3-plo longiore. Variat calycis lobis angustioribus acutis, seu latioribus obtusis vel obtusiusculis, fructiferis haud raro tubo aequilongis; corolla subpollicari vel dimidio minore.— Gaudichaud's plate of *Prasium glabrum* represents the largest-flowered form of this species. Bentham's *Phyllostegia glabra*, in Bot. Reg. and in Linnaea, was described from branched specimens with smaller and probably later flowers; his *P. Chamissonis*, from a larger-flowered form. The corolla varies much in size, but I have never seen it rival that of *P. grandiflora*. I am persuaded, accordingly, that Bentham's *P. Macraei* and *P. Chamissonis* must merge under the original name, *P. glabra*. The species is the only one with pedunculate cymules, except the following.

**PHYLLOSTEGIA HIRSUTA**, Benth. This is known only by deflorate specimens of Macrae's collection; but it is probably of this genus.

**PHYLLOSTEGIA PARVIPLORA** (Benth.) : molliter villosula vel pubescens; foliis ovatis seu ovato-oblongis serrato-crenatis basi rotundatis cordatisve; racemo laxo glanduloso- seu viscoso-villoso; verticillastris plerumque 6-floris, pedicellis gracilibus; calycis lobis breviter lanceolatis tubo 3 - 4-plo brevioribus, fructiferis vix ampliatis subpatentibus; corollae tubo puberulo calyce 2 - 3-plo longiore (semipollicari). — Under this I combine the following: —

Var. a. **GAUDICHAUDI** (*P. parviflora*, Benth.) : foliis subtus molliter seu mollissime pubescentibus; racemis saepe paniculatis; floribus parvis; corolla gracili; pedicellis saepe calyce (1½ lin.) multo longioribus (3 - 6 lin.) nunc tantum aequilongis.

Var. f. **GLABRIUSCULA** (*P. macrophylla*, Benth., praesertim pi. Macraei): foliis cauleque subpubescentibus vel glabratis; floribus majoribus; pedicellis calyce (2 - 3 lin.) 2 - 3-plo longioribus; verticillastris interdum 8-floris.

Var. y. **MOLLIS** (*P. mottis*, Benth.): undique mollissime velutino-pubescentibus, canescens; pedicellis calyce brevioribus vel subaequalibus; corolla (4 - 5 lin.) calyce duplo longiore.

**PHYLLOSTEGIA STACHYOIDES** (sp. nov.): molliter pubescens; foliis ovato-lanceolatis acuminatis vix basi subcordatis crenato-serratis; racemo denso; verticillastris 10-14-floris; pedicellis calyce brevioribus; lobis calycis glandulosi-puberuli subulato-lanceolatis tubo paullo brevioribus; corollae pubescentis tubo calyce duplo longiore. — Hawaii, in the district of Waimea. Leaves much like those of *P. racemosa*, but tapering to an acute point, and scarcely at all cordate.

**PHYLLOSTEGIA CLAVATA** (Benth.): pubescens vel hirsuta pilis appressis, foliis ovatis seu ovato-lanceolatis subacutis basi rotundatis vix subcordatis crenato-serratis; verticillastris 6- 14-floris, pedicellis calyce subaequilongis; lobis calycis strigosi late triangulari-ovatis obtusis tubo triplo brevioribus; corolla strigoso-pubescentis tubo calyce triplo longiore; stilo apice clavato. Variat 1. foliis glabriusculis pedicellis fructiferis 2-3-plo longioribus, 2. sericeo-villosa, canescens, lobis calycis paullo majoribus. — Style more clavate than usual at its summit, the upper lobe smaller and its stigma often abortive.

**PHYLLOSTEGIA RACEMOSA** (Benth.): villosula seu tomentoso-pubescentibus; foliis oblongis ovato-lanceolatisve obtusis basi saepissime cordatis crenatis; verticillastris 8-12-floris; pedicellis brevissimis; lobis calycis

tomentulosi ovatis obtusissimis tubo dimidio brevioribus, fructiferis auctis patentibus; corolla pubescente calyce duplo longiore. — Branches of the style often unequal, the upper one being smaller, as in the preceding.

**PHYLLOSTEGIA HAPLOSTACHTA** (sp. nov.): cano-tomentosa; foliis cordato-oblongis seu cordato-lanceolatis crenatis; verticillastris bifloris; floribus subsessilibus in spicam simplicem virgatam digestis; calycis dentibus lato subulatis erectis tubo 3 - 4-plo brevioribus; corollas tubo longe exserto, lobis crispis. — Maui, on the sands of the low isthmus. Also gathered by Remy on Hawaii. Calyx 3 or 4 lines long, cylindrical, a little curved, and the flower horizontally spreading in anthesis. Corolla white; the tube 8 or 9 lines long, the lips less unequal than in other species, the upper one and the three lobes of the lower lip rotund and with strongly undulate-crisped margins. Style of the genus. So of the fruit, which is apparently drupaceous when fresh, but is included in the ovoid and nearly closed fructiferous calyx.

**Var. 0. LEPTOSTACHYA** : foliis angustioribus e basi minus cordata, pagina superiore calycibusque minutim tomentulosi nee incanis; floribus inferioribus dissitis. — On barren ridges of Kauai; in flower.

**PHYLLOSTEGIA TRUNCATA** (sp. nov.) : tomentulosa; foliis lanceolatis crenulatis basi truncatis vel subcordatis subtus incanis; verticillastris bifloris; floribus in spicam simplicem digestis brevissime pedicellatis, infimis dissitis; calyce puberulo glanduloso repando-truncato, dentibus brevissimis latis obtusissimis; corollas tubo elongato, lobis rotundatis subrequalibus crispis.—Maui, Coll. Remy, no. 395. Closely related to the preceding. The two would be taken for the type of a distinct genus; but I find no sufficient reason for their separation.

**PHYLLOSTEGIA FLORIBUNDA** (Benth.): villosa-hirsuta; caule rigido (bipedali); foliis ellipticis seu oblongo-ovatis acuminatis crenato-serratis basi rotundatis vel obtusis; racemis brevibus plurifloris ex axillis fol. inf., rhachi pedicellis filiformibus calycibusque patentihirsutissimis; lobis calycis linearibus tubo suo et corollas "late violaceae" subaequilongis. — Hawaii, in woods of the district of Puna. Before known only from the specimen gathered (probably on Hawaii) by Nelson in Cook's last voyage, and preserved in the Banksian herbarium. Achenia fleshy, projecting from the open mouth of the fructiferous calyx.

**STENOGYNE**, Benth., is the other Labiate genus peculiar to the Sandwich Islands. In all the species the corolla is more or less hairy or downy externally towards its summit, while the lower part of the



tube is apt to be glabrous or glabrate. The color is mostly rose or pink. The lips, indeed, are often "subaequal"; but it is the upper (not the lower) lip which surpasses the other, sometimes strikingly so when fully developed. This is especially the case in the small-leaved section, where the erect or falcate upper lip, produced much beyond the short and 3-cleft lower one, calls to mind the corolla of a *Castilleia*. The bearded annulus is wanting in *S. rotundifolia*, *S. cordata*, and nearly so in what I take to be *S. macrantha*, therefore probably in *S. sessilis*. The stamens equal the upper lip, or are exerted beyond it. The following conspectus of the species will be convenient.

\* *Corolla exannvlata. Verticillastri scepius 6-flori.*

Folia longius petiolata: nervi calycis obsoleti.

Hirsuto-hispida: calyx 5-fidus: cor. lab. superius productum. *S. macrantha,*

Glabrata: calyx breviter dentatus: corollas labium superius  
inferiori vix longius: filamenta villosa! *S. rotundifolia.*

Folia vix petiolata, glabra: calyx nervosus, 5-lobus.

Folia subpetiolata: calycis lobi acuti. *S. cordata.*

Folia arete sessilia: calycis lobi lati obtusi. *S. sessilis.*

\*\* *Corolla villosa-annulata.*

Folia majora, longius petiolata: verticillastri scepius 6-flori: labia corolla subaequilongia vel superius paullo longius.

Calycis nervi obscuri, dentes breves obtusi. Folia submembranacea.

Subglabra, caule angulis hirsutis: folia rotundata: pedicelli  
calycem vix sequantes. *S. calaminthoides.*

Glabra: folia ovata, acuta: pedicelli calyce longiores. *S. scrophularioides.*

Calycis praesertim fructiferi nervosi, lobi acuti: folia rigida.

Erecta: folia ovata sen oblonga. *S. rugosa.*

Procumbens: folia oblongo- seu lanceolato-lineararia: verticillastri biflori. \* *S. angustifolia.*

Folia parva, plerumque petiolata: caules ramosissimi diffusi: verticillastri biflori: corollas (viridulse) fauce minus ampliatae, labium superius insigniter productum: stamina exserta. (*Microphylla* R.)

Glabra: folia acute serrata vel incisa, basi angustata. *S. microphylla.*

Hispida: folia oblonga, obtusa, grosse crenata. *S. crenata.*

Villoso-pubescentis: folia rotundata, basi truncata vel subcordata, grosse crenata, \* & *diffusa.*

STENOGTNE MACRANTHA (Benth.?): pilis patentibus undique moliter hispida; foliis subrotundis vel ovatis crenatis basi saepius cordatis submembranaceis longiuscule petiolatis; verticillastris 6-floris; pedicellis calyce 5-lobo aequilongis, utrisque hispidis; filamentis subnudis;

corolla (subpollicari!) fere exannulataextus sericea.—The above character is drawn from no. 381 of Remy's collection, from Hawaii. It does not accord in several particulars with the character of Bentham's *S. macrantha*, drawn from a single specimen collected by Macrae. That is stated to have corollas an inch and a half long, "labio superiore viz inferiore brevior." In Remy's specimens the lower lip is decidedly shorter than the upper, the dilated orifice oblique.

STENOGTNE ROTUNDIFOLIA (sp. nov.): caulibus basi suffruticosis acute tetragonis ad angulos praesertim cum petiolis retrorsum hirsutis; foliis glabratis rotundis crenatis basi truncatis vix subcordatis pollicaribus; verticillastris 6-floris; pedicellis petiolo dimidio brevioribus calyce glabro breviter dentato subaequilongis; filamentis villosis; corolla (10 lin. longa) exannulata intus villosa. — Mouna Haleakala, E. Maui.

STENOGTNE CORDATA (Benth.) : glabrata vel prater nodos barbato glabra; foliis subpetiolatis ovatis basi pi. m. cordatis (pollicaribus) crenulatis; verticillastris 2 - 6-floris; pedicellis brevissimis; calyce inaequali, lobis acutis, anticis tubo subaequalibus; corolla exannulata, labiis fere aequilongis. — Hawaii and W. Maui.

STENOGTNE SESSILIS, Benth., nearly related to the last, has been found only by Menzies. The specimens in the Banksian and Hookerian herbaria have larger, rounder, more rugose, and more closely sessile leaves than *S. cordata*, the stem hairy on the angles, the lobes of the calyx broad and obtuse, and the downy corolla larger.

STENOGTNE CALAMINTHOIDES (sp. nov.): subglabra; caulibus decumbentibus vel repentibus tetragonis ad angulos retrorsum hirsutis; foliis rotundo-ovatis crenatis basi subcordatis truncatisve longiuscule petiolatis subflaccidis (1 - 2-poll.) ; verticillastris 6 - 8-floris; pedicellis calycem vix aequantibus; dentibus calycis obtusis brevissimis; corollas elongatae superne puberulae (ultrapollicaris) labiis fere aequilongis.—Hawaii, in the forests of Mouna Kea, &c. Allied both to *S. rotundifolia* and to *S. scrophularioides*.

STENOGTNE SCROPHULARIOIDES (Benth.): glabra, divaricato-ramosa; foliis ovatis acutis serratis basi rotundatis vel truncatis subflaccidis, petiolo gracili; verticillastris saepissime 6-floris; pedicellis calyce breviter dentato longioribus; corollae superne pubescens labiis subaequilongis—Hawaii.

Var. *p<sub>m</sub>* foliis oblongo-ovatis saepius acuminatis argutius serratis floribusque majoribus. *S. Nelsoni* Benth. *Phceopsis montana*, Nutt. — Hawaii and Oahu.

**STENOYTNE RUGOSA (Benth.)** : saepius glabra vel glabrata; foliis coriaceis rigidis oblongis seu ovato-oblongis basi rotundatis vel truncatis petiolatis crenato-serratis reticulatis nunc rugulosis; verticillastris plerumque 6-floris; pedicellis calyce brevioribus; calyce subinaequali, lobis saepius mucronato-acutis vel acutissimis tubum subaequantibus; corollae breviusculae labio inferiore paullo brevior. — Variat, 1. fere omnino (corolla excepta) glaberrima, laevis, seu pedicellis calycibusque hirsutulis: 2. hirsutula vel hispida, foliis nunc rugosis asperulis: 3. pube brevi molli induta, verticillastris 6 - 10-floris. — Hawaii, brought by most collectors.

**STENOGYNE ANGUSTIFOLIA (sp. nov.)**: glaberrima; caulibus filiformibus sarmentosis saepius procumbentibus; foliis coriaceis oblongo-linearibus seu lineari-lanceolatis crenulato-serratis basi in petiolum angustatis; verticillastris bifloris; floribus fere *S. rugosae*, lobis calycis inferioribus tubo paullo longioribus; corolla glabrata. — Hawaii, in the district of Waimea. Possibly an extreme form of the preceding.

**STENOGYNE MICROPHYLLA (Benth.)** : glabra, diffuso-ramosissima, subscandens; foliis parvis (½ - J-poll.) oblongis grosse serratis vel incis basis in petiolum marginatum angustatis; verticillastris bifloris; corolla extus puberula, labio superiore falcato longe producto; staminibus exsertis. — Hawaii.

**STENOGYNE CRENATA (sp. nov.)**: hispida, ramosissima, foliosissima; foliis parvis oblongis seu ovalibus obtusis grosse crenatis breviter (nunc brevissime) petiolatis; verticillastris bifloris; corolla extus hispida, labio superiore longiuscule producto; staminibus exsertis. — Maui, on Mouna Haleakala. Differs from the preceding in the hispid hairiness, which is retrorse and aculeolate on the acute angles of the stems, in the blunt and crenate leaves, less unequal lips of the corolla, &c.

**STENOGYNE DIFFUSA (sp. nov.)** : molliter villosopubescent, divaricato-ramosissima; foliis parvis rotundis grosse crenatis basi truncatis vel subcordatis (1 J - 2 lin. latis) petiolatis; verticillastris bifloris; calycis lobis obtusis; corolla extus pubescente, labio superiore longe producto; staminibus exsertis. — Hawaii, in forests of the district of Waimea.

A specimen of what may be still another species of this small-leaved section was gathered on East Maui, with ovate-subcordate or deltoid leaves, incisely lobed, and with the diffuse branches cinereous-pubescent; but the flowers and fruit are unknown.

TEUCRIUM ARGUTUM, R. Br. var. PINNATIFIDUM : foliis laciniato-pinnatifidis fere bipinnatifidis. — Hunter's River, New South Wales.

The no. 359 of Seemann's Feejee collection, inadvertently named *Coleus atropurpureus*, is *Plectranthus Forsteri*.

*Acanthacece.*

ERANTHEMUM LAXIFLORUM (sp. nov.) : glaberrimum; foliis ovato-seu lanceolato-oblongis ssepius acuminatis acumine obtuso; ^dunculis axillaribus petiolo longioribus cymoso-tri-multifloris; bracteis oblongis parvis herbaceis; pedicellis calyce longioribus; laciniis calycis setaceo-subulatis tubo brevissimo pluries longioribus; corolla "caerulea" hypocraterimorpha, lobis ovalibus. — Sandalwood Bay, &c, Feejee Islands. A showy species, of the same group as & *tricolor*; "shrub six feet high, ornamental." The color of the flowers, "blue," is stated on the authority of Dr. Pickering's notes. This and the following mixed were distributed by Dr. Seemann under the name of "*Graptophyllum hortense*," — which throws much doubt on the assigned difference in color.

ERANTHEMUM INSULARUM (sp. nov.) : glabrum ; foliis ovatis lanceolatisve obtuse acuminatis; pedunculis axillaribus seu ramos terminantibus brevibus 1 - 3-floris; bracteolis minutis; calycis laciniis subulatis tubo duplo triplove longioribus; corolla "purpurea" infundibuliformi, lobis oblongis. — Feejee Islands, "frequent and sometimes cultivated; an ornamental shrub, six feet high, with purple flowers." Vavau and Lifuka, Friendly Islands, Prof. Harvey. Perhaps varying into the preceding. Is *Justicia longifolia*, Forst. *fj. sinuata*, Soland., appended by Nees to *Anthacanthus*) a congener of the above ?

CHJETACANTHUS REPANDUS : glaber, elatus (fruticosus ?) ; foliis ovato-lanceolatis seu oblongis acumine obtuso repandis sinuatisve membranaceis; pedunculis cymoso-paucifloris; corolla extus calyceque minutim pubescentibus. *Justicia repanda*, Forst.? *Eranthemum repandum*, Roem. & Schult.? *Anthacanthus repandus*, Nees in DC. ? — Ovolau, Feejee Islands. The small flowers, anthers, &c. correspond with the Cape species, upon which Nees founded his *Chcetacanthus*,

DICLIPTERA CLAVATA, Juss. Our materials from Tahiti barely suffice to show that the plant is of this genus. The apparent contradiction in Vahl's description, which puzzled Nees (Prodr. 11. p. 490), is readily harmonized by noting that the word "bracteis" in the diagnosis refers to the involucre valves, but in the appended remarks it applies to those bracts which subtend the ramifications.

*Gesneriaceae, Cyrtandra.*

Of *Cyrtandra iiflora*, Forst., from Tahiti, the original of the genus, I have nothing to remark. The species inhabiting the Sandwich Islands I have been able to study under favorable circumstances; the substance of the revision is presented in the following analysis and diagnoses.

*Cyrtandra Sandwicensis.*

## 1. Mores mediocri, ultra-semipollicares.

Folia cordata, ampla.

Calyx rotatus, lobis ovatis: ovarium villosum. *C. cordifolia.*

Calyx campanulatus, lobis lanceolatis: ovarium glabrum. *C. platyphylla.*

Folia utrinque acuta vel acuminata.

Calyx crateriformis breviter 5-lobus. *C. Pickeringii.*

Calyx cylindricus, breviter 5-lobus. *C. grandiflora.*

Calyx campanulatus vel cylindraceus, 5-fidus.

Pedunculus comraanis brevissimus. *C. paludosa.*

Pedunculus pedicellis sequilongus. *C. triflora.*

Calyx 5-partitus: folia utrinque viridia. Var. *lysiosepala.*

Calyx 5-partitus: folia subtus ferrugineo-sericea. *C. Lessoniana.*

## 2. Flores parvi, haud semipollicares.

Folia elliptica, subtus canescenti-velutina: calyx 5-fidus. *C. Garnotiana.*

Folia lato ovata, subtus pruinoso-canescens; calyx 5-partitus, lobis lanceolatis. *C. Macraei.*

Folia utrinque viridia, oblonga seu lanceolata: calyx 5-partitus, lobis setaceis elongatis. *C. Memesii.*

CYRTANDRA CORDIFOLIA (Gaud.): villosissima; foliis rotundo-ovatis cordatis acuminatis argute dentatis supra hirsutis subtus calycibusque dense tomentoso-villosis subincanis (5 - 7-poll.); pedunculis plurifloris; calyce rotato angulato-quinquefido fere aequali corollam subaequantibus, lobis late ovatis acuminatis; ovario cum stylo brevissimo villosa. — Oahu. Gaudichaud's plate pretty well represents this species, except that the shaggy pubescence is omitted, the leaves are not large enough, and the rotate calyx not expanded.

CYRTANDRA PLATYPHYLLA (sp. nov.): foliis subrotundo-cordatis breve acuminatis (5 - 9 poll, latis) argute denticulatis supra hirsutulis subtus canescenti-pubescentibus, costis cum petiolis ramis calycibusque pube ferruginea villosis; pedunculis plurifloris; calyce inaequaliter quinquefido, lobis lato-lanceolatis corolla brevioribus; ovario cum stylo gracili glaberrimo. — Hawaii, in forests. Stem 10 feet high.

CYRTANDRA PICKERINGII (sp. nov.): ferrugineo-villosa; foliis oblongo-lanceolatis utrinque acuminatis subserrulatis supra hirsutis subtus

(praeter costas viljosas) fulvo- vel canescenti-pubescentibus; pefanculis 3 - 5-floris; calyce crateriformi subaequaliter breviter 4 - 5-lobo corolla brevior, lobis late deltoideis. — Mountains of Oahu. Except for the calyx (which is ampliate in the manner of *C. cordifolia*, but crateriform or cyathiform rather than rotate, and much less lobed), and the soft fulvous down of the lower surface of the leaves, this might be taken for a variety of the next species.

CYRTANDRA TRIFLORA (Gaud.) : glabrata vel primum ferrugineo-hirsuta; foliis oblongis seu ellipticis utrinque acutis vel acumroatis serrulatis serratisve utrinque viridibus; pedunculis brevibus 2 - 5-floris ; calyce subaequaliter 5-fido cylindraco, lobis lato-lanceolatis corolla brevioribus.

Var. a. GAUDICHAUDI: ramis foliisque praeter costam venasque pagino inferioris ferrugineo-pubescentes glabris; calycis lobis tubo sequilongis. — Oahu, Hawaii.

Var. /3. ARGUTA: ramulis cum inflorescentia ferrugineo-hirsutis; foliis majoribus ovalibus caudato-acuminatis crebre argutissirae serratis hirsutulis; calycis (etiam fructiferi hirsuti) lobis tubo brevioribus. — Hawaii, in mountain forest.

Var. y. LYSIOSEPALA: calyce fere 5-partito; cast. var. j9.— Hawaii, in deep forest.

CYRTANDRA GRANDIFLORA (Gaud.): foliis oblongis seu ovatis utrinque acuminatis subintegerrimis glabratis subtus pallidis puberulis, costa venis petioloque pube brevissima ferrugineis; pedunculo 1 - 2-floro bracteis foliaceis; calyce cylindrico breviter ð-lobo hinc saepe profundius fisso corolla glabra paullo brevior. — Oahu. Calyx, when well developed, an inch long; teeth three lines long. To this probably belong *C. Endlicheriana*, Nees, and *C. Ruckiana*, Meyen and Walpers.

CYRTANDRA PALTJDOSA (Gaud.): "suffruticosa," glabra; foliis oblongis sublanceolatisve utrinque acuminatis serratis subtus pallidis; pedunculis brevissimis nudis 1 - 5-floris; calyce cylindraco-campulato inaequaliter 5-fido, lobis triangulari-acuminatis, anticis tubo aequilongis; corolla glabra; fructu olivaeformi. — This is most related to *C. grandiflora*, but is glabrous in the adult state, only the nascent leaves, &c. ferrugineous-pubescent.

CYRTANDRA LESSONIANA (Gaud.): foliis oblongis utrinque saepius acuminatis denticulatis supra hirsutulis subtus cum ramis pedunculisque pube adpressa ferruginea sericeis; pedunculis elongatis 1 - 3-floris; bracteis lanceolatis; calyce 5 - 6-partito; lobis ovatis seu ovato-lanceo-

latis cordata extus sericeo-villosa brevioribus vel demum sequalibus  
laxis; fructu ovato. — Oahu.

Var. *β*. calycis lobis elongato-lanceolatis; corolla subglabrata.—  
West Maui.

The deeply-parted divisions of the calyx are at first considerably shorter than the corolla, but they enlarge with age: at first silky-villous and ferruginous, when old they are glabrate; they are not always so broad as Gaudichaud represents them, nor with such undulate reflexed margins; sometimes they become merely broad-lanceolate; in the variety from Maui they are still narrower, and then occasionally six. Corolla white or greenish, as in all these species.

CYRTANDRA GARNOTIANA (Gaud.) : foliis ellipticis vel obovatis utrinque saepius anguste acuminatis denticulatis supra hirsutulis subtus cum inflorescentia ramisque canescenti-velutinis; pedunculis gracilibus 3-5-floris; bracteis parvis; calyce campanulato subaequaliter 5-fido, lobis triangularibus tubo subaequilongis corolla extus hirsuta (4-5 lin. longa) subdimidio brevioribus. — Oahu. One of the small-flowered species. The fruit is figured by Gaudichaud as ovate.

CYRTANDRA MACILEI (sp. nov.): foliis lato-ovatis acuminatis denticulatis supra glabris subtus ramulisque novellis pruinoso-incanis, venis pubescentibus; pedunculis brevissimis cymoso-multifloris; calyce sequaliter 5-partito corolla pruinosa fructuque ovoideo multo brevior, lobis e basi lata lanceolatis. — Oahu, gathered by Macrae (1825), Gaudichaud (in voyage of the Bonite), and by Brackenridge. "Shrub 10 feet high/' but the branches collected are herbaceous. Leaves 4 to 8 inches long by 3 to 6 wide. Bracts minute. Flowers very small for the genus; corolla 4½ lines long. Stamens not examined, only a single flower having been seen. Pistil of the genus. Immature fruit 4 lines long, conical-ovoid or ellipsoidal, probably more or less fleshy.

CYRTANDRA MENZIESII (Hook. & Arn. Bot. Beech., p. 91, adn.): subglabra; foliis quaternis (an semper?) oblongis seu lanceolatis utrinque acuminatis serrulatis; pedunculis petiolo brevioribus umbellato-plurifloris; calyce 5-partito, lobis elongatis subulato-setaceis corolla vix semipollicari paullo brevioribus; fruct. fere *C. Macraei*. — Not in our collection, but found by Gaudichaud in the voyage of the Bonite.

As to the species of the Feejee Islands, the collection of the American Expedition contains only three or four of the eight enumerated by Dr. Seemann, the characters of which he is about to publish.

# **BOTANICAL CONTRIBUTIONS,**

**BY ASA GRAY.**

EXTRACTED FROM THE PROCEEDINGS OF THE AMERICAN  
ACADEMY OF ARTS AND SCIENCES, VOL. VI.

**[Issued January, 1864.]**



ON STREPTANTHUS, AND THE PLANTS WHICH HAVE BEEN REFERRED TO THAT GENUS, p. 182.

REVISION OF NORTH AMERICAN SPECIES OF ASTRAGALUS AND OXYTROPIS, p. 188.

Read November 11, 1863.

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*On STREPTANTHUS, Nutt., and the Plants which have been referred to that Genus.* By ASA GRAY.

A number of plants have been referred to *Streptanthus*, — some by its founder, Nuttall, and others by myself, — which, upon re-examination, appear to belong elsewhere. Having now before me all the authentic materials which exist in herbaria in this country, I have endeavored to clear up the group, with the following results.

1. STREPTANTHUS, Nutt.

The characters of this genus are the linear or elongated and sagittate anthers, and petals with long canaliculate claws (with or without a dilated lamina), along with the flattened siliques and broad flat seeds of *Arabis*. *iodanthus*, Torr. & Gray, and *elypodium* Endl. (*Pachypodium*, Nutt.), which have long unguiculate petals and narrow anthers (which coil or curve when effete, like those of *Streptanthus*), have terete and torulose siliques, the valves with an obscure if any mid-nerve, and oblong seeds, the cotyledons in the latter obliquely more or less incumbent. There are transitions which connect, quite too closely, *Streptanthus* with *Arabis*. But the genuine species of the former are so strikingly marked, that the genus will probably be kept up. The disposition of the calyx to assume a crimson or purple color and of the filaments of the longer stamens to unite in pairs, may also be taken into account. I recognize the following species.

§ 1. *EUSTREPTANTHUS*, Endl. Petals with a broad and ample plane lamina. Sepals suberect or erect. Seeds winged. Flowers pretty large, rose-purple. Cauline leaves all sessile and cordate-clasping, glabrous and more or less glaucous.

\* Flowers all subtended by persistent bracts.

1. *S. BRACTEATUS*, Gray, Gen. 111. 1, t. 60; Pl. Lindl. 2, p. 143, & Pl. Wright. 2, p. 11. Siliques elongated-linear, 6 inches long, spreading. Mature seeds not seen. — Texas.

\* \* Flowers (or all but the lowest) ebracteate.

2. *S. PLATYCARPUS*, Gray, Pl. Wright. 1. c. Siliques oblong-linear (2J-3 lines wide), very flat, erect. Leaves clasping by rather short and rounded lobes, the lower and radical ones lyrate-pinnatifid. — S. W. Texas.

3. *S. MACULATUS*, Nutt. in Jour. Acad. Philad. 5, p. 134, t. 7. *S. obtusifolius*, Hook. Bot. Mag. t. 3317. *Brassica Washitana*, Muhl. Cat. ? Siliques narrowly linear (only a line wide, 3 or 4 inches long), erect or ascending. Cauline leaves clasping by long and obtuse lobes, making a very deep and nearly closed sinus. — Arkansas and E. Texas.

§ 2. *EUCLISIA*, Nutt. Petals undulate-crisped, the lamina narrow or attenuated, scarcely if at all broader than the claw. Sepals connivent, mostly colored, often saccate at the base. The longer stamens often connate.

\* Flowers distinctly pedicelled. Stem not fistulous-inflated.

-i-Wholly glabrous and mostly glaucous: cauline leaves clasping by a cordate or sagittate base.

4. *S. CARINATUS*, C. Wright, in Gray, Pl. Wright 2, p. 11. Flowers purple (half an inch long); the urceolate calyx carinately 5-saccate. Pedicels of the flowers and of the broadly linear and flat (half-grown) siliques erect. Radical and lower cauline leaves runcinate-pinnatifid, the upper ones sagittate-clasping, all very glaucous. Seeds unknown. — S. W. Texas, below El Paso.

<sup>5</sup>- *S. CORDATUS*, Nutt. in Torr. & Gray, Fl. 1, p. 77. This, although marked with the exclamation point, as having been authenticated, is not preserved in any American herbarium, so far as I can ascertain. It is characterized by Nuttall as having very obtuse leaves, toothed near the summit, the cauline cordate and clasping, greenish-

yellow flowers on short pedicels, an oblong campanulate calyx, and deflexed siliques. The locality assigned by Nuttall is "Forests of the Rocky Mountains." An imperfect specimen gathered "on the Colorado" by Dr. Newberry may be of this species. Otherwise it is wholly unknown to me. I suppose it can be neither the foregoing nor the following species.

6. *S. TORTUOSUS*, Kellogg, in Proceed. Calif. Acad. 2, p. 152, t. 46, wood-cut. *S. cordatus*, Torr. Bot. Whipl. Exped. Pacif. R. R. Surv., p. (65) 9, not of Nutt. Flowers purple, on slender (spreading or ascending) pedicels, in a lax raceme, the lowermost often leafy-bracted, half an inch long; the (ovate) buds and the sepals usually long-acuminate. Siliques, according to Dr. Kellogg's figure and description, narrowly linear and falcately recurved-spreading. Seeds, according to Dr. Kellogg's description, wing-margined. Leaves entire or denticulate, the cauline cordate-clasping and mostly appearing as if perfoliate. Stem paniculately branched. — Dr. Kellogg's uncharacteristic name for this species refers only to the areolation of the septum of the silique. — California, on the Yuba River, Dr. Bigelow; and "the Copper region of the Sierra Nevada, Mr. C. D. Gibbs," Dr. Kellogg. The habitat is remote from that assigned for his *S. cordatus* by Nuttall, who, moreover, could never have omitted to notice the taper-pointed flower-buds and sepals, so conspicuous in Dr. Bigelow's specimens and Dr. Kellogg's figure. But I must remark that two specimens in Dr. Torrey's herbarium, collected in California by Mr. Gibbs (I presume the person who supplied Dr. Kellogg) have flowers with nearly obtuse buds and sepals, but in size and all other respects like the *S. tortuosus*. The "wing-margined seeds," noted by Dr. Kellogg, who alone has seen the fruit, should aid in distinguishing this species from the next

7. *S. BREWERI*, n. sp. (Gray in Proceed. Calif. Acad. ined.) Flowers purple, on very short ascending pedicels, the lowest often leafy\* bracted; the buds a quarter of an inch long, obtuse or barely acute; the sepals with scarious but recurved blunt tips. Siliques narrowly linear, ascending or erect, straight or slightly incurved (1 j - 2 j- inches long, less than a line wide), compressed, but torulose, the nerve of the valves obscure. Seeds wholly marginless. Glauous, annual, branched from near the base. Cauline leaves, except the lowest, strongly cordate-clasping with a closed sinus, entire or denticulate, the uppermost sagittate. California; collected in the State Geological Survey by Prof. William H. Brewer, at three stations, under the following forms: —

1st. In a dry ravine of Shasta Mountain, at the elevation of 8000 feet: a dwarf state, in flower only, a span high; the foliage resembling that of *Thlaspi perfoliatum*. 2d. On the Diablo Mountains, five degrees farther south, on the top of a dry mountain, alt. 3200 feet; in flower and fruit, 9 inches high. Flowers rather smaller, more numerous. Lower cauline leaves 2 inches long, very glaucous. 3d. On San Carlos, of the Mount Diablo range: in flower and fruit, with more naked and virgate branches, one or two feet high; the calyx hoary or downy, but otherwise the plant is quite glabrous and glaucous, as in the other forms.

•i- -i- Wholly glabrous and somewhat glaucous: cauline leaves not cordate nor auriculate at the base, entire or very obscurely toothed.\* Flowers violet-purple.

8. & *hyacinthoides*, Hook. Bot. Mag. t. 3516 ; Gray, Gen. 111. 2, t. 61. *S. glabrifolius*, Buckley in Proceed. Acad. Philad. Flowers in the virgate raceme spreading and soon pendulous, green and violet-purple; the calyx cylindraceous. Siliques erect-spreading (2-4 inches long, a line wide). Seeds with a narrow wing. Leaves linear-lanceolate and oblong-linear. — E. Texas and the adjacent part of Arkansas.

4- H- H- More or less furnished with bristly simple hairs: cauline leaves or some of them usually auriculate- or sagittate-clasping and lacinate-toothed. Flowers, at least the calyx, crimson-purple or red.

9. *S. GLANDULOSUS*, Hook. Ic. t. 40. Cauline leaves narrowly lanceolate and mostly sagittate-clasping, their sparse teeth with callos rather than glandular tips. The lax raceme with the pedicels and flowers glabrous or nearly so; calyx ovate. Siliques narrowly linear (2 or 3 inches long, less than a line wide), straight or curved, ascending. Immature seeds slightly wing-margined. The cauline leaves are commonly sagittate and the siliques glabrous. But Dr. Brewer has collected a form with the leaves slightly auricled at the base, and the siliques beset with a few bristles. — California.

10. *S. HETEROPHYLLUS*, Nutt. in Torr. & Gray, 1. c. Cauline leaves oblong and lanceolate and sagittate-clasping, mostly hispid. •Pedicels in the lax raceme spreading in flower, deflexed in fruit, commonly (as well as the calyx) more or less hispid. Siliques deflexed, straight, very narrowly linear, teretish-subtetragonal, 3 or 4 inches long\*

glabrous, tapering at the summit into a distinct style. Seeds wingless. In Nuttall's original specimens all but the lower pedicels and also the calyx are glabrous: in those of Coulter and of Xantus they are hispid, especially the pedicels. They have, in the fruit, a strongly 2-lobed stigma. In Nuttall's the stigma is only emarginate. — Southern part of California.

11. *S. HISPIDUS*, n. sp. (Gray in Proceed. Calif. Acad. ined.) Very dwarf (2 or 3 inches high, from an annual root), hispid throughout, even to the siliques. Leaves cuneate or obovate-oblong, coarsely toothed or incised, the cauline sessile, but hardly at all clasping. Raceme short and loosely flowered: pedicels spreading or at length recurved, but the linear compressed siliques (1½ inch long and a line wide) are erect. Stigma emarginate, almost sessile. Immature seeds winged. The flowers resemble those of the preceding species. The anthers are rather short for this genus, only linear-oblong, and blunt; but the longer filaments are connate. The whole body of the petal is a long, linear lamina, the base of which is contracted into a narrow claw. — California; on the dry summit of Monte Diablo, coll. William H. Brewer, California State Geological Survey.

4 Sparingly hirsute with simple hairs or nearly glabrous: cauline leaves not clasping nor auriculate at the base, the lower sinuate or pinnatifid and contracted at the base into a margined petiole. Flowers yellowish or greenish-white.

12. *S. PLAVESCENS*, Hook. Ic. t. 44. Flowers ascending: calyx cylindraceous. Siliques erect, glabrous or sparingly hairy, teretish, pointed with a distinct style. Seeds probably wingless. — California. A very large or luxuriant form of this was gathered at the coal-mine near Monte Diablo by Dr. Brewer, 2 or 3 feet high, the lower leaves runcinate,\*the "greenish-white" flowers half an inch long; siliques half-grown.

\* \* Flowers sessile or nearly so. Stem fistulous-inflated.

13. *S. CRASSICAULIS*, TOIT. in Stansbury, Rep. Salt Lake Exped. p. 384, 1.1. Leaves mostly radical, runcinate-pinnatifid. Calyx woolly. Petals dark purple. Silique unknown. — Utah.

#### *Doubtful Species.*

*S. REPANDUS*, Nutt. in Torr. & Gray. Fl. 1, p. 77, of the *Euclisia* section, from Santa Barbara, California, is known only from Nuttall's brief character.

2. *Species excluded from Streptanthus.*

*S. sagittatus*, Nutt. in Jour. Acad. Philad. 7, p. 12. The scanty original specimens of Wyeth are in flower only. The *S. sagittatus* of Hooker and Arnott, from the Snake Country (which is the suppl. to Fl. N. Amer. vol. 1, was referred to *S. angustifolius*, Nutt.) is apparently the same with smaller flowers. These specimens show a torulose terete silique and oblong seeds, in which the cotyledons probably are not truly accumbent. They are identical with *Pachypodium* (*Thelypodium*) *sagittatum*, Nutt. in Torr. & Gray, Fl.; and so, likewise, we may regard the larger-flowered specimens, until their fruit is known.

*S. angustifolius*, Nutt. in Torr. & Gray, Fl. 1. c. To this certain narrow-leaved and smaller-flowered forms of the preceding species have been subsequently referred. But Nuttall's specimens, on which the species was founded, belong to *Turritis patula*, Graham, which is as good an *Arabis* as need be, — therefore *Arabis patula*.

*S. angustifolius*, Gray in Proceed. Acad. Philad. March, 1863, p; 67, coll. Hall and Harbour, no. 35, is *Turritis brachycarpa*, Torr. & Gray, Fl., a short-fruited form of *T. stricta*, Graham, which is a true *Arabis*, — *A. Drummondii*.

*S. virgatus*, Nutt. in Torr. & Gray, Fl. 1. c, although not extant in any of our herbaria, I may rather confidently refer to *Arabis retrofracta*, Graham (*Turritis*, Hook, etc.), and *A. Hb'lbollii*, Hornem., probably the purple-red-flowered form which occurs west of the Rocky Mountains.

*S. arcuatus*, Nutt. 1. c, which Mr. Wallace and Dr. Brewer have also collected in California, is another genuine wing-seeded *Arabis*, — *A. arcuatus*.

These last, with *Arabis blepharophylla*, Hook, (of which the fruit is unknown), have short, oval or barely oblong anthers, and there is nothing in their flowers to associate them especially with *Streptanthus*.

*S. petiolaris*, Gray, PL Fendl. &c. (to which belongs *S. Brazoensis* of Buckley), having short anthers, &c, must be referred to the wing-seeded division of *Arabis*, — *A. petiolaris*.

*S. longifolius*, Benth. Pl. Hartw. and *S. micranthus*, Gray, Pl. Fendl. (which is perhaps a form of *S. longifolius*), with short anthers, very narrow siliques, and wingless seeds, may probably be referred to *Arabis*. But the valves are so carinate that the silique appears almost tetragonal.

*S. Knearifolius*, Gray, PL Fendl., has elongated acute anthers, in-

deed, and long-clawed petals; but, with its almost terete siliques, having an obscure stipe, and oblong seeds, it best accords with *Iodanthus*, Torr. & Gray, — which genus, again, is not well, if at all, to be distinguished from *Pachypodium*, Nutt. (*Thelypodium*, Endl.), and this name, though badly chosen, may have to be adopted. It would be better if we could settle upon the name of *Thelypodium*.

No. 684 (or 689 ?) of Coulter's Mexican collection, from Zimapan, appears to be a strict congener of *Iodanthus pinnatifidus*.

*A Revision and Arrangement (mainly by the fruit) of the  
North American Species of ASTRAGALUS and OXYTROPIS.*  
By ASA GRAY.

In view of the species known to him by the fruit, it was natural enough that Linnaeus should distinguish from *Astragalus* his genus *Phaca*. Being established, and augmented with a considerable number of species, it is not surprising that the two genera should still have been maintained long after the neat carpological character which alone distinguished them was found in some cases to fail. Perhaps there are not very many large genera in botany which do not at some point graduate into some other. But in the present case, — not to refer to the eminent unsafeness of all leguminous genera founded on the legume alone, and to the inutility of genera which are not recognizable by habit or floral structure, — it has now become evident that the distinction between *Phaca* and *Astragalus* breaks down so completely and so variously, that the two genera are, as I suppose, no longer tenable. Indeed, from analogous instances we might expect that the intrusion into the cell of one or the other suture, even when, as here, quite constant in species, would not of itself be of generic consequence. An obvious alternative to combining these two Linnaean genera is to proceed further in division, by taking the form and texture of the legume into generic account. The manifold diversity which the fruit exhibits, and also the vastness of the group, would\*invite to this course. But a study even of the North American species only — especially as here grouped mainly in reference to the fruit — demonstrates its impracticability. In place of two genera with outlines here and there blended, we should have twenty, most of them still less definable. A partial attempt of this kind, probably one of the best that could be made, was that of Nuttall, in proposing his two genera, *Homalobus* and *Kentro-*

*phyta*, upon flat-podded species of what would otherwise belong to *Phaca*, the single species of the latter and some species of the former being quite peculiar in habit. But intermediate forms connect the compressed with the turgid and inflated legumes.

Used for sectional groups, these minor carpological characters may be turned to good practical account; for it is no great objection to such natural groups, as it is to genera, that they blend through gradations or have occasional exceptions.

It is in the botany of this country that the question of the distinction between *Phaca* and *Astragalus* is most pressing, and where the *data* for the answer are most largely to be found. While extra-tropical\* Asia is the focus of true *Astragalus*, that of *Phaca* is in America, mainly in North America, with an extension along the Andes into South America. While the Flora of the Russian Empire enumerates 168 species of *Astragalus* (of which I suppose more than nine tenths are bilocellate or nearly so), and only six species of *Phaca*, I recognize in the following paper 66 species of the *Phaca* series to 52 of *Astragalus* proper. Moreover, rather less than half of the latter are completely bilocellate by a dorsal septum, and at least half a dozen, of different groups, have been or might be referred to *Phaca*. *A. aboriginum*, *A. Robinsii*, &c. are retained in the *Astragalus* series, on account of the vanishing rudiment of a dorsal septum; and *A. lotiflorus* chiefly, and *A. microlobus* entirely, because of their close affinity to cognate Astragaline species; while, on the other hand, *A. Cooperi* and *A. Bechvithii*, associated with their natural allies among the *Phacae*, might technically be about as well placed in the other series.

I cannot avoid the conclusion that *Phaca* must be merged in *Astragalus*. Also, — since in perhaps the majority of the *Phacae* there is no intrusion nor peculiar tumidity of the seminiferous suture, — that the subtribe *Astragalece* of De Candolle has no valid foundation, so that *Astragalus* is merely a genus of the *Galegece*.

The combination of *Phaca* with *Astragalus* at once leads us to consider the case of *Oxytropis*. \* This is a genus founded by De Candolle upon Linnsean species of *Astragalus*, and now pretty numerous in species. It is characterized by having, along with the legume of *Phaca*, carried sometimes to an extreme (that is, with the ventral suture septiferous), a beak-like acumination or cusp at the apex of the carina of the corolla, — whence the generic name. Thus *Oxytropis*, strictly considered, would now appear to rest upon this cusp or tip alone.



This tip, moreover, while sometimes conspicuously prominent, is obsolete or barely perceptible in one or more species of every group the genus comprises. We have in North America only 8 species of *Oxytropis*, all northern or montane ; and Europe has about as many ; but the Flora of the Russian Empire boasts of sixty-one species. Ought *Oxytropis* to be retained as a genus ? On the one hand there is a general congruity of the species in habit; on the other, *O. Lapponica*, with the technical generic character almost obliterated, and others of that group, very closely resemble species of *Astragalus* with which they are geographically associated. Moreover, the technical generic character is of no such value in *Indigofera*.

Probably the best support of the genus, notwithstanding the reduction of *Phaca* to *Astragalus*, has been the constant coincidence of the pointed keel of the corolla with the introflexion of the ventral suture ; in other words/that no *Astragali*, in the strict sense, are known with a pointed keel. There are, however, among American species some *Astragali* and *Phacæ* with the keel either considerably attenuated upwards or acutish. And at length we have one from Arizona, described at the end of the genus, under the name of *A. nothoxys*, which, along with the habit and the dorsally bilocellate legume of a true *Astragalus*, has in the corolla a sharply acuminate keel! Still, although *Oxytropis* could hardly be more completely invalidated than by this discovery, I think it probable that it may still be kept up, on the ground of general convenience.

If *Phaca* must needs be merged in *Astragalus*, it is obviously desirable that the change should be made as soon as possible, and the requisite alterations in nomenclature effected. Moreover, our species greatly needed revision, and reduction to some systematic arrangement. In this view, having obtained from their obliging proprietors the important materials in the herbaria of Dr. Torrey, Mr. Durand, and of the Philadelphia Academy (containing the types of most of Nuttall's species), and collated them with those of my own herbarium, I have devoted much time to the study of these plants; and the result is herewith presented.

The general order is from the completely bilocellate legumes, through the imperfectly bilocellate, to the strictly unilocular species; with no attempt (which would be hopeless) to dispose the groups in any natural series. When brought into proper form for a systematic work, the groups themselves would be considerably condensed, reduced, or subordinated.

**1. ASTRAGALUS, *Tourn.*****• CLAVIS.**

- I-i II. Corolla carina obtusa. Sp. legitimi, **1-108.**
- III. Corollae carina acutissime acuminata. Legumen Astragalorum typicorum. Sp. anomala, 109.
- I. Legumen sutura dorsali intrusa vel impressa bilocellatum aut subseptatum, sutura ventrali in unilocularibus nullo modo seu minus quam dorsalis intrusa. ASTRAGALUS, L., DC. Sp. 1 - 52.
- Legumen septo completo bilocellatum, didymum, locellis 1 -2-ovulatis. § 8.
- Legumen septo completo bilocellatum breve, locellis 3 - 4-ovulatis, estipitatum, Ovato-trigonum, crasso-coriaceum, dorso profundissime sulcatum bipartitum. Flores parvi, albo-violacei: carina corollae falcato-attenuata. § 7.
- Turgido-ovatum, tenui-coriaceum, sulco levi. Flores parvuli, flaviduli. § 3.
- Legumen septo completo manifesto bilocellatum, locellis 5-multi-ovulatis, haud (in sp. no. 14 brevissime) stipitatum.
- Crasso-succulentum, exsiccatum parietibus medullosis. § 1.
- Membranaceum, vesicario-inflatum, septo versus medium seminifero. § 2.
- Coriaceum vel subcartilagineum.
- Oblongum, teres, dorso anticeque subsulcatum. Subcaulis, villo sericeo molissimo splendentes: flores speciosi. § 4.
- Oblongum, teres, nee antice vix postice sulcatum. Elati, glabelli; flores haud amoeni. § 5.
- Oblongum, ovatum seu lineare, postice bicarinatum vel profunde sulcatum, sectione transversali obcordata vel e dorso biloba vel Y-formi.
- Stipulae adversus folium pi. m. connate. Flores spicati vel capitati, medioeres. Legumen oblongum, compresso-trigonum, pubescens seu **villosum**. § 6.
- Stipulae discrete.
- Flores parvi seu parvuli; calycis tubo brevi. § 9.
- Flores majusculi; calycis tubo cylindrico. Legumen lineari-elongatum, glaberrimum. § 10.
- Legumen septo incomplete) seu nullo uniloculare, sub-bilocellatum, vel sutura dorsali ventralem attingente interstinctum quasi bilocellatum, Stipitatum. § 11, et pro pane § 14.
- Estipitatum.
- Stipulae omnes alte. folium adversus connate. § 12.
- Stipulae praeter inferiores discrete liberae.
- Legumen 6 - 7-ovulatum floresque (purpurei) minimi. § 13.
- Legumen pluri-ovulatum, sat magnum, raro parvulum, Vix ac ne vix obcompressum: calyx brevis.
- Flores albi, violacei, seu purpurei. § 14.
- Flores flavidi. Calycis dentes elongati. § 15.
- Maturitate obcompressum, suturis approximatis. Calycis dentes tubo sessilissime oblongo vel cylindrico breviores. Plantae albo-sericeae vel canescentes: flores violacei seu purpurascens. § 16.

II. Legumen sutura dorsali haud vel minus quam ventralis intrusa seu impresaa plane uniloculare. PHACA, L., DC. Sp. 53-108.

1. Pinnatifolii, rarius abortu paucifoliolati seu aphylli, quandoque simplicifolii. Sp. 53-106.

Legumen lanosissimum, coriaceum. Herbs lanuginosse. (17.

Legamen glabrum, inflatum, majusculum, sutura ventrali manifeste intrusa. § 18.

Legumen glabrum vel pubescens (nunquam sub lana longa occultum), sutura neutra intrusa, ventrali nunc intus prominula,

Membranaceum, inflatum, nee compressum,

Vesicarium, magnum seu majusculum, ssepe stipitatum. § 19.

Vesicarium, subglobosum, parvum, haud stipitatum. 4 21.

Elongato-cylindricum, stipitatum. § 20.

Coriaceum, antice concavum sutura cariniformi percursum, stipitatum. § 22.

Cartilagineum, breve, teres, haud stipitatum, suturis utrisque crassis extus prominentibus.

Flores subpollicares, albi. Foliola persistentia. § 23.

Flores purpurei leguminaque minimi. § 13, pro parte.

Coriaceum, ovatum, oblongum, raro cylindricum, vix ac ne vix compressum, soepius estipitatum. § 24: Cf. § 15 (sp. 46).

Crasso-cartilagineum, compressum, exserte stipitatum, incurvum, suturis validis marginatum. § 25.

Coriaceum vel chartaceum, compressum, rectum seu rectiusculum, suturis nerviformibus marginatum. § 26.

2. Quasi palmatim trifoliolati. Legumen conico-ovatum, parvum, calyce subinclusum. § 27.

Species ignotte ad calcem.

Series I. Legumen sutura dorsali seu inferiori (carinali) intrusa aut subseptatum aut bilocellatum. (In unilocularibus sutura ventralis neutquam aut minus quam dorsalis intus tumida vel induplicata.)  
ASTRAGALUS, L., DC.

§ 1. *Sarcocarpi*, Legumen pruniforme succulentum (exsiccatum parietibus crassis medullosis), indehiscens, in calyce haud stipitatum, septo completo bilocellatum. Radix perennis. Caules foliosi humiles. Stipulae discrete fere liberae. Racemi spiciformes breves.

Ovarium et legumen glaberrima.

1. A. CARYOCARPUS, Ker. Bot. Reg. t. 176; Gray, PL Wright. 1, p. 51 (ubi syn.). *A. carnosus*, Nutt. Gen. (non Pursh, nisi fruct.) *A. succulentisj* Richards.; Lindl. Bot. Reg. t. 1324. *A. pachycarpus*, Torr. & Gray, Fl. 1. p. 332. Pube appressa subcinereus; floribus violaceis; legumine globoso vel ovato plerumque apiculato percrasso.—

Saskatchewan to Texas. *A. pachycarpus*, known only from a single specimen, seems to be only a depauperate state of *A. caryocarpus*.

2. *A. MEXICANUS*, A. DC, PI. Hort. Genev. 5, p. 7, t. 3. *A. trickocalyx*, Nutt. in Torr. & Gray, Fl. 1, p. 332. Viridior, altior, minus pubescens; floribus albis vel ochroleucis apice purpureo seu violaceo pi. m. tinctis; calyce pube molli brevi albo-villoso vel tomentoso; legumine ovato-globoso vix apiculato. — Plains from the Mississippi River at St. Louis to S. Texas and to the base of the Rocky Mountains. — As this has not yet been found even on the Mexican side of the Rio Grande, the older name of *Mexicanus* should perhaps give way to Nuttall's good name of *trickocalyx*. Some of the Texan forms especially, with less hairy calyx, run much too close to the foregoing species; but, on the whole, this pale-flowered and coarser fleshy-fruited *Astragalus* seems to hold distinct

\* \* Ovarium cano-hirsutum: legumen vetustate nunc glabratum.

3. *A. PLATTENSIS*, Nutt. in Torr. & Gray, l. c. *A. caryocarpus*, Torr. in Ann. Lye. N. Y. Laxe villosum; stipulis majusculis; floribus ochroleucis nunc apice purpureo tinctis; legumine ovato acuminato. — Nebraska to Texas.

Var. TENNESSEENSIS. *A. Tennesseeensis*, Gray in Chapm. S. Flora. *A. Plattensis*, Gray, Man. addend. 1863, p. 91. Legumen oblongum, subcurvatum. — Prairies of Illinois, and Nashville, Tennessee, to N. W. Alabama.

§ 2. *DiphysL* Legumen ovatum vel globosum, membranaceum, vesicario-inflatum, fere glabrum, estipitatum, suturis utrisque introflexis pi. m. didymum complete bilocellatum; septo versus medium seminifero; loculis polyspermis. — Multicaules e radice perenni, pube brevi vel subnulla; stipulis discretis petiolo subadnatis. Flores parvuli, albi vel cyanei, spicati vel subcapitati.

Humiles, glabri vel glabelli; racemis capituliformibus densifloris.  
Legumen vesicario-ovatum, acuminatum,

4. *A. DIPHYSUS*, Gray, PI. Fendl. p. 34. Subglaber; foliolis 9-11-jugis confertis carnosulis oblongis; calycis tubo cylindraco dentibus subulatis duplo longiori; legumine glaberrimo acumine incurvo. — New Mexico, and probably in Utah. Flowers blue or purple, occasionally white. Legume half an inch or more in diameter, grooved down both sides.

5. *A. LENTIGINOSUS*, Dougl. in Hook. Fl. Bor. Am. Hirsutulus; foliolis 8-9-jugis obovatis; calycis tubo campanulato dentibus vix longiori; legumine puberulo demum glabro arcuatim incurvo. — Interior of Oregon and Washington Territory. — Flowers known only from specimens collected in Wilkes's Exploring Expedition near Fort Okanagan. They are much smaller than those of the preceding species, only 4 lines long; the corolla apparently white or purplish. Legumes very much like those of *A. diphysus*, but more incurved, and less sulcate down the outer or dorsal side. It is only in Douglas's specimens that they have been found mottled or freckled.

\* \* *Elatior, cinereus* ; *spicis laxifloris*. Legumen *globoso-didymum*.

6. *A. FREMONTII*, Torr. & Gray, Bot. Whipl. Exped. (Pacif. R. R. Surv. 4), p. 24 (80), excl. var.! Pilis appressis cinereus ; caule ultrapedali parcius folioso ; foliolis 5 - 6-jugis ovalibus obovatisve retusis; floribus in spica laxiuscula subsessilibus "purpureis" (lin. 4 longis) patentibus; calycis dentibus tubo longiuscule campanulato brevioribus ; legumine glabro globoso apice brevissimo subincurvo postice paullo antice profunde sulcato didymo. — Banks of the Rio Virgen, in the desert of Nevada, between California and New Mexico, Fremont, who alone has met with it. For the specimens referred to this in Dr. Bigelow's collection are probably different. Legume half an inch in diameter, the apex inconspicuous at maturity, although in the forming fruit there is a broad and more manifest acumination. The two sutures meet and unite in the very middle of the cell.

§ 3. *Chatodontes*. Legumen ovatum, parvum, flore haud longius, estipitatum, coriaceum, turgidum, nunc compressiusculum, postice pi. m. sulcatum, septo completo bilocellatum, locellis 3 - 4-ovulatis. — E radice perenni multicaules, foliosi, undique villo sericeo albicantes; foliolis angustis saepius acutis. Flores spicati, parvuli, ut videtur flaviduli, patentibus; tubo calycis brevi, dentibus setaceis elongatis corolla parum brevioribus. Stipulas libenc, subdiscretas, subulatre.

7. *A. CHJETODON*, Torr. in Bot. Wilkes Expl. Exped. ined. Pedalis; pube villosa; foliolis 10-12-jugis lanceolatis seu oblongo-linearibus (3-6 lin. longis) ; pedunculis folia superantibus; spica oblonga densa nunc basi interrupta laxiuscula; calyce villosissimo, dentibus tubo longioribus; legumine villosa postice vix sulcato. — Plains on the Kooskooskie River, interior of Washington Territory, Rev. Mr.

Spalding, Dr. Pickering. — Flowers nearly 5 lines long. Bracts setaceous. Legume 2£ or scarcely three lines long, apiculate, under the wool transversely veined, maturing one or two seeds in each cell.

8. A. LYALLI, sp. nov. Albo-sericeus; spica brevius pedunculata elongata laxiflora; floribus parvis (lin. 3 longis) ; calyce villosa, dentibus tubo aequilongis; legumine incano postice profundius sulcato: caet. praecedentis. — Upper Yakima River, on the boundary between British Columbia and Washington Territory, Dr. Lyall (no. 8, ex herb. Kew.). — Appears different enough from the preceding by the more silky pubescence, and the loosely-spiked flowers of only half the size.

§ 4. *Mottissimi*. \* Legumen cartilagineum vel coriaceum, estipitatum, oblongum, turgidum, nee compressum nee obcompressum, ad suturas utrasque pi. m. sulcatum, septo perfecto bilocellatum, demum incurvum.—E caudice perenni subacaules, villo sericeo molli (saepius fulvo vel aurato) splendentes; pedunculis scapiformibus elongatis. Spicae densiflorae. Flores inter majores, violacei; calyce tubuloso.

9. A. MOLLISSIMUS. Torr. in Ann. Lye. N. Y. 2, p. 178. Legumen angusto-oblongum, cartilagineum (5-9 lin. longum), glaberrimum, su-

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\* The materials in our herbaria are too scanty to justify me in meddling with the *Astragali* of the region contiguous to the United States on the south. But there are two very well-marked Mexican species which may be noticed here, viz. *Phaca mollis*, H.B.K., and a new species allied to it. If not referable to the present group,—with some extension of the character as to the legume, making less account of the inflexion of the dorsal suture,—they will constitute a strictly analogous group. The species are: —

A. HUMBOLDTII. *Phaca mollis*, H.B.K. Nov. Gen. & Sp. 6, p. 496, t. 585. Brevicaulis, fulvo-sericeus; foliolis oblongis (lin. 4-6 longis); spicis oblongis; floribus mediocribus (lin. 8-9 longis) "albis seu violaceis" (ex Kunth); vexillo superne recurvo-patente; alis angustis rectis carinam subfalcata longius superantibus; ovario sericeo suturis haud introflexis.—The specimens examined were collected near the city of Mexico, by Dr. Halstead (herb. Torr.), in flower. The legume is still unknown. Instead of the "alae . . . . nee adherentia" of Kunth, I find that the wing and keel petals on each side hook into each other neatly, as in other species.

A. ORTHANTHUS, sp. nov. Brevicaulis, velutino-tomentosus; foliolis ovalibus (6-8 lin. longis); spicis capituliformibus; floribus elongatis (ultrapollicaribus); corolla ut videtur rubro-purpurea recta, vexillo spatulato conduplicato, alis lanceolatis carina haud incurva parum longioribus; legumine ovato tumido obcompressa coriaceo velutino sutura dorsali scptifera fere bilocellata.—Mexico, near Perote, on sandy hillsides, Dr. Halstead, in herb. Torr. — Leaves and peduncles about 9 inches long. Immature legumes nearly an inch in length. The shape of the flower, with its narrow and strict petals, is remarkable.

turis utrisque sulcatis subdidymum. Ovarium etiam glaberrimum. — Plains of Nebraska to the western borders of Texas.

10. *A. BIGELOVII*, Gray, PL Wright. 2, p. 42. Legumen coriaceum, magis turgidum, ovali-oblongum (semipollicare), dense lanosum, suturis parum sulcatis. — Western borders of Texas, New Mexico, and near Chihuahua. — Nearly resembles the foregoing, except in the ovary and the legume.

§ 5. *Uliginosù* Legumen coriaceum, turgidum, oblongum, teres, nee antice vix postice sulcatum, septo perfecto bilocellatum, fere rectum, estipitatum. — E radice perenni elati (sesqui - tripedales), pube adpressa subcinerei vel glabrati. Spicae densiflorae. Flores viridulo-albidi vel ochroleuci, nunc purpureo lurido tincti, per anthesin patentissimi seu deflexi, sed legumina (semipollicaria) in spicam confertam arrecta. Stipuke a petiolo liberae, nunc discrete, nunc in eadem stirpe ad versus folium coadunatae.

[*A. ULIGINOSUS*, L. Bracteis ovato-lanceolatis longe acuminatis calycem superantibus, et legumine postice longitudinaliter impresso (vix canaliculato) a *Canadensi* differt. — This Eastern Siberian species was recognized by Pallas as a form or analogue of the following.]

11. *A. CANADENSIS*, (Tourn.) L. *A. Carolinianus*, L. *A. orthocarpus*, Dougl. in herb. Hort. Soc. Elatus; bracteis subulatis calyce brevioribus; ovario glaberrimo; leguminis sutura dorsali haud impressa, ventrali prominente costaeformi. — Canada and Saskatchewan to Louisiana and the interior of Oregon. Occurs with short and also with longer and slender calyx-teeth, the former chiefly eastward.

12. *A. MORTONI*, Nutt. in Jour. Acad. Philad. 7, p. 19. *A. spicatus* *Sf* (ex char.) *A. tristis*, Nutt. in Ton\*. & Gray, Fl. Minus altus; bracteis ovatis vel lanceolatis calyce brevioribus; ovario pubescente; legumine (*A. spicati*, Nutt.), pube tenui excepto, *A. Canadensi* similimo. — Rocky Mountains, Wyeth, Nuttall. Of *A. Mortoni* we have in herbaria only one or two incomplete flowering specimens; of *A. spicatum* a fruiting specimen, apparently of the same species. Except for the cinereous-pubescent ovary and legume I should refer them probably to *A. Canadensis*.

§ 6. *Onobrychides*. Legumen coriaceum, oblongum seu ovatum, rectum, soepius pi. m. compresso- vel obcompresso-trigonum, semper\* postice sulcatum vel exaratum (sectione transversali obcordata vel e dorso biloba), sutura intrusa bilocellatum, pubescens, locellis

pluriovulatis. — Caulescentes e radice perenni, cinereo-pilosuli vel glabelli, adsurgentes vel decumbentes. Stipulas adversus folium pi. m. coadunatae. Spicae seu capitula densiflorae. Flores mecliores, saepissime violacei seu purpureae, semper leguminaque adscendentes vel arrecti.

13. *A. ADSURGENS*, Fall. Astrag. t. 31. *A. Laxmanni*, Jacq. Hort. Vind. 3, t. 37; Pall. Astrag. t. 30 : forma pallidiflora. *A. striatus*, Nutt. in Torr. & Gray, Fl. 1, p. 330. Spithamaeus ad sesquipedalem, pube adpressa minuta subcinereus, vel glabratus viridis; caulibus subvalidis; stipulis scariosis basi plerumque concretis; spica demum oblonga vel cylindracea; leguminibus ovato-oblongis haud stipitatis, pube brevi adpressa. — Plains of Nebraska to the interior of Oregon and throughout the Saskatchewan region. (Also Siberia.) The Russian botanists recognize a white-haired as well as dark-haired calyx in *A. adsurgens*. A white-haired form, with a rather shorter calyx-tube, a very dense spike, and more nearly erect and rigid stems, which abounds on the plains of Nebraska, is Hooker's var. *robustior* (*A. nitidus* Dougl. ined.), and is *A. striatus*, Nutt., or rather Nuttall's specimens are intermediate between this and the laxer form, with longer and partly dark-haired calyx: this particularly well accords with Pallas's original figure and description.

14. *A. HYPOGLOTTIS*, L.; DC. Astrag. t. 14. *A. arenarius*, Pall. Astrag. t. 34. *A. dasyglottis*, Fisch. *A. goniatus*, Nutt. in Torr. & Gray, Fl. Humilis, gracilior, diffusoprocumbens, pube laxiore; stipulis subfoliaceis concretis; capitulo plurifloro; leguminibus ovato-trigonis albo-villosis brevissime stipitatis oligo-(2-8-)spermis. — Upper plains of Nebraska, Rocky Mountains, and northward. (Siberia, Europe.)

§ 7. *Reflexi*, Legumen crasso-coriaceum, estipitatum, ovato-trigonum, postice profundissime sulcatum (sulco angusto marginibus rugulosis), bilocellatum, sectione transversali obcordato-biloba, locellis 3-4-ovulatis. Carina corollae falcata, sursum attenuata, vexillura angustum subssquans, alas sublonge superans! — Caules graciles e radice annua, piloso-pubescentes; foliolis emarginatis. Flores parvi, brevissime pedicellati, pauciusculi, subcapitati, albo-violacei, patentes: legumina deflexa.

15. *A. REFLEXUS*, Torr. & Gray, Fl. 1, p. 334. — Texas. Known only from Drummond's specimens, Buckley's *A. Brazoensis*, which I had too hastily referred here, being different. Flowers scarcely 3 lines





long. Legumes 4 lines long, glabrous, the pericarp thickened on the back each side of the deep groove.

§ 8. *Didymocarpis*. Legumen tenuiter coriaceum, obcompresso-didymum, transversim costato-rugosum vel reticulatum, septo angusto bilocellatum, maturitate in cocca dua intus rima hiascentia mono-disperma (nunquam ultra biovulata) secedentia. Ovarium breviter stipitatum. — Caulescentes e radice annua, parvuli, parce pubescentes; stipuli 3 discretis fere liberis; foliolis emarginatis. Spies breves densiflorae. Flores parvi, violacei, nunc fere albi, carina apice arete inflexa. Legumina saepissime deflexa.

16. A. DIDTMOCARPUS, Hook. & Arn. Bot. Beech, p. 334, t. 81. *A. Catalinensis* *fy* *A. nigrescens* (§ *Microlobium*), Nutt. PL Gamb., in Jour. Acad. Philad. n. ser. 1, p. 152. Triuncialis ad pedalem; floribus sessilibus in capitulo vel spica demum cylindracea; legumine didymo parvo valde rugoso (cinereo-hirsutulo scabro vel demum glabro) in calyce brevissime stipitato, locellis uni-ovulatis semine solitario fere repletis. — California. Occurs under a variety of forms, of which Dr. Brewer, of the Geological Survey of that State, has recently collected an instructive series. Ovary truly stipitate; but the stipe of the legume is very short and occult.

17. A. BRAZOENSIS, Buckley in Proceed. Acad. Philad. Dec. 1861, p. 452. Annuus? spithamaeus; floribus brevissime pedicellatis laxiusculis; legumine maturo valde obcompresso fere scutelliformi incurvo glabro transversim nervoso versus margines reticulato, stipite e calyce exserto, locellis biovulatis plerumque monospermis. — W. Texas, Buckley. Valley of the Nueces, Major G. H. Thomas, in herb. Torr. — In a notice of Mr. Buckley's Texan plants, contributed to the Proceedings of the Philadelphia Academy, April, 1862, I wrongly referred Mr. Buckley's very imperfect specimens of this plant to the little known *A. rejlexus*, Torr. & Gray. But the good specimens, with mature fruit, which I now find in Dr. Torrey's herbarium, collected by Major Thomas, show that the species is wholly distinct, and is really allied to *A. didymocarpiis*, as its propounder supposed. The disciform and somewhat acetabuliform legume is a quarter of an inch in diameter; its stipe about the length of the calyx.

§ 9. *Micranthū*. Legumen coriaceum, oblongum, lanceolatum, seu lineare, rectum vel curvatum, baud stipitatum, postice sulcatum, sutura dorsali intrusa ventralem extus prominulam attingente bi-

locellatum, locellis multiovulatis. — Caulescentes, humiles vel graciles e radice plerumque annua. Stipulso discretse fere liberae. Flores parvi seu parvuli, violacea seu albida, carina apice incurva vel obtusissima; calycis tubo brevi. (Species inter se diversae.)

\* Flores numerosi, dense spicati, per anthesin leguminaque deflexi: pedunculi elongati. Pedales et ultrapedales, strigoso-puberuli.

18. A. VACCARUM, Gray, PL Wright. 2, p. 43. Cinereo-puberulus; radice perenni; calycis dentibus tubo asquilongis; corolla incurva (alba seu albida nunc post anthesin purpurea); leguminibus lanceolato-oblongis arcuatis hirsutulis, sectione transversali late obcordata.— Arizona.

19. A. HARTWEGI, Benth. PL Hartw. p. 10; Torr. Bot. Mex. Bound, p. 56. Viridior; calycis dentibus tubo brevioribus; corolla fere recta. — Arizona and Mexico. — Legume unknown, but from the enlarging ovary apparently like that of *A. vaccarum*, which may pass into this.

\* \* Flores pauciusculi in racemo laxo, per anthesin leguminaque penduli. Humiles, glabelli.

20. A. COBRENSIS, Gray, PL Wright. p. 43. Diffusus; foliolis retusis; pedicellis tubo calycis vix brevioribus; corolla purpurascens; leguminibus obcompressis-oblongis rectis dorso late concavis sub-cymbaeformibus. — New Mexico. Ovary short-stipitate, but the legume sessile in the calyx.

\* \* \* Flores pauci capitati, cum leguminibus oblongis erecti. Corolla dentes calycis tubo multo longiores subulato-lineares baud supcrans. Humiles e radice annua, villosa-hirsuti.

21. A. WRIGHTII, Gray, PL Lindh. 2, p. 176, & PL Wright. 1, p. 51. Legumen rectum, subcompressum, bicarinatum, acutum, calyce dimidio longius; stylo perbrevis. — Texas. — Very unlike any other of our species.

\* \* \* \* Flores pauci subcapitati, nunc subsolitarii, parvuli, carina vexillo valde breviori apice inflexa paullo producta. Legumen lineare, subcompressum, dorso bicarinatum. Humiles e radice annua, diffusi; foliolis plerumque retusis.

22. A. NUTTALLIANUS, DC. Prodr. 2, p. 289. *A. micranthus*, Nutt., non Desv. Glabellus vel cinereo-pubescent; leguminibus juxta basin sursum incurvatis reticulatis aut glabris aut (var. *trichocarpus*,

etc.) cinereo-hirsutulis. — Arkansas and Texas to Arizona. Flowers varying from violet-purple to whitish.

23. *A. LEPTOCARPUS*, Torr. & Gray, PL 1, p. 334. Subglaber; leguminibus rectis patentibus minus reticulatis glabris. — Arkansas and Texas. — Corolla 4 or 5 lines long, curved, violet or violet-tipped, the keel produced into a narrower apex. Legume an inch long, thin-walled.

§ 10. *Succumbentes*. Legumen chartaceo-coriaceum, haud stipitatum, lineari-elongatum, valde compressum, sursum falcatum, dorso bica-rinatum sulco profundo, sutura intrusa ventralem extus prominulam acutam attingente bilocellatum, sectione transversali Y-formi. — Caules humiles, diffusi, flexuosi; pedunculis brevibus; stipulis discretis liberis. Flores majusculi, laxiuscule subcapitati, pur-purascentes; calyce cylindrico.

24. *A. SUCCUMBENS*, Dougl. in Hook. Fl. Bor.-Am. 1, p. 151. Cinereo-hirsutus; foliolis obovatis; leguminibus arrectis nitidis eximie reticulatis rete transversa. — Interior of Oregon, on barren grounds of the Columbia and Wallawallah. — Flowers narrow, three fourths of an inch long. Legumes from one to two inches long.

§ 11. *Galegiformes*. Legumen stipitatum e calyce exsertum, cum flore pendulum, coriaceo- vel cartilagineo-chartaceum, rectum, pi. m. trigonum, in nostris angustum, postice maxime sulcatum, sutura dorsali intrusa semi- vel fere bilocellatum. — Caules foliosissimi, e radice perenni erecti, validi, sulcati; stipulis discretis liberis. Racemi elongati confertiflori. Flores majusculi, albi vel ochroleuci (carina tantum purpureo tincta).

\* Calyx basi vix gibbosus, nigricanti-pilosus.

25. *A. DRUMMONDII*, Dougl. in Hook. PL Bor.-Am. 1, p. 153, t. 57. Molliter villosus, albiflorus; calycis dentibus subulatis tubo brevioribus; legumine glaberrimo lineari-elongato tereti-biventricoso, sulco angusto profundissimo, sectione transversali obcordato-biloba, stipite calycis dentes superante. — Saskatchewan or Hudson's Bay to Nebraska and the Rocky Mountains. — Legume completely or incompletely divided by the intrusion of the dorsal suture.

\* \* Calyx basi valde gibbosus.

26. *A. RACEMOSUS*, Pursh, Fl. 2, p. 740. *A. galegoides*, Nutt. Gen. Appresse pubescens, glabratus, albiflorus; calycis albido-puberuli dentibus setaceis tubo paullo brevioribus stipitem adaequantibus; legumine glaberrimo lanceolato-oblongo triquetro. — Plains of Nebraska

and Idaho to the Rocky Mountains. — Legume not divided internally into two cells, but the cross section somewhat equally triradiate or Y-shaped.

27. *A. CYRTOIDES*, sp. nov. Molliter pubescens; stipulis parvis; foliolis 7 - 10-jugis lineari-oblongis supra glabris; pedunculis folia longe superantibus; racemo spiciformi; floribus in pedicello brevi suberecto resupinato-pendulis; calycis tomentulosi dentibus subulatis tubo oblongo 3 - 4-plo brevioribus; corolla ut videtur ochroleuca calyce vix duplo longiore; ovario stipitato lineari cinereo-pubescente. — Clear Water River, interior of Oregon (now in Washington Territory), in rich land on hillsides, April 14, Rev. Mr. Spalding. — This we have long had in the herbarium; but the legume is still unknown. Its near relationship to *A. racemosus* is manifest. Its calyx is still more gibbous at the insertion and bossed on the upper side, like that of a *Cuphea*. Corolla from half to two thirds of an inch long, less exerted from the calyx than in allied\* species.

§ 12. *Ocreati*. Legumen estipitatum, coriaceum, obcompressum vel obcompresso-trigonum, sutura dorsali impressa ventrali approximata pi. m. interstinctum, haud bilocellatum. Humiles vel humifusi e radice perenni, pilis incumbentibus canescentes vel strigosi. Stipulae a petiolo liberse, inter se ad versus folium alte connatse. Flores spicati, vix mediocres; calycis tubo saepius campanulato.

\* Flores saturate flavi. Stipulae in ocream obliquam petioli basin caulemque vaginantem coalitae.

28. *A. FLAVUS*, Nutt. in Torr. & Gray, Fl. 1, p. 335. Multicaulis, diffusus, pube tenui canescens; foliolis linearibus subacutis; legumine parvo (4 lin. longo) calyce semi-incluso canescente ovato recto utrinsecus impresso, loculo suturis approximatis longitudinaliter strangulato. — Rocky Mountains, about lat. 41°; found only by Nuttall.

\* \* Flores purpurei, patentes. Stipulae vix vaginantes.

29. *A. HUMISTRATUS*, Gray, Pl. Wright. 2, p. 43. Strigoso-pilosus, subglabratus; caulibus plurimis e radice perenni procumbentibus elongandis; foliolis lanceolatis seu lineari-oblongis acutis; calycis dentibus tubo longioribus; vexillo albo-purpureo et lineato; carina apice angustato producto inflexa; legumine oblongo-lineari arcuato pubescente obcompresso-trigono, sutura dorsali intrusa ventralem extus prominentem carinatam haud attingente. — New Mexico and Arizona.

\* \* \* Flores majusculi ochroleuci ? Stipulae vix vaginantes.

30. A. OREGANUS, Nutt. 1. c. Nanus, hirsutulo-canescens; foliolis obovatis emarginatis; floribus in pedunculo brevi spicato-capitato; calyce cylindraceo tubo dentibus bis longiori; ovario fere semi-bilocellato. — Western slope of the Rocky Mountains, collected only by Nuttall, without fruit. Arranged among ochroleucous species in the Flora of North America; but the color of the corolla is not recorded, nor can it be determined from the only specimen I have seen, that in herb. Torrey. The stipules, at least the lower ones, are connate almost to the top.

§ 13. *Microlobi*. Legumen minimum (lin. 2 — 3 longum), estipitatum, coriaceum seu cartilagineum, 6 - 7-ovulatum, elliptico-ovatum, aut fere teres postice vix complanatum, aut postice late concavum, semper uniloculare, sutura neutra introflexa, ventrali costiformi crassa extus prominente. — Subcinerei: caules erecti vel adscendentes e radice perenni, graciles, rigiduli; foliolis 5-8-jugie linearibus. Stipulse inferiores subconnatae, caeterae discrete. Racemi spiciformes, multiflori, virgati. Flores parvi, purpurei, per anthesin recurvo-patentes; calyce brevi, dentibus abbreviatis.

Here are two closely allied species which have been confounded, and indeed are not readily distinguished without the fruit; one of which, by the strong concavity of the dorsal face of the legume, would be looked for in *Astragalus proper*, while the other, wanting this concavity, is referable to *Phaca*, where it would be sought among the *Scytocarp*.

31. A. GRACILIS, Nutt. in Fras. Cat., & Gen. 2, p. 100. *A. parvifolius*, Nutt. in herb. Acad. Philad. *Dalea parviflora*, Pursh, Fl. 2, p. 474. Caulibus virgatis (ultrapedalibus e radice praelonga dulci); foliolis angustissime linearibus fere filiformibus obtusis retusisve (lin. 7-10 longis); racemis longe pedunculatis elongatis densifloris; floribus pallide purpureis albidisve (lin. 3 longis); leguminibus patentibus coriaceis dorso impresso quasi cymbiformibus canescenti-pilosis demum glabellis transversim rugoso-venosis, sutura ventrali subacuta. — Plains of Nebraska and Missouri to the Rocky Mountains. — This and the following species may have been confounded from the first. Except as to the fruit, Nuttall's original description would as well or better apply to *A. microlobus*; but the original specimens preserved are of the plant here retained as *A. gracilis*. From his tickets it appears that he more recently noticed that there were two species; but the fruit of the second species, which confirms the distinc-

tion, was first brought to light in Hall and Harbour's recent collection, no. 119.

32. *A. MICROLOBUS.* *A. gracilis*, Torr. in Ann. Lye. New York, 2, p. 179 ; Nutt. in herb. Acad. & herb. Torr. 1838; Gray in coll. Parry, no. 189, & coll. Hall & Harbour, no. 119. Caulibus subpedalibus diffusis; foliolis linearibus seu oblongo-linearibus emarginatis (lin. 4 - 6 longis) ; racemis breviusculis ssepius laxifloris; floribus saturate purpureis (lin. 4 longis) ; leguminibus reflexis crasso-cartilagineis puberulis tenuiter rugulosis turgidis, dorso tantum planiusculo, sutura ventrali percasso. — Plains of Nebraska, &c, to the Rocky Mountains. — By the above characters flowering specimens of this may be distinguished from the original *A. gracilis* ; and the species is confirmed by the legume, which is that of a *Phaca*, and in texture, &c. is much like that of *A. pectinatus* on a very reduced scale.

§ 14. *Oroboidei.* Legumen stipitatum vel estipitatum, coriaceum vel fere membranaceum, vix aut ne vix obcompressum, sutura dorsali nunc paullulum nunc profundius impressa vel introflexa plane uniloculare vel imperfecte bilocellatum. — Caulescentes, glabelli vel pubescentes, graciles. Stipuke praeter infimas discretas, fere liber®. Racemi saepe spiciformes breves, vel capitula pauciflora. Flores parvuli vel mediocres, albo-violacei, purpurei seu albi, patentes; calyce brevi.

\* *Veri, Boreales,* e radice perenni adscendentes; floribus pedicellatis plerumque racemosis. Legumina oblonga, stipitata (in *A. Oroboide* et *sparsiflora* stipite brevissimo occulto), subsecunda, saepius pendula, sutura ventrali extus prominula.

4- Legumen membranaceum, glabrum vel tenuiter puberulum, lateraliter compressiusculum, septo e sutura dorsali rudimentario angustissimo uniloculare, ventre gibbosum, nempe sutura dorsali recta vel concaviuscula, ventrali arcuata.

++ Legumen longe stipitatum, dorso nequaquam sulcatum, sectione transversali ovali. Foliola nunquam retusa, infima stipulis approximata, nisi foliorum inferiorum. Flores in racemo compacto, albi vel cierulescentes, carina violacea.

' 33. *A. ABORIGINUM*, Richards, in App. Frankl. Journ. ed. 2, sub nom.falso "*aboriginorum*!" *Phaca aboriginorum*, Hook. Fl. Bor.-Am. 1, p. 143, t. 56. Canescenti-puberulus seu villosulrfs ; caulibus adscendentibus pedalibus rigidis; foliolis 3 - 6-jugis linearibus seu oblongo-

lanceolatis; calycis dentibus filiformi-subulatis tubo parum brevioribus; leguminibus semi-ellipticis mox glabris, stipite calycem bis excedente. — Lake Winipeg to Bear Lake and the Rocky Mountains. — The legume is correctly described by Hooker as "sutura hinc plana marginibus paululum introflexis, illinc curvata"; but in the plate the straight suture is represented as the seminiferous one. Hence the erroneous description in this respect in the Flora of North America.

34. A. GLABRIUSCULUS, Gray, Enum. Pl. Parry, Hall & Harbour, no. 116, in Proceed. Acad. Philad. March, 1863. *Phaca glabriuscula*, Hook. 1. c. Glaber, vel pilis brevibus raris conspersus; foliolis tenuioribus viridibus "lineari-lanceolatis subacutis" seu oblongis utrinque obtusis; ovario glaberrimo; leguminibus lanceolato-subfalcatis in stipitem' calyce bis terve longiorem attenuatis: cset. fere praecedentis.— Valleys in the Rocky Mountains in British America, Drummond. Also, var. *major*, near Jat. 40°, at middle elevation, Hall and Harbour; with foliage resembling large forms of *A. alpinus*. Legume an inch, stipe nearly half an inch long.

++ ++ Legumen brevi-stipitatum, dorso haud vel obsoletissime sulcatum, sectione transversali obovata retusa, pube minuta subnigricante. Foliola subretusa. Flores albi, parvuli (lin. 4. longi).

35. A. ROBBINSII, Gray, Man. Bot. N. U. S. ed. 2, p. 98. *Phaca Bobbinsii*, Oakes in Hovey, Mag. Hort. 7, p. 181. Subglaber; caulibus pedalibus subejctis; foliolis 3-5-jugis ovalibus oblongisve; racemo compacto oblongo; dentibus calycis tubo multo brevioribus; leguminibus tenuiter membranaceis oblongis rectis vel subincurvis parvulis (semipollicaribus) obtusissimis basi in stipitem e calyce haud exsertum subito angustatis. — Near Burlington, Vermont, in fissures of limestone banks of the Onion or Winooski River; the only known habitat, discovered by Dr. Bobbins. In this, aa in the two preceding species, the dorsal suture is not itself introflexed, but bears the rudiment of a septum in the form of a narrow and thin membrane projecting distinctly, but a very little way, into the cell. The present is a connecting link between the foregoing and the following species.

•i- -t- Legumen magis coriaceum, nigro-rariusve cinereo-pubescent, sutura dorsali sulcato-impressa pi. m. trigonum et semi-bilocellatum, —

++ Subsymmetricum, breve, lentiformi-oblongum, compressiusculum, sectione transversali obcordata, sutura ventrali paullo magis gibbosa.

36. A. OROBOIDES, Hornem. Fl. Dan. t. 1396. *A. leontinus*, Wahl. Pl. Lapp. t. 12, f. 4. *A. alpinus giganteus*, Pall. Astrag. t. 33. *A. brachytropis*, C. A. Meyer. *Phaca brachyiropis* (Stev.) & *oroboïdes*, DC. *P. parviflora*, Nutt. in Torr. & Gray, Fl. Glabellus; caulibus sub-erectis sub-sesquipedalibus; foliolis 5 - 7-jugis oblongis ovalibusque vix retusis; racemo elongato secundo; floribus violaceis aut purpureis (lin. 5-6-longis), alis carinam superantibus; legumine elliptico-lentiformi semipollicari sspissime nigro-villoso calyce triplo longiore dorso modice sulcato subsemibilocellato oligospermo, stipite brevissime occulto. — Arctic and North Alpine Europe and Asia.

Var. AMERICANUS. *Phaca elegans*, Hook. 1. c. Minus viridis, pube tenui subcinereus; foliolis saepe lineari-oblongis; floribus semper minoribus (lin. 3 - 4 longis) ; legumine calycem 3 - 4-plo superante minus nigricante pube appressa saepius griseo. — Rocky Mountains, in and considerably below the Alpine region, Drummond, Parry and Hall. Saskatchewan, Bourgeau. Labrador, Eisner, communicated by the late Dr. Steetz. — Legume 5 to 6 lines long.

\*+ \*+ Legumen dorso magis impresso trigonum, sectione transversali profunde obcordata, rectiusculum vel incurvum, *dorso gibbosum*, nempe sutura dorsali longiori convexa, ventrali recta seu concava. Foliola nunc retusa vel subemarginata.

37. A. ALPINUS, L.; Pall. Astral, t. 32. *A. secundvs*, Michx.! *A. Labradoricus* & *Phaca astragalina*, DC. Pildlb-pubescentis seu glabellus; caulibus diffusis; foliolis 6-12-jugis ovalibus seu oblongis; racemo brevi vel subcapitato plurifloro; floribus violaceis seu albo-violaceis (lin. 5 - 6 longis), alis carinam majusculam raro vel paullo superantibus; legumine oblongo recto vel subcurvato nigro-villoso seu nigro-pubescente trigono-turgido sutura profunde intrusa semi- vel subbilocellato, stipite calycem saepius excedente. — Arctic and Alpine regions around the Northern hemisphere. Not found on the higher mountains of the Eastern United States, but occurring at moderate elevations in the northern parts of Vermont and Maine, and even on the coast of Maine.

38. A. SPARSIFLORUS. Gray in Enum. coll. Parry, Hall, & Harbour, 1. c. no. 128, 129, sine char. Appresse pilosulus, glabratus; caulibus gracillimis ramosis diffusis ; stipulis triangulati-subulatis discretis; foliolis 4 - 6-jugis obovatis vel suborbiculatis saepe emarginatis parvis (2 - 3 lin. longis) ; pedunculis folio vix longioribus 3 - 5-floria; floribus



albis violaceo tinctis parvis (lin. 3 longis), vexillo apice emarginato-bifido alisque carinam incurvum longe superantibus; calycis dentibus tubo aequilongis ; ovario 8 - 10-ovulato breviter stipitato ; legumine parvo oblongo falcato-incurvo striguloso-pubescente substipitato oligospermo sutura dorsali intrusa semibilocellato. — On the lower Rocky Mountains of Colorado Territory, about lat. 40°, Hall and Harbour, no. 128. — Stems a foot or more in length, with many slender branches. Legumes 3 to 4 lines long, coriaceous, spotted with purplish, either slightly or strongly incurved, pointed with the style, pubescent with whitish short hairs, ripening from three to five seeds; the stipe as short and occult as in *A. oroboides* ; the dorsal suture as deeply sulcate-impressed as in that species; the ventral suture acute and prominent.

Var. MAJUSCULUS. Glabrior; foliolis majoribus (lin. 3 - 5) obovato-oblongis; pedunculis 5 - 10-floris in racemo laxo secundo; legumine magis elongato semipollicari 10-12-spermo. — With the preceding (no. 129 of the same collection) ; the legumes the same, except in their greater length, similarly spotted.

\* \* *Californici*, pusilli, e radice annua erecti; foliolis obcordato-emarginatis ; floribus paucis capitatis. Corollas aloe et prsecipue vexillum carinam longe superantcs. Ovaria sericeo-canescencia breviter stipitata vel sessilia. Legumina matura ignota.

39. A. TENEB, sp. nov. *Phaca astragalina* £. Hook. & Arn. Bot. Beech, p. 334. *A&Hypoglottis*, var. *strigosa*, Kellogg in Proceed. Calif. Acad. 2, p. 115, fig. 373. Spithamaeus, pilis nigris albidisque brevissimis strigulosus; stipulis parvis ovatis scariosis; foliolis 5-7-jugis lineari-cuneatis late emarginatis; ovario lineari semibilocellato 10 - 12-ovulato stipitato, deflorato reflexo. — California, Douglas : from near Monterey or San Francisco. — This was long ago collected by Douglas, without fruit. But the forming legume is deflexed, linear-lanceolate, canescent, and on a stipe considerably shorter than the tube of the calyx. The latter is black-hairy and in other respects much like that of *A. alpinus*. But the corolla is wholly different, much narrower, with the far smaller keel one third shorter than the wings, and only half the length of the standard ; the color apparently similar, the keel tipped with deep violet. The root is evidently annual. If this is, as I suppose, the plant coarsely figured by Dr. Kellogg, the legumes are oblong-linear, somewhat incurved, not obviously stipitate, and only spreading.

40. *A. BREWERI*, sp. nov., Gray in Proceed. Acad. Calif, ined. Subspithamaeus ; foliolis 4-5-jugis oblongo-obcordatis ; capitulo 5-7-floro compactiore; legumine immaturo globoso-ovato cano-sericeo in calyce baud stipitato erecto 6-ovulato uniloculari, sutura dorsali leviter intrusa; caet. praecedentis. —+ California, " in the Sonoma valley, common in fields: April 18." Dr. W. H. Brewer, California Geological Survey. — Closely resembling the foregoing in its whole appearance ; but perhaps more branched from the annual root, and with broader leaflets. Calyx and corolla similar; the latter tinged with violet-purple, and the summit of the keel deep violet. But even the ovary is sessile and ovate, and the half-grown legumes (which are very white-hairy and only twice the length of the calyx) are erect, and in a close head.

\* \* \* *Austro-Orientales* ; racemis spiciformibus saepissime brevibus; calyce nunquani nigro-piloso. Legumina glaberrima, reticulata, haud vixve stipitata, oblonga, pi. m. incurva.

\*• E radice annua multicaulis, diffusus.

41. *A. LINDHEIMERI*, Engelm. in Gray, Pl. Wright. 1, p. 52. Glabellus; foliolis 6-8-jugis angusio-oblongis plerumque emarginatis ; racemo subcapitato; calycis dentibus subulato-setaceis tubo subduplo longioribus; corolla violacea; carina majuscula alis et vexillo amplo vix emarginato paullo brevior ; leguminibus in pedicello patente adsurgentibus oblongo-linearibus subfalcatis compressis Utransversim venuloso-reticulatis dorso bicarinatis sutura intrusa semibilocellatis, sutura ventrali costiformi acuta. — Texas. — Corolla half an inch long, showy. Legume an inch or more in length, substipitate, the ovary manifestly short-stipitate.

-t- K E radice perenni.

42. *A. DISTORTUS*, Torr. & Gray, Fl. 1, p. 332. Multicaulis, bumilis, diffusus, subglaber; foliolis 8-12-jugis oblongis emarginatis; floribus breviter spicatis; calycis dentibus lato-subulatis tubo (nigrescenti-puberulo) dimidio brevioribus; corolla pallide purpurea, vexillo alte emarginato; leguminibus ovato- seu lanceolato-oblongis arcuatis crassocoriaceis minutim reticulatis subteretibus ad suturas praesertim dorsali sulcatis unilocularibus. — Texas, Arkansas, and S. Illinois (Dr. Mead). — Corolla narrow and small, scarcely over four lines long. Legumes variable in thickness, delicately reticulated when mature, 6 to 9 lines long, obscurely obcompressed; the ventral suture a little, but the dorsal more conspicuously introflexed.

43. A. OBCORDATUS, Ell. Sk. 2, p. 227. Multicaulis, humilis, diffusus, subglaber; foliolis 7-12-jugis obcordatis; racemo brevi spiciformi; calycis cinereo-pilosi dentibus setaceo-subulatis tubo aequilongis; corolla pallide purpurea, vexillo emarginato; leguminibus lunatis subcompressis tenuiter coriaceis maxima\* reticulatis, sutura dorsali extus sulcata intra loculum leviter intrusa, ventrali acuta costiformi. — Florida and Georgia, in sand-barrens. — Flowers scarcely larger than in the foregoing; the crescent-shaped legumes larger, fully an inch long, the ventral suture salient.

44. A. GLABER, Michx. Fl. 2, p. 66. Elatus (bipedalis), erect us; foliolis 9-18-jugis elliptico- seu lineari-oblongis crassiusculis vix retusis; stipulis minimis; racemo laxifloro; calycis dentibus triangulari-subulatis brevibus; corolla alba, carina alis vexilloque paullo brevior; leguminibus oblongo-linearibus arcuatis seu rectiusculis subcompressis transversim venoso-reticulatis dorso sulcatis et sutura introflexa semibilocellatis, sutura ventrali extus prominente costiformi. — North Carolina to Florida, in pine-barrens. — Flowers fully half an inch, legumes an inch long.

§ 15. *Lotiflori*. Orobideis Austro-Orientalibus subdiv. -i- •\*- fere similes, nisi plantae et legumina villosae seu canescentes, humiliores, floribus flavidis. Legumen semi-ovatum oblongumve, turgidum, coriaceum, subarcuatum, dorso gibboso pi. m. impresso subtrigonum, uniloculare, sutura ventrali extus carinatoprominente. Corolla calycem paullo superans, carina apice inflexa. Calycis dentibus elongatis tubo longioribus.

45. A. VILLOSUS, Michx. Fl. 2, p. G7. *Phaca villosa*, Nutt. etc. Laxe villosus; caulibus spithamoeis adsurgentibus; foliolis ovalibus retusis; racemis longe pedunculatis capituliformibus plurifloris; calycis dentibus lineari-subulatis tubo multum longioribus; legumine villosissimo dorso manifeste intruso fere semidiviso, sectione transversali obcordata. — Dry pine barrens, South Carolina to Florida and Louisiana. ← Corolla 4 lines long, curved.

46. A. LOTIFLORUS, Hook. Fl. Bor.-Am. 1. c. *Phaca lotiflora*, Nutt.; Torr. & Gray, 1. c. *P. (Astragalus) cretacea*, Buckley in Proceed. Acad. Philad. Dec. 1861, p. 452. Pilis appressis canescens vel cinereus; caulibus brevissimis; foliolis lanceolato-oblongis; capitulis paucifloris; calycis dentibus subulatis tubo longioribus; legumine oblongo-ovato magis inflato subcanescente dorso leviter impresso, sectione transversali obovata retusa ssepiusve basin versus late obcordata. —

Formae duae : a. PBDUNCULOSUS, normalis, pedunculis folia subaequantibus vel superantibus: £. BRACHTPUS, pedunculis brevissimis vel subnullis. — Plains of Texas and Nebraska to the Rocky Mountains and Hudson's Bay. Both forms are represented in Hall and Harbour's collection, no. 131. The form ft from the withered corolla being carried up on the apex of the growing legume, is perhaps precociously fertilized. It seems doubtful if the root is perennial. Mature legumes about an inch long; when fresh or when dried without pressure the impression of the back of the legume is manifest enough, although shallower than in *A. villosus*, which is a true *Astragalus*; while this would be taken for a *Phaca*.

§ 16. *Argophylli*. Legumen estipitatum (plerumque crasso-coriaceum et obcompressum), sutura dorsali impressa vel intrusa ventrali approximata pi. m. interstinctum, haud septato-bilocellatum, pubescens. — Humiles, albo-sericei vel canescentes. Stipulae discretæ, fere liberae. Flores spicati vel subcapitati, violacei vel purpurascens. Calycis dentibus tubo saepius oblongo vel cylindrico brevioribus.

Multicaulis e radice annua vel bienni; floribus parvulis albo-purpurascens. Legumen inflatum, membranaceum, incurvum.

47. A. PUBENTISSIMUS, Torr. & Gray, Fl. 1, p. 693. *A. multicaulis*, Nutt. 1. c, non Ledeb. Nanus, pube laxa hirsuto-canescens; foliolis oblongis obovatisve; floribus in pedunculo brevi paucis subracemosis; calycis dentibus tubo campanulato aequilongis; legumine villosa membranaceo inflato ovato-lunato valde incurvo dorso sulcato sutura leviter inflexa uniloculari. — Colorado Territory, near the sources of the Colorado of the West; found only by Nuttall. Legumes 9 or 10 lines long, the ventral suture perhaps slightly, the dorsal more deeply sulcate-introflexed.

\* \* Simpliciter caulescens e radice annua; floribus mediocribus violaceis. Legumen rectum ?

48. A. ARTHU-SCHOTTII, sp. nov. Pube appressa sericea undique mcanus; caule (spithamseo et ultra) erecto; foliolis 4-9-jugis obovatis saspe retusis, pagina superiore interdum glabrata; floribus in pedunculo folium superante pluribus laxè spicatis; calycis dentibus subulatis tubo oblongo-campanulato vix dimidio brevioribus; carina majuscula subrecta vexillo paullo brevior; legumine juvenili oblongo-lanceolato acuminato recto canescente e sutura dorsali semiseptato. —

Interior district between Utah and California; on the Mohave River, April 23, Fremont. Diluvial banks of the Colorado near its mouth, March 12, A. Schott. Boca Grande, Capt. E. K. Smith;—Specimens of this have accumulated enough to show that they belong to a quite distinct species, although only the forming fruit has come to hand. It was unnoticed in the Botany of the Mexican Boundary Survey.

\* \* \* *Brevicaules vel subcaulescentes, ssepiusque depr.esso-humifusi vel caespitantes e radice longa perenni; floribus majusculis breviter pedicellatis plerumque violaceis; foliolis oblongis ellipticis obovatisve. Legumen crasso-coriaceum, maturum obcompressum vel obcompresso-trigonum transverse rugulosum. (ArgophyUi genuini.)*

The immature legumes in dried specimens frequently appear as if compressed (i. e. flattened parallel with the valves) ; but when fully mature I believe they are always obcompressed (i. e. contrary to the valves), or, by the salience of the ventral suture and introflexion of the dorsal one, obcompressed-triangular.

49. *A. MISSOURIENSIS*, Nutt. Gen. 2, p. 99. *A. melanocarpus*, Fraser, Cat.; Richards, in Frankl. Journ.; Hook., etc. Subcaulescens, pube brevi appressissima cano-sericeus; pedunculis scapiformibus capitato-paucifloris vel spicato-8 - 14-floris; calycis dentibus tubo cylindrico vel cylindraceo subdimidio brevioribus; corolla laste violacea (fide Nutt. raro alba) ; legumine fere recto (circiter pollicari) nigricante elliptico. — Nebraska and New Mexico to the Saskatchewan. — The short and appressed pubescence of the calyx and of the legume is usually of blackish and whitish hairs intermixed. The mature legumes, when preserved in their natural form, or restored by maceration, are obcompressed, oftener so that the dorsal suture touches the ventral, which, however, is externally salient or carinate. But in herbaria, they frequently appear as if laterally compressed, with the dorsal suture only slightly intrusive.

50. *A. SHORTIANUS*, Nutt. in Torr. & Gray, Fl. 1, p. 331, ex descr. *A. humflis*, Geyer ex Hook, in Lond. Jour. Bot. 6, p. 211, non Bieb. *A. cyaneus*. Gray, Enum. coll. Parry, Hall, & Harbour, no. 126. Subacaulis, pube appressissima sericeo-canescens; foliolis majusculis (lin. 7 - 10 longis) obovatis ovatisve ; pedunculis scapiformibus paucifloris"foliis saepius brevioribus; calyce cylindrico (semipollicari), dentibus tubo dimidio brevioribus; corolla violacea vel cyanea; legumine iminaturato ovato-lanceolato crasso (sesqui-bipollicari) puberulo

arcuato-incurvo. — Rocky Mountains, about the head-waters of the Platte or Nebraska.

Var. ? MINOR. *A. cygneus* Gray, Pl. Fendl. p. 34 (magna pro parte). Saepe subcaulescens; foliis minoribus; legumine oblongo- seu lanceolato-lineari arcuato-incurvo postice profunde sulcato-introflexo. — Mountains and plains, from the southern frontier of New Mexico and W. Texas to Nebraska and the Rocky Mountains. — Probably only a smaller form of *A. Shurtianus*, between that and *A. Missouriensis* which it closely resembles (except in the fruit and in usually wanting dark hairs), and with which I have more than once confounded it. In fruit it is distinguished from that species by its long (1½ inches or more), -pointed, and strongly arcuate legume. Its cross-section is obcordate-two-lobed, the intruded dorsal approaching the externally carinate ventral suture.

51. *A. PARRYI*, Gray, Enum. coll. Parry, in Sill. Jour. n. ser. 33, p. 410, & Enum. coll. Parry, Hall, & Harbour, in Proceed. Acad. Philad. March, 1863, p. 60. Brevicaulis, caespitoso-humifusus, pilis laxis patentibus villosus; pedunculis breviusculis 6 - 10-floris; floribus laxe subcapitatis; calycis dentibus tubum oblongum subaequantibus; corolla albida seu flavidula (lin. 6 - 8 longa), carina apice purpurascens; legumine pubescente oblongo-lanceolato, maturo arcuatim incurvo demumve circinato valde obcompressa tam antice quam postice sulcato-impresso et propter suturas contiguas fere bilocellato. — Rocky Mountains, both low and subalpine, in Colorado Territory, and south to the Llano Estacado in N. W. Texas. I find in Dr. Torrey's herbarium a specimen collected by Fremont in his second expedition (station not recorded), with very ripe legumes: these are an inch or rather more in length, strongly rugulose, much obcompressed, and curved nearly into a ring. In Dr. Parry's specimens they are much less incurved and less rigid.

52. *A. GLAREOSUS*, Dougl. in Hook. Fl. Bor.-Am. 1, p. 152. *A. argophytus*, Nutt. in Torr. & Gray, Fl. 1. c. excl. syn. Caespitoso-depressus, pilis incumbentibus albidis villosis-sericeis; pedunculis 3-6-floris folia haud superantibus; floribus angustis (lin. 9 - 12 longis); calycis dentibus tubo longe cylindrico triplo brevioribus; corolla laete violacea; legumine immaturo oblongo-ovato apice attenuato incurvo sericeo-pubescente, "maturo subglabro." — Dry gravelly banks of streams, in and near the Rocky Mountains, on the southern tributaries of the Columbia River, and of the Platte. In the herbarium, without

fruit, it is liable to be confounded with the two succeeding species, but its pubescence is hirsute-silky or villous-silky, not lanuginous ; and the forming legume is canescent with short appressed pubescence.

Series II. Legumes sutura neutra introflexa plane uniloculare, aut sutura ventrali magis quam dorsalis intrusa. PHACA, L., DC.

1. Folia pinnato-plurifoliolata, rarius paucifoliolata vel abortu defoliolata, in nonnullis *Homalobis* simplicia.

§ 17. *Eriocarp*L Legumen lanosissimum, plerumque sub lana longa copiosissima occultum, breve, turgidum, coriaceum, pi. m. incurvum, acuminatum vel apiculatum, estipitatum. — Brevicaules e radice valida perenni, humifuso-caespitantes, mollissime lanuginosi. Flores elongati, saepius pollicares, laxe subcapitati; calyce longe cylindrico.

53. *A. inflexus*, Dougl. in Hook. Fl. Bor.-Am. 1, p. 151. Lanugine laxa subvillosa cinereo-canescens; caulibus (6-12-pollicaribus) diffuso procumbentibus ; foliolis oblongis; floribus laete purpureis, carina dentes calycis graciles setaceos laxos paullo superante; legumine ovato-oblongo, juniore lanosissimo, maturo (in herb. Hook.) subdenudato maxime incurvo obcompressa suturis utrisque praesertim ventrali impressis longitudinaliter interstincto. — Barren grounds along the southern tributaries of the Columbia River; on the Clearwater, Rev. Mr. Spalding, &c. — Flowers fully an inch long, evidently purple or violet and showy. — This species, copiously collected by Mr. Spalding, with only forming fruit, I have variously confounded with the preceding *m* account of its purple flowers, and with the following on account of the woollier pubescence and the very woolly young pods. But on now comparing these materials with the description of *A. itiflexus* by Sir William Hooker, and with a ripe pod from his herbarium, I think they may be united. From the mature legume it might as well be referred to the foregoing group; but here it is clearly the ventral suture which is intruded to meet the slightly impressed dorsal suture.

54. *A. Puusmi*, Dougl. in Hook. Fl. Bor.-Am. 1, p. 152. *Phaca mollissima*, Nutt. in Torr. & Gray, Fl. 1, p. 350. Lanugine laxa subvillosa cinereo-canescens, subcaulis vel humifuso-depressus ; foliolis oblongis; floribus ochroleucis, carina apice purpurea dentibus calycis subulatis longius superante: legumine ovato (subpollicari) leviter incurvo, intus haud interstincto, lana persistente flavida. — Western side of the Rocky Mountains, through Utah and the interior of Oregon to the

mountains of California. — Flowers more or less smaller, and calyx-teeth much shorter and less attenuated than in the preceding.

55. A. UTAHENSIS, Torr. & Gray, Bot. coll. Gunnison & Beckwith, Pacif. R. R. Exped. 2, p. 120. *Phaca mollissima* 0. *Utahensis*, Torr. in Stansbury, Rep. p. 385, t. 2. Lanugine implexa niveo-tomentosus, humifuso-caespitans; foliolis obovatis seu orbiculatis; floribus violaceis; legumine oblongo leviter obcompresso modice incurvo, coat, fere praecedentis. — Utah, on the shores of Great Salt Lake. — Flowers rather shorter, but otherwise as large as those of *A. inflexus*; the calyx-teeth rather as in *A. Purshii*; the pubescence, &c. peculiar. On stripping off the wool from the pods, they are seen to be not unlike those of *A. inflexus*, except that they are less curved, and only a little sulcate at the sutures, which do not meet to divide the cell.

§ 18. *Oocarpus*. Legumen chartaceo-coriaceum, ovatum, vesicario-inflatum, estipitatum, glabrum, sutura dorsali obsolete ventrali manifeste intrusa. — Glabrati, e radice perenni erecti, foliosi; stipulis discretis liberis; foliolis oblongis ovalibusque nunc retusis. Flores in racemo spiciformi plures albi seu albidi, semipollicares; calyce brevi. Legumina erecta, nee ultrapollicaria.

56. A. COOPERI, Gray, Man. Bot. N. U. S. ed. 2, p. 98. *Phaca neglecta*, Torr. & Gray, Fl. 1, p. 344. Ultrapedalis, foliosus; foliolis oblongis; floribus confertis mox reflexis albis; calyce nigricanti-pubescente, dentibus subulatis tubo brevioribus; legumine ovato-globoso sub-obcompressso antice posticeque leviter sulcato, sutura dorsali intus prominula, ventrali satis introflexa. — W. New York to Wisconsin along the Great Lakes. Legume lined with cobwebby hairs which traverse the cell.

57. A. OOCARPUS. A. *Crotalaria* (in tab. *crotalarioides*), Torr. Bot. Mex. Bound, p. 56, t. 17, non *Phaca Orotalarice*, Benth. Elatus (4 - 6-pedalis); foliolis ovalibus parvulis crassiusculis; floribus patentibus in racemo sublaxo; calycis albido-puberuli dentibus brevissimis; legumine oblongo-ovato acuto antice solum leviter sulcato sectione transversa circulari, sutura dorsali intus vix prominula, ventrali introflexa. — Mountains east of San Diego, California, Dr. Parry. — Legume rather firmly coriaceous, with a somewhat lateral or oblique contracted insertion, within glabrous.

§ 19. *Tnflati*. Legumen membranaceum, vesicario-inflatum, globosum, oviforme, vel semi-ovatum, saepius magnum, tenuiter reticulatum,



glabrum vel glabratum, sutura aut neutra aut rarius ventrali solum intus subintroflexa.

\* Radix annua. Legumen haud stipitatum, haud maculoso-pictum. Flores parvi, ochroleuci vel purpurascens. — Humiles: foliola linearia seu lineari-oblonga, striguloso-cinerea.

58. A. TRIFLORUS, Gray, PL Wright. 2, p. 45. *Phaca triflora*, DC. Astrag. t. 1 ? *P. Oandolliana*, H.B.K. Nov. Gen. & Sp. 6, p. 495, t. 586. A basi ramosissimus; floribus in pedunculo 3—15 ochroleuco-purpurascens; legumine ovali obtuso vel acutiusculo (7-12 lin. longo). — Arizona and Mexico. Legumes larger and more inflated in specimens from the northern stations, otherwise like the Mexican specimens. The specific name not appropriate.

59. A. GETERI. *Phaca annua*, Geyer in Hook. Lond. Jour. Bot. 6, p. 213. Simpliciior; floribus in pedunculo paucis luteo-albis; legumine ovato-lunato acumine incurvo (lin. 8-9 longo). — Drift-sand plains of the Upper Platte, Geyer. Said also to have been collected by Douglas and by Gordon. The crescentic outline and sharp acumination of the legume distinguishes this from the last. The leaflets are linear. There is an obscure *A. annuus*.

\* \* Radix filiformis, aut annua? aut perennis (in *A. Hookerianus* adhuc ignota). Legumen maculosum, in albido seu viridulo purpureo-pictum, stipite brevi calycem adaequante sustentum. Flores in pedunculo pauci, parvuli, albo-rosei seu pallidi; carina apice inflexo subproducto.

60. A. PICTUS. *Phaca longifolia*, Torr. & Gray, Fl. & *P. picta*, Gray. Pubes sericeo-strigulosa canescens, arenicolus; radice tenuissima (ut videtur nunc annua, nunc forte perenni surculos filiformes subterraneos proferente); stipulis subulatis rigidis persistentibus adversus folium basi connatis; foliolis anguste linearibus seu filiformibus, plerisque saepius abortivis petiolo persistente folium filiforme mentiente; legumine pendulo ovoideo vix apiculato. — Nebraska and New Mexico, in drift-sand, "binding the sand-hills with its long filiform roots." — The name *filifolius*, which I had applied to one form of this species (see below) on remanding it to the genus *Astragalus*, is preoccupied by Clos in the Flora Chilena. That of *pictus*, so appropriate for the legume, may be adopted; for "*A. pictus*, Steud." is merely a name to replace "*A. bicolor*, Desf. Cat. addend.," of which no character was ever published, which has been overlooked in the Flora Chilena, and is

doubtless a synonyme of some described Chilian species. The following two forms are pretty clearly of one species.

Var. FOLIOLOSUS. *Phaca picta*, Gray, PL Fendl. p. 37. Folia perfecta; foliolis 3 - 7-jugis plerisque semipollicaribus ; legumine parvulo vix ultra semipollicari.

Var. FILIFOLIUS. *Psoralea longifolia*, Pursh. FL 2, p. 741. *Orobus longifolius*, Nutt. Gen. 2, p. 95. *Phaca longifolia*^ Ton\*. & Gray, FL 1, p. 346. *Astragalus filifolius*, Gray, in Pacif. R. R. Surv. 12, pars 2, Bot. t. 1, A. Folia saepius imperfecta ; foliolis perpaucis plerumque attenuatis (1 - 1 ½ poll, longis), terminali seu rhachi filiformi producto persistente; legumine 1 - 1 ½-pollicari.

61. A. HOOKERIANUS. *Phaca Hookeriana*, Torr. & Gray, FL 1, p. 693. Sericeo-pubescens, humilis (spithamaeus); radice verosimiliter perenni; stipulis subscariosis discretis; foliolis lineari-oblongis subcuneatis 7 - 9-jugis ; legumine erecto magno (bipollicari) oblongo-obovato apice rotundato basi in stipitem brevem attenuato. — Interior of Oregon, Douglas; station unknown. Legume beautifully mottled. Species somewhat like *P. arenaria*, Pall.

- • \* Radix perennis. Legumen unicolor (haud maculoso-pictum).  
+- Subcaulis, pauciflorus; legumen brevissime stipitatum.

62. A. MEGACARPUS. *Phaca megacarpa*, Nutt. in Torr. & Gray, FL 1, p. 343. Glabellus; foliolis 4-6-jugis late ovalibus ovatisve saepius emarginatis; scapo 3 - 6-floro foliis multo brevioribus ; floribus pollicaribus ochroleucis albidisve; calycis cylindranei dentibus subulatis elongatis carina paullo brevioribus ; legumine ovato-oblongo acuminato 2 - 2 ½-pollicari basi obtusissimo stipite calyce multoties brevior inserto erecto. — Plains of the Rocky Mountains ; found only by Nuttall. No other North American species resembles it.

-t- -h- Caulescentes, sat alti, foliosi; foliolis multijugis oblongis vel sublinearibus ; racemis spicisve plerumque plurifloris. Prater *A. frigidum* Californici.

•M Legumen nunquam stipitatum, ultrapollicare, saepius 1½-2-pollicare, sutura ventrali recta vel convexiuscula, dorsali valde gibbosa.

a. Corolla flavida vel flavescens, parvula, brevis, supra calycem incurva; carina inflexa. Pedunculi folia haud superantes.

63. A. DOUGLASII. *Phaca Douglasii*, Torr. & Gray, FL 1, p. 346; Hook. & Am. Bot. Beech, p. 334. Adsurgens, subglaber vel puberulo-subcinereus; stipulis triangularibus discretis; foliolis 10-14-jugis

lineari-oblongis lanceolatisve apice obtuso vel apiculato; racemis brevibus laxifloris; dentibus calycis lato-subulatis tubo brevioribus; legumine gibboso-ovoideo, sutura ventrali fere recta. — California, near the coast, Douglas, Fremont, Brewer.

64. A. MACRODON. *Phaca macrodon*. Hook. & Am. 1. c. Adscendens vel erectus, villosulo-canescens, nunc glabriusculus; stipulis lanceolato-subulatis discretis; foliolis 11 - 14-jugis lineari-oblongis apice obtuso mucronato; racemis breviusculis; floribus demum deflexis; dentibus calycis sericei filiformi-subulatis laxis tubo asquilonis corolla (flavida) paullo brevioribus. — California, Douglas; in flower only. — A specimen with forming fruit, like that of the foregoing, collected by Dr. Gibbons, is ambiguous between the two, being glabrate, but with the calyx-teeth nearly of the present species, and with subulate rigid stipules.

b. Corolla alba vel ochroleuco-purpurascens, e calyce longius exserta, recta apice subincurva, alarum et carinarum unguibus lamina subaequilongis. Fedunculi folia superantes: racemi elongandi, multi- et conferti-flori, floribus mox deflexis. Foliola multijuga, conferta, apice saepe retusa, infima cauli appropinquata.

65. A. CROTALARLE. *Phaca Crotalaria*, Benth. PI. Hartw. p. 307? *P. densifolia*, Torr. Bot. Whipl. Exped. (Pacif. R. R. Surv. 4, p. 24, 80), non Smith. Glabratus vel subglaber; caule valido ascendente; stipulis triangularibus discretis; foliolis aut lineari- aut obovato-oblongis petiolulatis (6-16 lin. longis); corolla alba; legumine ovoideo 1 - 1<sup>1</sup>-pollicari chartaceo (rigidiori et minus inflato quam subsequenter). — California. Near Monterey, Coulter, if the plant here described be really Mr. Bentham's species, as I am disposed to conclude, from a study of sketches and notes kindly furnished by him. But the specimens here described are by no means canescently pubescent, nor should I quite term their legumes "sub-coriaceous," although the mature ones are considerably firmer in texture than those of the related species, — chartaceous they may be called: moreover, the teeth of the calyx are much shorter than the tube in Coulter's plant, little shorter than the tube in our specimens; yet the following species shows a similar diversity in this respect. The flowers of Coulter's plant, moreover, seem to be fewer, and the leaflets more cuneate-obovate; in all ours they are oblong. (It is certain that Coulter's plant is not that figured by Dr. Torrey, our no. 57.) The materials before me are from the three following sources. Near San Francisco?

Dr. Gibbons, received from the late Dr. Darlington, with both flowers and ripe fruit. Cocomungo, Dr. Bigelow, from Dr. Torrey, with flowers and fruit. Valley of San In«z River, near Santa Barbara, Dr. Brewer, in the State Geological Survey; in "flower and with forming fruit. In all these the leaves and stems are glabrous, except some scattered appressed hairs, especially on younger parts; the calyx sometimes considerably pubescent. Flowers 6 to 8 lines long.

66. A. MENZIESII. *Phaca densifolia*, Smith; Hook. Ic. t. 283, excl. syn. Nutt. *P. injlata*, Nutt. mss., non Gill. *P. Nuttallii*, Torr. & Gray, Fl. 1. c. Villosa-canescens; caule decumbente glabrescente; stipulis scariosis adversus folium connatis; foliolis subcuneato-oblongis subsessilibus; legumine ovoideo "fere biunciali" tenui-membranacea. — California, near Monterey, Santa Barbara, &c. — There is an *Astragalus densifolius* of Lamarck.

++ ++ Legumen brevi-stipitatum (stipite calycem adaequante); caeterum praecedentium. Stipulae scariosae folium adversus fere ad apicem usque (summis exceptis) connatae.

67. A. CURTIPES (Gray in Proceed. Acad. Calif, ined.), sp. nov. Pubes appressa minuta canescens, demum glabrata; caule erecto pedali; stipulis coalitis majusculis; foliolis 12-16-jugis oblongis seu lineari-oblongis retusis petiolulatis supra glabris; racemo fructifero brevi; calycis dentibus tenui-subulatis tubo campanulato parum brevi-oribus; legumine sesquipollicari puberulo glabrato semi-ovoideo (sutura ventrali fere recta, dorsali maxime gibbosa) utrinque vix acutato cum stipite rigido calycis tubum adaequante articulado. — San Luis Obispo, California, on the side of a dry hill, April 13th. Dr. Brewer. Corolla not seen.

M. ++ ++ Legumen longiuscule vel longissime stipitatum, §-14-pollicare, sutura ventrali convexiuscula recta vel concaviuscula. Stipulae discretae. Flores albi seu flaviduli, rectiusculi.

a. Stipes leguminis (basi haud vel parum attenuati) calycem longe superans. Pedunculi folium longe excedentes, racemo brevi oblongo terminati. Stipulae parvae.

68. A. LEUCOPSIS, Torr. & Gray, Bot. Mex. Bound, p. 56, t. 16. *Phaca canescens* Nutt. in Torr. & Gray, Fl. 1, p. 344. *P. leucopsis*, Torr. & Gray, 1. c. p. 694. Tomentuloso-canescens demumve cinereus; foliolis 10-18-jugis oblongis vel sublinearibus obtusis retusisve; dentibus calycis subulatis tubo brevi-campanulato dimidio brevioribus;

corolla ochroleuca; legumine glabro (subpollicari vel sesquipollicari) basi in stipitem calyce bis longiorem subattenuato. — Coast of California from Santa Barbara southward. — Calyx more or less pubescent, not silky. Ovary canescent. Legume often appearing as if acute or acutish at the apex, more so at the base. Stipe slender, five or six lines long.

69. A. LEUCOPHYLLUS, Torr. & Gray, Fl.\*1, p. 236. *Phaca leucophytta*, Hook. & Arn. Bot. Beech, p. 333. Sericeo-incanus; foliis 10-18-jugis lato-linearibus lanceolatisve obtusis vel acutiusculis; dentibus calycis sericei attenuato-subulatis tubo oblongo dimidio brevioribus; corolla ut videtur flavescente; legumine demura glabro (sesquipollicari) ovali-gibboso utrinque obtusissimo, stipite gracillimo ultra calycem praelonge (pollicem) exserto. — California, probably in the northern part of the State. The fruit is now known from the collection of Wilkes's Exploring Expedition (Sacramento Valley) and of a correspondent of the Rev. John Blake. Ovary silky-canescens, this pubescence remaining on the filiform stipe, which is fully as long as the half-grown legume.

70. A. TBICHOPODUS. *Phaca trichopoda*, Nutt. in Torr. & Gray, 1. c. Cinereo-puberulifl<sup>l</sup> glabratus; caule sesqui-tripedali; foliis 12-19-jugis lineari-oblongis obtusis; calycis nigricanti-pubescentis dentibus subulatis tubo campanulato multo brevioribus; corolla ochroleuca; ovario glaberrimo; legumine ellipsoideo utrinque obtusissimo haud pollicari stipite tenuissimo e calycem praelonge (semipollicem) exserto paullo longiore. — California, Santa Barbara and Monterey, Nuttall, Dr. Gambell, Dr. Brewer. Flowers 4£ to nearly 6 lines long. Legumes only two thirds or three fourths of an inch long, much less gibbous than in the related species, a line from base to apex being\* nearly axial; the ventral suture only slightly convex to near the apex, where it is strongly convex. Stipe minutely pubescent.

*b.* Stipes calycem brevius superans. Legumen utrinque acutatum.

71. A. OXYPHYSUS (Gray in Proceed. Acad. Calif, ined.), sp. nov. Elatus, raollissime canescenti-villosus; stipulis scariosis\* foliis 8-11-jugis oblongis, junioribus incanis, adultis viridescentibus; pedunculis folium longe superantibus; racemo elongato; bracteis subulatis parvis; calycis sericei dentibus subulatis tubo cylindraco dimidio brevioribus; corolla "alba seu viridulo-alba" (lin. 9 longa); legumine obovato-clavato glabrato apice acute acuminato basi longe attenuate, stipite recurvo calycem parum superante. — California, Arroyo del Puerto, in

the Mt. Diablo range, on dry hills, June 11, in flower and fruit. Dr. Brewer. — A most distinct and striking species, apparently at least three feet high; the younger parts white, the older grayish with soft, villous pubescence. Larger leaflets an inch long. Flowers narrow. Legumes an inch and a half to two inches long, in the dried specimens all much flattened laterally and margined by the two nerviform sutures (the ventral one more or less convex), the general outline being nearly semi-obovate with an attenuated base and a sharp-pointed apex: but the pods are evidently inflated in the fresh plant, and therefore more clavate. The texture of the walls is that of a thin parchment-like membrane. Seeds numerous. Stipe 3 or 4 lines long, pubescent.

72. A. FRIGIDUS. *Phaca frigida*, L. Pedalis bipedalisve, subglaber; stipulis ovato-oblongis membranaceis; foliolis 7 - 9-jugis ovato-oblongis seu elliptico-oblongis viridibus; pedunculis folium adaequantibus; dentibus calycis abbreviatis; corolla alba; legumine oblongo utrinque acutato in stipitem calyce sequilongi vel longiori attenuato nigro-piloso vel in stirp. Amer. glaberrimo. — Rocky Mountains to the Arctic regions and the northern parts of the Old World.

§ 20. *Lonchocarpus*. Legumen membranaceum, lanceato-cylindricum, rectum, exserte stipitatum, glabrum, sutura neutra intrusa. Flores majusculi, calyce cylindraco. Foliola pauca vel subnulla.

73. A. LONCHOCARPUS, Torr. & Gray, Bot. Whipl. Exped. in Pacif. R. R. Surv. 4, p. 24 (80). *Phaca macrocarpa*, Gray, PL Fendl. p. 36. Cinereo-puberulus, glabratus; caule fistuloso bipedali ramoso e radice perenni; stipulis discretis parvis; foliis 1 - 5-foliolatis quandoque ad rhachin complanato-filiformem reductis; foliolis filiformi-linearibus remotis; racemis plurifloris laxis; bracteis pedicello dimidio brevioribus; floribus pendulis albis; dentibus calycis lato-subulatis tubo quadruple brevioribus; legumine (sesquipoilicari) elongato-cylindrico, utrinque acutissime acuminato, stipite calycem excedente. — New Mexico, near Santa Fe.

The plant from the Llano Estacado, with shorter and blunt pods, collected by Dr. Bigelow, and noticed in the Pacific R. R. Survey, above cited, is not included in the character here given. When better known, it may prove to be a second species of this group.

§ 21. *Microcyrtis*. Legumen membranaceum vel chartaceum, parvum, globosum seu ovatum, vesicario-inflatum, estipitatum, sutura neutra introflexa. — E radice perenni diffusi vel procumbentes, plerique tenelli. Flores parvi, saepius pauci.

74. *A. MICROCTSTIS*, sp. nov. Cinereo-pubescens, e radice lignescente procumbens; caulibus gracilibus ramosissimis; stipulis scariosis connatis summisve fere liberis; foliolis 4-6-jugis oblongis seu oblongo-lanceolatis obtusis; racemis 5-12-floris gracilibus; calycis pilosi dentibus setaceo-subulatis tubo brevi-campanulato sequilongis; corolla violacea seu albo-violacea, vexillo profunde emarginato alas paullo carinam incurvam bis superante; legumine inflato globoso-ovato tenui-membranaceo griseo-pubescente lin. 3 longo. — Interior of Washington Territory, Fort Colville to the Rocky Mountains, Dr. Lyall (ex herb. Kew. no. 4, 5, 6). — This has the aspect of *A. sparsiflorus*; and the flowers are similar; but the fruit is quite different, neither suture being at all introflexed, and resembling the *Inflati* on a very small scale.

75. *A. LEPTALEUS*. *A. (Phaca) pauciflorus*, Gray, Eurn. coll. Parry, Hall, & Harbour, 1. c. no. 141, non Hook. *Phaca pauciflora*, Nutt. in Torr. & Gray, Fl. 1, p. 348, fide herb. Durand. Fere glaber; caulibus tenellis adseudentibus (spithamaeis); stipulis basi subconnatis elongato-subulatis; foliolis 7-11-jugis lanceolato-linearibus oblongisve saepe acutis; pedunculis folio brevioribus 2-4-floris; calycis nigropilosuli dentibus subulatis tubo campanulato parum brevioribus; corolla alba, vexillo emarginato carina apice violacea tertia parte longiore; legumine ovato seu ovali puberulo chartaceo (lin. 4 longo) sub-obcompressa? — Valleys of the Rocky Mountains, in South Park, &c. — Flowers about 4 lines long, on pedicels about the length of the calyx-tube and of the subulate bract. Herbage tender: said to be a good forage plant where abundant; but it is small and slender. Nuttall\* states that he has seen but a single specimen, and that not in flower. There is only one specimen named by him in the Philadelphia collections, viz. in Mr. Durand's herbarium, and that is in flower only.

76. *A. THURBERI*, Gray, PL Thurb. p. 312, & Bot. Mex. Bound, p. 56. Pube minuta cinereus; caulibus suberectis (6-10-pollicaribus); stipulis discretis scariosis parvis; foliolis 6-7-jugis lineari-oblongis retusis crassiusculis; racemis spicisve laxe 10-20-floris in pedunculo brevi; dentibus calycis subulatis tubo parum brevioribus; corolla alba; legumine coriaceo-membranaceo globoso glabello (lin. 3 diametro). — Arizona, on dry plains. — Flowers barely 3 lines long, on very short pedicels.

§ 22. *Bisulcati*. Legumen coriaceum, e calyce per stipitem brevem exsertum, leviter obcompressum, antice concavum, recessu sutura cariniformi maxime prominente percurso. — Glabelli vel glabri;

radice perenni; stipulis discretis liberis. Flores mediocres leguminaque penduli seu patentes. Calycis dentes tubo campanulato vix breviores, setacei. Carina subrecta.

77. *A. BECKWITHII*, Torr. & Gray, in *Pacif. R. R. Surv.* 2 (coll. Beck with), p. 120, t. 3. Glaber, humilis, diffusus; foliolis late ovalibus; floribus in racerao brevissimo 5-8 albis; legumine ovali (pollicari) subincurvo acumine lato compressissimo apiculato, dorso planiusculo sutura levissime sulcata et intus tumida, ventre impresso sutura exserta acutissime marginata. — Utah. The legume described from a fruiting specimen communicated to the late Dr. Darlington by Capt J. W. Phelps. — From the dorsal suture forming a slight internal ridge on that side of the cell, while the ventral is altogether externally salient, this would technically fall into the *Astragalus* rather than the *Phaca* series. But the conformation of the legume is more like that of *A. bisulcatus* than any other.

78. *A. BISULCATUS*, Gray, in *Pacif. R. R. Surv.* 12, pars 2, (Bot.) p. 38, t. 1, B. *Phaca bisulcata*, Hook. *PL Bor.-Am.* 1, p. 145. Striguloso-puberulus; caule erecto ultrapedali valido; foliolis oblongis sacpe angustis, imis stipulis approximatis; racemis spiciformibus densifloris; floribus violaceis; legumine parvulo (semipollicari) recto anguste oblongo semicylindrico antice profunde bi-excavato. — Plains of Nebraska to the Saskatchewan and to the Rocky Mountains. — The ventral suture forms a strong and salient obtuse ridge of the same height as the borders of the deep excavation it divides.

§ 23. *Pectinati*. Legumen crasso-cartiagineum epicarpio subcarnoso, subovatum vel oblongum, turgidum, estipitatum, nee antice nee postice sulcatum vel intrusum, suturis crassis ntrisque extus prominentibus. — Caules subpedales e radice perenni, foliaque rigidiusculi; foliolis fere filiformibus rhachi baud articulatis persistentibus. Stipulcc inferiores adversus folium connatac.\* Flores elongati (subpollicares) in racemo breviusculo plurimi, albi, carina rectiuscula.

(From the legume *A. microlobus* may be sought here.)

79. *A. PECTINATUS*, Dougl. *Phaca pectinata*, Hook. *Fl. Bor.-Am.* 1>P« *HI*, t. 54. Puberulo-cinereus, glabratus; ramis striatis angulatis; calycis dentibus tubo cylindraceo multo brevioribus; vexillo elongato; legumine pendulo glabro (semipollicari) cuspidato, sutura dorsali percrassa—Dry plains, Nebraska to Saskatchewan.



§ 24. *Scytocarp*L Legumen coriaceum, ovatum seii oblongum, rariis cylindricum, turgidum, nee antice nee postice sulcatum, sutura neutra introflexa. (Inter se valde diversi.)

(Here probably *A. microlobus*, no. 32, might also be sought.)

Legumen stipite crasso calycem subaequante sustentum. Flores magni (pollicares), calyce cylindraco.

80. *A. PREUSSII*, sp. nov. Fere glaber, e radice perenni? ultrapetalis; caule erecto; stipulis ovatis discretis; foliis 6 - 8-jugis carnosulis subrotundis quandoque retusis (semipollicaribus); racemis spiciformibus plurifloris; bracteis ovatis parvis; dentibus calycis subulatis tubo 3 - 4-plo brevioribus; corolla ut videtur purpurea, carina flubrecta alis paullo brevior, vexillo elongato; legumine ovali-oblongo recto duriuscule coriaceo inflato (pollicari) glaberrimo apiculato basi subito in stipitem validum contracto. — Banks of the Rio Virgen, a tributary of the Colorado in Nevada, near the eastern borders of California, in loose saline soil. Fremont, in second expedition, 1844. — A well-marked species, named in memory of Fremont's able assistant in all his earlier explorations, Mr. Charles Preuss. The only specimen is preserved in Dr. Torrey's herbarium. A pretty stout, large-flowered species, with firm, leathery, Baptisia-like pods, which are strictly one-celled, without introflexion.

\* \* Legumen. haud vixve stipitatum.

-i- Fere acaulescens, argenteo-sericeus, grandiflorus, radice perenni.

81. *A. CHAMJELEUCE*, Gray in Bot. Ives' Colorado Exped. p. 10. *Phaca pygmaea*, Nutt. in Torr. & Gray, Fl. 1, p. 349. Caespitoso-depressus (1 - 2-pollicaris); foliis 2 - 5-jugis obovatis ovalibusque cano-sericeis; scapis brevibus 3 - 8-floris; calycis dentibus subulatis tubo cylindrico multoties brevioribus; corolla albo-violacea (f-pollicari); legumine ovato-oblongo crasso-coriaceo (epicarpio subcarnoso?) tereti subarcuato puberulo (pollicari). — Upper waters of the Colorado of the West.

H- -i- Humiles e radice annua seu bienni, canescentes, parviflori; stipulis discretis.

82. *A. TEFHRODES*, Gray, PL Wright. 2, p. 45. Incano-villosus; caulibus perbrevibus; stipulis scariosis triangulari-ovatis; foliis 7-12-jugis oblongis ovalibusque; pedunculis scapiformibus folia demum superantibus spicato-plurifloris; calycis dentibus tubo campanulato di-

midio brevioribus ; corolla purpurea ; legumine pubescente arcuato-ovato dorso gibboso acuto chartaceo-coriaceo (semipollicari et ultra). — New Mexico, Wright, Thurber, Bigelow. — Stems only an inch or two in length; the peduncles at length three inches long. Flowers rather small.

83. *A. ARIDUS*, sp. nov. Sericeo-canescens ; caulibus spithamseis e radice annua diffusio-erectis foliosis ; stipulis minutis ; foliolis 5 - 6-jugis oblongis utrinque albo-sericeis ; pedunculis spicato-5 - 8-floris folio brevioribus ; calycis dentibus tubo brevi-campanulato brevioribus ; corolla ochroleuca, minima (2 - 2 j- lin. longa) ; legumine canescente gibboso-ovato (semipollicari) tenui-coriaceo inflato. — Interior Californian desert, on the route between the mouth of the Gila River and San Diego, Prof. Thurber. The materials are scanty. Perhaps the species has a truly membranaceous legume, and should rather be associated with *A. Thurberi*.

H- -!\_ +» Piloso-sericeus, e radice perenni decumbens; floribus medio-ocribus; stipulis scariosis ad versus folium connatis.

84. *A. SONORJE*, Gray, PL. Wright. 2, p. 44. Caulibus gracilibus decumbenti-diffusis prostratisve ; foliolis 7 - 8-jugis oblongo-linearibus lanceolatisve acutatis pilis valde adpressis utrinque canescenti-sericeis ; pedunculis folio longioribus spicato-8-12-floris; calycis dentibus setaceis tubo campanulato sequilongis; corolla incurva purpurea, carina inflexa apice rostratim producta; legumine canescenti-puberulo ovato-lunato acuminato turgido (semipollicari) chartaceo-coriaceo, suturis extus prominentibus. — On the borders of Arizona and the Mexican province of Sonora. — Flowers 4 or 5 lines long.

+ - + - + - +\_ Glabelli seu pubescentes; caules e radice perenni adsurgentes vel erecti, ssepius flexuosi; stipulis plerumque discretis; floribus parvis, in unica majusculis; leguminibus saepe patentibus vel pendulis, stipite brevissimo in calyce occulto. Dentès calycis cinereo- vel nigricanti-pubescentis tubo breviores.

++ Legumina ovali-oblonga, inflata, subpollicaria, chartaceo-coriaceo.

85. *A. GRACILENTUS*. *Phaca gracilentata*, Gray, PL Fendl. p. 36. Pube appressa subcanescens, erectus, subpedalis; foliolis oblongo-linearibus basi attenuatis; racemis laxifloris; corolla purpurascens (lin. 4 longa); legumine oblongo utrinque obtuso rectiusculo cinereo-pubescente in calyce arete sessili. — Santa Fe, New Mexico, on rocky hills.

86. A. FENDLERI, Gray, PL Wright. 1. c. *Phaca Fendleri*, Gray, PL Fendl. 1. c. Glabellus vel pube appressa puberulus, erectus, ultrapetalis; foliolis oblongis seu lineari-oblongis; racemis longe pedunculatis laxifloris; corolla purpurea (lin. 4 longa); legumine ovali inflato recto apiculato minute puberulo, stipite brevissimo. — New Mexico, in the Mountains, &c.

87. A. HALLII, sp. nov. (A. *Phacce debili* aff., Gray, Enum. coll. Parry, Hall, & Harbour, 1. c. no. 121.) Subcinereo-pubescentis, glabratus; caulibus pedalis adsurgentibus; stipulis subulatis; foliolis 9 — 12-jugis angusto-oblongis subcuneatis retusis; pedunculis folium superantibus racemo densifloro capituliformi terminatis; floribus majusculis (lin. 7-8 longis); calycis nigricanti-pubescentis dentibus latiusculis tubo campanulato basi gibboso 3-4-plo brevioribus; corolla violacea; legumine oblongo inflato glaberrimo recto apiculato stipite calyce triplo breviori suffulto. — Valleys of the Rocky Mountains of Colorado Territory, lat. 39°-41°, coll. Hall & Harbour, no. 121. — Stems rather stout. Leaflets 4-7 lines long. Flowers 20 or more in an open head or short and dense raceme, the rachis in fruit at most an inch and a half long. Calyx broadly campanulate, very gibbous at the base, 3 lines long, the short teeth rather obtuse. Corolla straightish. Ovary very glabrous. Legume 7-10 lines long, very turgid, its short but distinct stipe about a line long. — This very well-marked species occurs in no other collection that I am aware of. Comparison with an original specimen of the little-known *Phaca debilis* of Nuttall does not confirm my former suspicion that this might be a larger form of that species. It may therefore appropriately bear the name of the assiduous discoverer.

++ ++ Legumina lineari-oblonga, cylindrica, tenui-coriacea.

88. A. FLEXUOSUS, Dougl. in Hook. Fl. Bor.-Am. 1, p. 141. *Phaca elongata* & *P. Jkxuosa*, Hook. 1. c. Cinereo-puberulus, adsurgens, pedalis; foliolis oblongo-vel cuneato-linearibus obtusis retusisve; pedunculis folium superantibus; racemis plerisque elongatis laxis; calycis canescenti-pubescentis dentibus tubo triplo brevioribus; corolla albida vel "purpurascens (lin. 4 longa); legumine cylindraco (8-11 lin. longo lin. 2 diametro) puberulo apiculato recto vel subincurvo, stipite calyce occulto brevissimo sed manifesto. — Plains of Nebraska Territory to the Saskatchewan and the borders of the Rocky Mountains.

§ 25. *Podo-sclerocarpi*. Legumen crassocartilagineum, exserte stipitatum, coinpressum, incurvum, suturis valide incrassatis nequaquam intrusis a valvis demum secedentibus marginatum. — Perennes, ramosi, cinereo-puberuli, arenicolae, stipulis parvis discretis.

89. A. SCLEROCARPUS. *Phaca podocarpa*, Hook. Fl. Bor.-Am. 1, p. 142. Ramosissimus, fere canescens; foliolis 6-9-jugis linearibus; racemis laxis; floribus albis; legumine canescenti-puberulo lunato nunc fere hamato acumine cuspidato basi in stipitem validum calyce bis terve longiorem attenuate, valvis rigidissimis turgidis rugulosis. — Dry, sandy barrens at the Great Falls of Columbia River, Douglas, and lately collected by Dr. Lyall, with ripe fruit. This when well formed is an inch long, and with the stipe not much shorter; the very thick valves become strongly convex. There is an *A. podocarpus* of long standing.

90. A. SPEIROCARPUS, sp. nov. Subcinereus, sempipedalis; foliolis 4-9-jugis oblongis retusis; racemis paucifloris; legumine glabrato lineari-lanceolato complanato spiraliter 1-2-cyclo, stipite calycem bis superante. — Wenass, in the valley of the Upper Columbia River, Dr. Lyall, ex herb. Kew. In fruit only: the legume coiled like that of a *Medicago*. — The sutures, at least the thick ventral one, may be seen to separate more or less from the mature fruit in *A. gracilis*, *microlobus*, and I believe in *A. pectinatus*. In this and the preceding, both sutures become at length more or less detached, as in certain *Mimosece*.

§ 26. *Homalobi*. Legumen Vicise- seu Ervi-forme com plan at urn vel pi. m. compressum, rectum, suturis nerviformibus nequaquam intrusis marginatum, coriaceum vel chartaceum, quandoque stipitatum. — Perennes, alii pinnatifolii foliolis pluribus paucisve, alii simplicifolii, habitu diversi. (*Homalobus* et *Kentrophyta*, Nutt.)

*Genuini*; floribus in racemis spicisve pedunculatis; leguminibus pluri-(7 - 20-)ovulatis.

- Stipulae ut videtur omnes discretae. Legumen exserte longeque stipitatum. Calycis dentes tubo 3-4-plo breviores. Caulescentes, plerumque ultrapedales, pinnatifolii, plurifoliolati.

91. A. COLLINUS, Dougl. in Hook. Fl. Bor.-Am. 1, p. 141. *Phaca collina*, Hook. 1. c. Subcinereo-pubescens pube laxa, erectus vel diffusus; foliis linearibus seu oblongo-linearibus obtusis basi attenuate; pedunculis folio duplo longioribus; racemo brevi oblongo confertifloro; floribus in pedicello suberecto retrofractis; calyce oblongo-

campanulato vel cylindraco basi gibboso albido-pubescente, dentibus triangulari-subulatis; corolla fere alba calyce vix duplo longiori, vexillo carinam alasque subsuperante; legumine pubescente lineari-oblongo turgido basi in stipitem calyce bis longiorem attenuate — Subalpine range of the Blue Mountains, Oregon, Douglas. On the Kooskooskie Rivefj Dr. Pickering in Wilkes, Expl. Expedition (with fruit). Columbia Valley, Dr. Lyall, in flower. Described from the last two collections. Corolla purple according to Don, white with a purple spot on each petal according to Hooker, who had Douglas's notes. Legume an inch long including the stipe.

92. A. FILIPES, Ton\*, in Bot. S. Pacif. Expl. Exped. ined. Appresse-puberulus; caule gracili paniculato-ramoso; foliis subremotis angustissime linearibus parvis (lin. 3 - 4 longis); pedunculis gracillimis folio multo longioribus; racemo sparsifloro; floribus in pedicello erectiusculo vel recurvo-patente nutantibus; calyce campanulato haud gibboso albido-puberulo, dentibus subulatis; corollae albse? vexillo carinam paullo superante; legumine fere glabro lineari-oblongo complanato basi in stipitem- calyce ter longiorem angustato. — Interior of Washington Territory, near Fort Okanagan, Dr. Pickering in coll. Expl. Exped. — Flowers smaller than those of the preceding, and the legume apparently flat, an inch or rather less in length without the slender stipe, which commonly curves upwards out of the reflexed or spreading calyx.

93. A. STENOPHTLLUS, TOIT. & Gray, PL 1, p. 329. A. *leptophyllus*, Nutt. in Jour. Acad. Philad. 7, p. 18, non Desf. Glaber, erectus; foliolis anguste linearibus (6-8 lin. longis); pedunculis folium bis superantibus; racemo oblongo 10-16-floro; floribus patentibus; calyce campanulato nigricanti-pubescente, dentibus latiusculis obtusissimis; corolla "purpurascens" seu alba, vexillo carina longiori; ovario glabro stipite vix sequilongo. — Rocky Mountains at the headwaters of the Missouri, Wyeth. Fruit unknown, but probably pertaining to this section. Ovary strictly one-celled.

•H-4- Stipulae pleraeque, saltern inferiores, adversus folium connatse.

Legumen pi. m. stipitatum. Caulescentes, pinnatifolii, semper plurifoliolati. Dentes calycis tubo dimidio breviores.

94. A. MULTIFLORUS. *Ervum multijlorum*, Pursh, PL 2, p. 789. *Astragalus tenellus*, Pursh, Fl. 2, p. 473, pro parte, ex Pursh. *Orobis dispar*, Nutt. Gen. 2, p. 95. *Phaca nigrescens*, Hook. FL Bor.-Am. *Homalobus dispar* & *H. nigrescens*, Nutt. in Torr. & Gray. *H. multiflorus*, Torr. & Gray, FL 1, p. 351. *Astragalus (Phaca) nigrescens*,

Gray in coll. Hall & Harbour, no. 115. Subglaber; caulibus adsurgentibus vel diffusis (sub- vel sesqui-pedalibus) ramosis; stipulis superioribus basi tantum connatis; foliolis 6 - 10-jugis angusto-oblongis linearibusque obtusis nunc mucronatis; racemis brevi-pedunculatis plurifloris laxis; floribus flavido-albis, carina rectiuscula alis brevioribus obtusissimis apice nunc purpureo tincta; legumine oblongo piano glabro chaftaceo (circiter semi poll icari) stipite calycem subaequante rarius superante suffulto. — Plains of Nebraska to Mackenzie River (lat. 65°) and the Rocky Mountains. — The earliest specific name is fortunately not preoccupied in *Astragalus*, and may be adopted. It is only in Nicolle's specimens that I have seen the stipe much exceeding the calyx, — in these fully twice its length; but there is no clear distinction, either by the leaflets or the legumes, between Nuttall's two supposed species.

95 ? A. BOURGOVIL, sp. nov. Striguloso-pubescentis; caulibus e caudice lignescente adsurgentibus (spithamseis); stipulis fere omnibus alte connatis scariosis; foliolis 7 - 8-jugis oblongis lanceolatisve acutatis; pedunculis folia multo superantibus; racemo brevi 5 - 10-floro; pedicellis tubo calycis nigro-pubescentis subaequilongis; corolla violacea, carina apice inflexa subproducta alas adxquante; legumine immaturo ovato-lanceolato nigro- vel cinereo-pubescente stipite brevi calyce incluso suffulto. — Rocky Mountains on the British Boundary, Bourgeau, in Palliser's expedition (ex herb. Kew.). — Mature fruit unknown, perhaps turgid and not of this section. The forming legume is rounded at the base, on a very short included stipe, the dorsal suture not at all introflexed. Flowers 4J or 5 lines long, apparently deeply colored: vexillum a little exceeding the wings and large keel. Calyx oblong-campanulate, acute at the base, the teeth rather stout. — I had taken this for the *A. vaginatus* of Richardson and Hooker. But I am informed that Richardson's specimen in the Hookerian herbarium is different, and has been referred by Planchon to *Phaca australis*.

96. A. PALLISERI, sp. nov. Parce striguloso-pubescentis, glabratus; caulibus (subpedalibus) e caudice lignescente adsurgentibus ramosis gracilibus rigidulis; stipulis superioribus herbaceis discretis; foliolis 4 - 9-jugis linearibus lanceolatisve obtusiusculis; pedunculis folium aequantibus; racemo sparsi-(7-12-)floro; pedicellis calyce brevi aequilongis; corolla albido-purpurascens, carina apice angustata inflexa violacea alis brevioribus; legumine lineari (§ - f-pollicari lineam lato) glaberrimo stipite brevissimo at manifesto calyce incluso suffulto,

valvis turgidis. — Rocky Mountains on the British Boundary, probably not at great elevations, Bourgeau, in Palliser's expedition (ex herb. Kew.). — Leaflets 7 to 12 lines long, a line or a line and a half wide, rather rigid. Calyx short-campanulate, the teeth not half the length of the tube, often still shorter. Corolla 4℥ to 5 lines long, curved; the carinā produced into a narrow inflexed tip. Legume scarcely if at all exceeding a line in width, straight. It has a short stipe hidden in the calyx, like that of *A. Jlexuosus*, which is the species of *Scytocarp*i most approaching the *Homalobi* in the narrowness of its pod, and which the present species somewhat resembles. But the flowers of this are larger, and differ much in the narrow and inflexed tip to the keel. The pods with turgid valves resemble those of *A. cottinus*. But its near affinity is with *A. campestris* and *A. decumbens*, from which the glabrous legumes, on a manifest though short stipe, distinguish it.

⌘ -H- H- Stipuke pleraeque, saltern inferiores, adversus folium connatse.  
Legumen nunquam stipitatum. Caulescentes.

++ Calycis dentes gracillimi tubo sublongiores. Humiles e caudice lignescente, omnino pinnatifolii; stipulis omnibus pi. m. connatis.

97.- *A. PAUCIFLORUS*, Hook., Fl. 1, p. 149. Multicaulis, pumilus, cinereo-pubescentis; caulibus cespitanti-decumbentibus conferte foliosis stipulis majusculis; foliolis 3 - 5-jugis oblongis lanceolatisve acutis pedunculis folium superantibus 2 - 5-floris; floribus approximatis racemosis patentibus; corolla violacea, carina breviter incurva obtusissima alis satis vexillo dimidio brevioribus; legumine lineari-oblongo complanato sericeo-puberulo (lin. 4 - 5 lin. long). — Elevated regions of the Rocky Mountains, near the British Boundary. The fruit, that of a genuine *Homalobus*, is described from Bourgeau's specimens. Corolla 4℥ to 5 lines long, curved, the large vexillum reflexed.

98. *A. MISER*, Dougl. in Hook. Fl. Bor.-Am. 1, p. 153, adn. ? Multicaulis, cinereo-puberulus; caulibus diffusis (spithamaeis) gracilibus laxe foliatis; stipulis majusculis, superioribus ad medium connatis; foliolis lato-linearibus oblongisve plerumque obtusis; pedunculis folium longe superantibus 5 - 12-floris; floribus in racemo sparsis; corolla et calyce fere praecedentibus; legumine juvenili ovato-oblongo canescente. — Valley of Columbia River, Dr. Lyall (ex herb. Kew.), and, if the same, of its tributary the Spokane, Douglas. Described from Dr. Lyall's specimens (no. 7), and (the fruit being wanting) referred here on account of its resemblance to the preceding species. Douglas's

name may as well be taken up for this species from the same district. No specimens named by Douglas are extant.

++ ++ Calycis dentes aut breves aut tubo subaequantes. Stipulas superiores fere discrete. Graciles, rigiduli, ramosi, pinnatifolii vel abortu subsimplicifolii, nunc petiolis nudis. Racemi laxiflori, longius pedunculati. Flores oehroleuci, nunc purpureo suffusi; carina praesertim violaceo tincta vexillo parum brevior.

99. A. CAMPESTRIS. *Homalobus campestris* & (forma depauperata) *IT. tenuifolius*, Nutt. in Torr. & Gray, Fl. 1, p. 351. *H. decumbens*, Gray in Enum. coll. Parry, Hall, & Harbour, no. 142, non Nutt. Striguloso-cinereus, nunc glabrescens; caulibus adsurgentibus (3-15-pollicaribus); petiolis subcomplanatis rigidis saepius 9-13-foliolatis, summis raro paucifoliolatis nudisve; foliis lanceolatis linearibus seu lineari-subulatis plerumque acutis; racemis 5-10-floris; calycis dentibus tubo dimidio brevioribus; carina apice inflexa longe rostratim producta; legumine oblongo-lineari (subpollicari) puberulo, valvis subturgidis. — Colorado Territory, in valleys on both sides of the Rocky Mountains. — Variable in size and in the leaflets, but well marked by the long and narrow falcately inflexed tip to the carina. Flowers rather large, fully 5 lines long when well developed, yellowish-white, usually tinged with violet.

100. A. SEROTINUS, Gray in Pacif. R. R. Surv. 12, 2, p. 47, t. 5. Cinereo-puberulus, glabratus; caulibus adsurgentibus (9-18-pollicaribus); petiolis omnibus \*pluri-(9-21-)foliolatis; foliis linearibus; racemis virgatis 9-20-floris; calycis dentibus brevissimis (tubo 3-4-plo brevioribus); carina apice brevi subangustata inflexa; legumine lineari fere glabro. — On the Okanagan near the Columbia River, lat. 48°, Oct., Dr. J. G. Cooper. — Flowers tinged with purple, almost as large as in the preceding species, but the carina very different, having a much shorter and broad inflexed tip. From the next species the distinctions are not so certain, being chiefly the less pubescence and the short calyx-teeth.

101. A. DECUMBENS. *Homalobus decumbens*, Nutt. 1. c. Cinereo-vel sericeo-pubescent; caulibus diffusis vel adscendentibus (6-10-pollicaribus); petiolis nunc subcomplanatis plerisque pluri-(7-13-)foliolatis; foliis lineari-lanceolatis acutis; racemis 5-10-floris; calycis dentibus attenuatis tubo parum brevioribus; carina apice brevi inflexa; legumine lato-lineari recto vel falcato (subpollicari) canes-



centi-puberulo. — On both sides of the Rocky Mountains in Colorado Territory, and farther northward. — Corolla 4 or 4½ lines long, ochroleucous, sometimes with a purple tinge.

102. A. DIVERSIFOLIUS, *Homalobus orthocarpus*, Nutt. 1. c. Striguloso-cinereus; caulibus diffuso-decumbentibus elongatis (pedalibus); petiolis brevibus complanatis 1 - 5-foliolatis; foliolo terminali seu folio simplici lineari elongato (1 - 2-pollicari) utrinque attenuate); pedunculis 1 - 5-floris; calycis dentibus tubo dimidio brevioribus; carina falcato-incurva; legumine oblongo-lineari recto vel subfalcato (½-pollicari) canescenti-puberulo. — Gravelly plains of Colorado Territory, on both sides of the Rocky Mountains. — Flowers ochroleucous or lurid. — There is an *A. orthocarpus* of Boissier; and moreover the pods of this, as of the foregoing species, are often more or less falcate.

103. A. JUNCEUS. *Homalobus junceus*, Nutt. 1. c. Striguloso-cinereus; caulibus erectis paniculato-ramosis; petiolis filiformibus aphyllis, "radicalibus foliola 1 - 2-juga minima gerentibus"; pedunculis paucifloris; calycis dentibus brevissimus obtusis"; legumine lineari recto canescenti-puberulo. — Colorado Territory, on the head-waters of the Colorado of the West. — The only extant specimen of this in American herbaria, that I can find, is one in Dr. Torrey's herbarium, given by Nuttall, out of flower, and bearing a single legume, which is nearly an inch long. If distinct (and I know not to what other of the group it could be united) it may retain Nuttall's specific name, the *A. junceus* of Ledebour being a synonyme of *A. Stevenianus*.

+ K 4 + Stipulae scariosae folium adversus in unum connatae. Legumen breve, nunquam stipitatum, oligospermum. Acaulescentes, cespitosi, sericeo-canescens; foliis simplicibus lanceolato-vel spathulato-linearibus, nonnullis raro 3 - 5-foliolatis; scapis folia superantibus plurifloris; corollis purpureis vel roseis.

104. A. OESPITOSUS. *Homalobus cespitosus*, *brachycarpus*, & *canescens*, Nutt. 1. c. Late cespitosus; scapis 2 - 6-pollicaribus; racemo spiciformi; calycis dentibus attenuatis tubo subaequilongis; carina obtusissima vexillo multo brevior; legumine oblongo seu lato-lanceolato vix curvato (lin. 3 - 5 longo) subplano. — Dry hills and cliffs of the Platte or Nebraska, towards the Rocky Mountains. — Ovary and legume more or less canescent in Nuttall's specimens of his three species, which are all evidently reducible to one; while the ovary is glabrous" in a specimen collected at Scott's Bluffs by Mr. W. H. Wagner.

\* \* *Condensati*; floribus e rosulis foliorum simplicium vix exsertis; leguminibus pluriovulatis subturgidis suturis validioribus marginatis.

105. A. SIMPLICIFOLIUS. *Phaca simplicifolia*^ Nutt. 1. c. Pulvinate-caespitosus; foliis linear!- vel spathulato-lanceolatis rigide acutis saepius involutis sericeo-incanis ramos breves caudicis multicipitis dense obtegentibus; scapis brevissimis inclusis demum subexsertis; calycis glabrati dentibus tubo oblongo dimidio brevioribus; corolla parvula ochroleuca; legumine calyce semi-incluso oblongo acuto subcompresso glabro crasso-coriaceo, sutura ventrali recta acutissima, dorsali gibbosa. — Rocky Mountains of Colorado Territory near the sources of the Platte, found only by Nuttall. — Legume four lines long, of thicker texture and more turgid than in the preceding species, and with more prominent sutural edges, but formed on the same plan; the foliage also similar. Ovules about 12.

\* *Submonospermi*, depresso-caulescentes; floribus in axillis foliorum subsessilibus; leguminibus 3 - 4-ovulatis saepius raonospermis ovatis haud stipitatis. Pinnatifolii, paucifoliolati.

106. A. KENTROPHTTA, Gray, Enum. coll. Parry, Hall, & Harbour, 1. c. no. 106. *Kentrophyta montetna* & *K viridis*, Nutt. in Torr. & Gray, 1. c. Intricato-ramosus e radice longa, late depresso-caespitosus, undique foliosissimus, sericeo-canescens; stipulis folium adversus plerisque connatis; foliis pinnato-3 - 7-foliolatis; foliolis lineari-subulatis divaricatis rigidis mox involutis spinula terminatis cum rhachi haud articulatis persistentibus; floribus in axillis 1-3 parvis cseruleo-albidis ochroleucisve; legumine ovato acuminato compresso tenui-coriaceo canescente parvo (lin. 3 longo) bivalvi basi calyce brevi stipato suturis vix marginato. — Colorado Territory, on both sides of the Rocky Mountains, especially on the upper part of the Platte or Nebraska, in denuded or sandy places.

2. Folia quasi palmato-trifoliolata. (*Phaca* § *Orophaca*, Torr. & Gray.)

§ 27. *TriphylU*. Legumen conico-ovatum, acuminatum, nee stipitatum nee compressum, coriaceum. pluriovulatum, calyce subinclusum, sutura neutra intrusa. — Perennes, e caudice multicipiti lignescente caespitosi, depressi, argenteo-sericei, confertifolii; stipulis majusculis tejiui-scariosis adversus petiolum connatis ramos imbri-cantibus. Folia simulate palmatim re vera pinnatim trifoliolata, infima rarissime bijugatim 5-foliolata, foliolis confertis.

107. A. TRIRNYLLUS, Pursh, Fl. 2, p. 740. *Phaca cespitosa*, Nutt. Gen.; Hook. FL' Bor.-Am. t. 55. ' *P. argophylla*, Nutt. in Torr. & Gray? 1. c. Acaulescens, nitido-sericeus; stipulis hyalinis. glabris; foliis primariis quandoque 5-foliolatis foliolis cuneato-oblanco-latis, sequentibus longe petiolatis foliola 3 longiora lanceolata gerentibus flores (pollicares) sessiles confertos superantibus; calycis dentibus tubo cylindricodimidio brevioribus; corolla ochroleuca seu alba; legumine villosa calyce incluso. — Plains of Nebraska to the Saskatchewan. — Even the trifoliate leaves may be seen on close examination to be of the pinnate type, and not of the palmate, as I had supposed. ' Some of the earlier leaves of the season (which, by their shorter petioles and shorter and broader leaflets, exemplify Nuttals *Phaca argophylla*), moreover, show two pairs of leaflets and a terminal one, crowded indeed, but evidently pinnate. Pursh's name is to be restored to the species, the homonym'e of Pallas being an *Oxytropis*.

108. A. SERICOLEUCUS, Gray, Enum. coll. Parry, in Sill. Jour. n. ser. 33, p. 410, no. 190. *Phaca sericea*, Nutt. in Torr. & Gray, Fl. 1. c. Latissime cespitosus, sericeo-incanus; caulibus ramosis prostratis; ramis stipulis villosis obtectis; foliis omnibus trifoliolatis pedunculos filiformes 2-6-flores haud aequantibus; foliolis oblanco-latis cuneato-oblongisve (lin. 3 longis); calycis dentibus tubo campanulato subaequilongis; corolla purpurea (lin. 3-4 longa); legumine ovato-oblongo incano-calyce semi-incluso (lin. 3 longo). — Sand-hills and cliffs of the Platte or Nebraska to the Rocky Mountains.

III. Species anomala, carina in acumen producta *Oxytropidis* instar, legumine sutura dorsali (carinali) solum introflexa Astragalorum typicorum.

109. A. NOTHOXYS, sp. nov. Diffusus e radice ajinua, cinereo-puberulus; caulibus gracilibus (3-12-pollicaribus); stipulisfere liberis discretis; foliolis 6-9-jugis obovato-oblongis oblongisve saepe retusis supra glabris; pedunculis folium superantibus; racemo brevi spiciformi; calycis dentibus subulatis tubo oblongo brevioribus; corolla violacea, carina apice lato incurvo in acumen acutissimum desinente; legumine lato-lineari falcato puberulo tenui-coriaceo dorso sulcato septifero fere bilocellato, sutura ventrali extus prominula. — Arizona, formerly the northern part of the Mexican province of Sonora, Prof. Thurber. San Luis Mountain and Guadalupe Cañon, Capt. E. K. Smith, in herb. Torr. — Leaflets 3 to 6 lines long. Peduncles 3 to 6

inches long. Flowers about half an inch long. Legume 8 to 11 lines long, transversely venulose, many-seeded, considerably resembling that of *A. Nuttallianus*, with which (notwithstanding the obvious differences) some of the specimens were confounded in the Botany of the Mexican Boundary Survey. The broad and short, moderately incurved apex of the carina is abruptly contracted into a short, very acute, porrected-cusp, which would technically refer the plant to *Oxytropis*.

• *Obscure Species.*

A. DIAPHANUS, Dougl. in Hook. Fl. Bor.-Am. 1, p. 151, — from near the Great Falls of the Columbia River, — described as having linear, somewhat diaphanous, bilocellate legumes, I have not identified. I learn that the plant has the aspect of *A. distortus*.

A. COULTERI, Benth. Pl. Hartw. p. 307, near Monterey, California, with silky-villous, bilocellate legumes, would seem to belong to the section *Argophylli*. •

A. POLARIS, Benth. in Hook, f, Arct. PL (Linn. Trans. 33, p. 323)\* from Kotzebue's Sound, is said to differ from *A. alpinus*—not only in the size (an inch long) and upright direction of the legume, and the obsolete stipe, but also in the absence of any introflexion of the dorsal suture.

PHACA DEBILIS, Nutt. in Torr. & Gray, Fl. 1, p. 345, from the Rocky Mountains, is known to me only by a flowering specimen in Jherb. Torr. In appearance, and in the size of the flowers, it seems intermediate between *A. Hallii* and *A. Jtexuosus*; but it is dwVf, and has shorter calyx-teeth than either. The legume is a desideratum.

PHACA PARVIFOLIA, Nutt. l. c. p. 348, I find no specimen of; but conjecture that it may, like Nuttall's *P. parviflora*, have been founded on *P. elegans*, Hook., which is the small-flowered, American variety of *A. oroboides*.

Among *Astragali* which remain undetermined for want of sufficient materials are the following: —

1. A striking one collected, in blossom only, by Capt. Pope, on the Llano Estacado, with a head or short spike of large yellowish flowers. It is mentioned in the Botany of Pope's Exploration; Pacif. R. R. Surv. 2, p. 163.

2. The plant, in flower only, described as a variety of *A. Fremontii*, in Pacif. R. R. fc<sub>urv.</sub> 4, p. 80 (24), collected by Dr. Bigelow on the Mohave, but which is certainly different from Fremont's plant there

characterized. Dr. Parry gathered the same species on the Gila, still without fruit.

3. A canescent, narrow-leaved species from "Tubac, Sonora, Parry," which in the Bot. Hex.\* Bound. Surv., p. 56, was referred to *A. Sonorce*. Capt. E. K. Smith collected the same species at Los Nogales, Sonora, also without fruit,

4. A plant mentioned in Torr. & Gray, PL 1, p. 694, under *Phaca kucophytta*, from Douglas's last collection, of which the legumes only are known; these are ovate-oblong, rather cartilagineous than coriaceous, entirely one-celled.

### OXYTROPIS, DC.

The few North American species of *Oxytropis* of which materials are before me appear to be as follows:—

#### A. *Calyx fructifer vesicarius*.

§ 1. *Calycophysce*, (*Physocalyx*, Nutt. ined.) *Calyx fructifer vesicario-inflatus, globosus, legumen ovatum chartaceo-membranaceum sutura ventrali solum intrusa sub-semibilocellatum includens. Pulvinato-caesjytosae, subacaules: scapi biflori.*

1. *O. MULTICEPS*, Nutt. in Torr. & Gray, Fl. 1, p. 341; Gray in Enum. coll. Parry, Hall, & Harbour, no. 144 (forma minor). *Physocalyx multiceps*, Nutt. in herb. Rocky Mountains.—The legume of this most rare and charming little alpine species resembles that of *O. punctata*, Fischer, but is short-stipitate, and concealed in the persistent bladderly calyx.

#### B. *Calyx immutatus*.

§ 2. *Physocarpce*. *Legumen vesicario-inflatum, membranaceum, sutura ventrali solum intus tumida vel intrusa. Acaulescentes: scapi umbellato- seu capitato-2 - 6-flori.*

.2. *O. PODOCARPA*. *O. arctica*, Hook. Fl. Bor.-Am. 1, p. 146, pro parte, non R. Br. *Astragalus ijlorus*, Schweinitz in herb. Depresso-caespitosa, multiceps, albo-villosa, demum glabrescens; stipulis petiolo longe adnatis; foliolis 5-11-jugis crebris lineari-lanceolatis seu oblongo-linearibus (lin. 2-4 longis); pedupculis folia adaequantibus bifloris; corollie (subcaeruleae?) carina brevi-mucronata; legumine (subpolliniferi) oblongo-ovato tenui-membranaceo subglabro acutissime acuminato stipite gracili calycem adaequante sustento.— Labrador, Arctic regions, and Rocky Mountains, lat. 49°. The specimens before me are from

Labrador, good flowering specimens in the herbarium of Schwcinitz; from Arctic America, one in Dr. Torrey's herbarium, ticketed \* *O. enmpestris* (Parry) by Sir William Hooker (which may perhaps be his *O. campestris* var. *melanocphala*^ but the short peduncles are at most two-flowered), and one from Richardson named by him *O. arctica*; from the Rocky Mountains, Sir William Hooker's *O. arctica* 8, of Drummond's collection;—all the above in blossom only; and, finally, a fruiting specimen of the latter from Bourgeau's collection. This, with its thin-walled inflated legume on a slender stipe (which stipe is evident enough in such flowers of the above as I could venture to dissect), is thus shown to differ essentially from the original *O. arctica*^ which has the coriaceous nearly sessile legume, along with other characters of *O. Uralensis*. The present species is surely more nearly related to *O. physocarpa*, Ledeb., differing however in its stipitate and pointed pod, and in the merely conjugate, but much crowded leaflets.

§ 3. *Oampestres*. Legiimen coriaceum seu chartaceuin, nee vel parum icarium, in calyce sessile vel substipitatura, sutura ventrali eeptifera fere vel semi-bilocellatum, sutura dorsali raro subintrusa. Acaules: stipulro petiolo alte adnatae: scapi raro 2-4-flori, saepius pluriflori; floribus capitatis'spicatisve; legumibus erectis.

\* Foliola conjugata.

H- Scapi 2-5-flori.

3. *O. URALENSIS*, L. var. *PUMILA*, Ledeb. Fl. Alt. *O. arctica*, R. Br.; Hook, pro parte. *O. Uralensis*, var. *arctica*, Ledeb. Fl. Ross. *O. lagopus*, Nutt. in Torr. & Gray, FL — Arctic shores and islands; and Rocky Mountains to about lat. 40°, Nuttall, Hall and Harbour, no. 143. — I can well believe that this is an arctic-alpine form of *O. Uralensis*. The legumes are oval-oblong or elongated-oblong, with the partition from the ventral suture stretching across to the dorsal. But neither in this nor in Siberian specimens of genuine *O. Uralensis* (I have no fruiting European) do I detect any wing or rudiment of a septum projecting from the dorsal suture, as describeH by authors.

4- -i- Spicai vel capitula pluriflorae.

4. *O. CAMPESTRIS*, L., cum syn. Ledeb. & Hook. f. *O. viscida*, Nutt. in Torr. & Gray (*O. mottis*, Nutt. herb., forma viscidulo-villosa). Legumina chartacea, ovata seu ovato-oblonga, subinflata. Flores lutescentes, violaceo suffusi vel picti, rarius caerulei. Foliola plurijuga, oblongo-lanceolata, haud geH"»o-onn«a««n»tja. — Arctic regions to Lab-

rador, Maine, and Rocky Mountains, lat. 40°. In legumes of European *O. campestris*, but not in the plant of Maine; I find a slight internal projection of the dorsal suture; also, that the septum from the other suture divides the cell, except when the legume is considerably inflated. From the observations of Ruprecht, Ledebour, and others, it would seem that *O. campestris*, *argentata*, and *Uralensis* all run together. Equally they appear to run into the next in the Saskatchewan and Rocky Mountain region\*

5. *O.* LAMBERTI, Pursh. *O. Hookeriana? Plattensis? sericea*, Nutt. in Torr. & Gray. Legumina coriacea, nunc fere cartilaginea, arrecta, oblongo-cylindracea seu elongato-cylindracea (lin. 2-3 lata, longiora pollicem longa), septo e sutura ventrali fere bilocellata. Flores majusculi seu magni (8-12 lin. longi), spicati, purpurei, violacei, ochroleuci, seu albi. Foliola plurijuga, lanceolata, oblonga, vel linearia, cum calycibus canescenti-sericea. Stipulae plerumque hirsutissimae seu lanatae. — Plains of Saskatchewan to Texas and the Rocky Mountains. I am unable to compare this with the Siberian *O. grandiflora*.

6. *O.* NAN A, Nutt. in Torr. & Gray, 1. c. *O. argentata*, Pursh. Fl. ? non Pall. Cespitoso-multiceps; folia confertissima, magis cano-sericea; foliola 3-4-juga. Flores 9-12, capitati, majusculi. — Rocky Mountains about lat. 40°, Nuttall; and farther north on Little Blackfoot River, Dr. Cooper; in flower only. Legumes unknown.

\* # Foliola pleraque subverticillata.

7. *O.* SPLENDENS, Dougl. in Hook. A well-marked and beautiful, silvery silky-vilvous species. Plains of Nebraska to Bear Lake, and west into the Rocky Mountains.

§ I. *Montana*. Legumen tenuiter coriaceum, oblongum seu cylindraceo-elongatum, in calyce breviter vel brevissime stipitatum, sutura ventrali late impressa (haud vero septifera) sub-semibilocellatum. Caulescentes vel subcaules, pedunculis scapiformibus: stipulse praesertim superiores basi tantum petioli adnatae: foliola crebra: flores laete caerulei, spicati seu capitati, parvuli (tubo calycis brevi), patentes; leguminibus saepius patentibus seu deflexis.

8. *O.* DEFLEXA, DC. *O. foliolosa*, Hook., forma fere acaulis. — Saskatchewan to the Rocky Mountains, as far south as about lat. 40°. (Fine specimens in Parry, HaU, and Harbour's collection, no. 120.) *TU*. — *O.* of this group yet detected in America.

1. *Characters of some New or Obscure Species of Plants, of Monopetalous Orders, in the Collection of the United States South Pacific Exploring Expedition under Captain Charles Wilkes, U. S. N. With various Notes and Remarks.* By ASA GRAY. (Continued from Vol. V. p. 352, November, 1861.)\*

*Cyrtandra Polynesienses.*

SINCE the publication of the diagnoses of the *Cyrtandra* of the Sandwich Islands, specimens collected in our Expedition at the Society and Samoan or Navigators' Islands, accidentally mislaid, have come to light. *G. hiflora*, the original of the genus, is the only one recorded from the Society Islands. But we have now tolerable materials of two other Tahitan species, as well as four or five from the Samoan or Navigators' Islands\*

CYRTANDRA BIFLORA (Forst.) : arborea, pube furfuracea crocea nascentium partium mox delapsa glaberrima; foliis (3 - 5-pollicaribus) ovato- seu lanceolato-oblongis utrinque subacutis laevibus subtus palli-

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\* *Cyathodes Douglasii*, of the preceding paper, p. 325, proves to be *C. imbricata*, Stschelglew, in Bull. Soc. Mosc. 32, p. 10, a memoir published in the year 1859, which I had overlooked.

*Nama*. The following is supplementary to the revision of this genus published in the preceding paper, p. 337 :—

Specimens of two new species of *Nama*, collected somewhere in the interior of California, probably in the southern part of the country, by Mr. Lobb, have been communicated to me from the Hookerian herbarium. They do not fall well into place under any of the divisions in my revision \ but one of them might stand next to *N. organifolia*, although it has the inflorescence of *N. sericea*; the other should be placed between *N. hispida* and *N. sericea*, having the white villosity of the latter and the slender sepals of the former. The distinctive characters are annexed.

NAMA LOBBII (sp. nov.) : albo-pilosa; caule basi suffruticuloso; foliis anguste spathulatis basi longe attenuatis vix petiolatis subtus pilis arachnoideis albo-villosis; floribus subsessilibus congestis ; sepalis angustissime linearibus sursum attenuatis corollas tubum (limbo paullo longius) subacquantibus; ovario stylisque hirsutis. Corolla 5 lin. longa. — California, Lobb, No. 108.

NAMA BYSTYLA (sp. nov.): viscosohirsutula; caule debili; foliis ovatis petiolatis; pedunculis gracilibus cyraoso-plurifloris} sepalis angustissime linearibus superne haud dilatatis hispidis corolla triplo brevioribus; stylis longe ultra medium connatis inferne cum ovario hispidis. Corolla semipollicaris, angusta. — California, Lobb, No. 164. The connate styles, united for more than two thirds their length, are peculiar to this species.



dis crenato-sub serratis vel subintegerrimis; pedunculis petiolum paullo excedentibus "involucrum albidum 2-3-phyllum caducum pedicellosque 2-3, unifloros gerentibus"; calycis quinquefidi lobis lato-lanceolatis sensim acuminatis; corolla bipollicari; fructu oblongo. Folia adulta in sicco chartacea, venis paginse inferioris albidse perspicuis at vix prominulis. — Tahiti. Also, Tutuila, of the Samoan Islands, unless there has been transposition of specimens. Our specimens are very incomplete, wanting the corolla, calyx, &c. The above character is completed partly from Forster's figures, and his detailed description printed in Guillemin's *Zephyritis Taitensis*, and partly from notes upon his specimen in the herbarium of the British Museum. Hooker and Arnott, in *Bot. Beech. Voy.*, having introduced the phrase "calyce pubescenti-tomentoso" into the character, must have had one of the following Tahitan species in view, and so probably had De Candolle. The nearest relative of 01 *biflora* is the following, from the Samoan Islands.

CYRTANDRA PULCHELLA (Rich in herb. Expl. Exped., sp. nov.): "fruticosa, tripedalis," glaberrima; foliis oblongo-lanceolatis (5-9-pollicaribus) subfalcatis basi subcuneata inaequilatera versus apicem repando-crenatis supra nitidis subtus pallidis; pedunculis folio paullo brevioribus 7-9-floris; "bracteis latis" caducis; calycis coriacei breviter inaequaliter quinquefidi lobis ovatis obtusis; corolla bipollicari; ovario elongato. — Tutuila, one of the Samoan Islands, on the mountain ridge. Peduncles 4 or 5 inches long up to the bifurcation, stout, inclined to become fistulous. Anthers, as in all the following species which have an elongated and dry berry, with the cells perfectly parallel, and the stigma is 2-lobed; so that they are truly of this genus.

CYRTANDRA INDUTA (sp. nov.): arborescens, foliis inaequalibus (altero 8-10-, altero 8-14-pollicari) ovatis seu ovali-oblongis acuminatis dentatis basi inaequilatera ssepius acutis pilis pluriseptatis supra hirsutis subtus cum petiolis pedunculis ramisque junioribus molliter villosis; pedunculis petiolo sequilongis plurifloris; calyce infundibuliformi pubescente, lobis lanceolatis acuminatis tubo 2-3-plo brevioribus; corolla bipollicari; fructu immaturo elongato-oblongo basi attenuato quasi stipitato. — Tahiti, in the mountains, at the elevation of 2000 to 3000 feet, collected by Professor Dana. I have a less downy specimen, communicated by M. Pancher, said to be very common in moist valleys of Tahiti, the pubescence of the lower surface of the leaves ferruginous. This has been confounded with *C. biflora*, but it is wholly

distinct. Calyx nearly an inch and a half long when full grown, acute at the base. The forming fruit an inch and a half long, including the attenuate base.

CYRTANDRA TAITENSIS (Rich in herb. Expl. Exped., sp. nov.): fruticosa, "8-10-pedalis," puberula vel glabella, partibus novellis pube minuta sericea subferrugineis; foliis fere aequalibus ovatis seu ovato-oblongis acutis vel acuminatis subserratis (6-12-pollicaribus), adultis supra hirtulo-scabridis subtus ad costas prominulas venulasque puberulis; pedunculis petiolo 3-4-plo longioribus plurifloris; calyce campanulato brevi ad medium quinquefido, lobis ovato-acuminatis; corolla sesquipollicari, tubo gracili; fructu immaturo elongato-oblongo haud basi attenuato. — Tahiti, in the forest. One specimen is ticketed "Samoa," but as one specimen of the following species is ticketed "Tahiti," a transposition of the loose tickets may be strongly suspected. Petioles slender, 12 to 18 lines long. Peduncles often thickish, and inclined to be fistulous, 3 to 6 inches long. Cyme apparently loose and rather many-flowered, three or four times dichotomous, with a flower in each fork. Corolla white; the tube narrower and the limb smaller than in the foregoing species.

CYRTANDRA SAMŌENSIS (sp. nov.): frutescens, novellis partibus minutim ferrugineo-vel fulvo-pubescentibus; foliis ovatis ovalibusque (6-12-pollicaribus) aequalibus utrinque saepius acutis vel subacuminatis subdentatis vel fere integerrimis, adultis supra glabratis subtus albidis ad costas prominulas venulasque pubescentibus, petiolo (sesqui-quadripollicari) cymis plurifloris breve-pedunculatis bis terve longioribus; calyce tenuiter pubescente a basi 5-(-6-) partito, segmentis lato-lanceolatis corolla semipollicari paullo brevioribus; fructu breviter ovoideo. — Tutuila, Savaii, and Manua, Samoan Islands, along the coast. A specimen is ticketed "Tahiti," probably through a transposition. This should be compared with *C. latifolia*, Benth., & Feejean species not yet met with in later collections, which, however, has peduncles 2 or 3 inches, and the petiole only an inch long. In the present species, the peduncle is half an inch, or at most an inch long, the corymbose or umbel-like cyme about the same length. Forster's *C. cymosa*, from Tanna, as described by Vahl, also has peduncles surpassing the petiole.

CYRTANDRA RICHII (sp. nov.): glabra; caule fruticosa crasso (10-15-pedali); foliis amplis (1-2-pedalibus) membranaceis lanceolato-oblongis basi attenuatis subintegerrimis utrinque viridibus; cymis sub-

sessilibus fasciculiformibus petiolo brevioribus; " corolla viridula suburceolata parvula"; fructu immaturo ovoideo.— Savaii, one of the Samoan Islands, in the deep, interior forest. Petioles 3 or 4 inches long, stout. Calyx and also the corolla not seen by me.

*CYRTANDRA LABIOSA* (sp. nov.) : glabra, praecedenti affinis, sed foliis lato-lanceolatis multo minoribus (6-7-pollicaribus); floribus majoribus; corolla alba eximie bilabiata."—Savaii, Samoan Islands. Loose corollas with the very imperfect specimens appear to be short and broad, deeply bilabiate, the lips twice or thrice the length of the tube, the upper one arching, the lower spreading.

*CYRTANDRA POGONANTHA* (sp. nov.): frutescens; foliis amplis (pedalibus) utrinque acutis vel basi attenuatis subintegerrimis glabratibus viridibus membranaceis, nascentibus ferrugineo-pubescentibus; cymis petiolo brevioribus involucratis brevi-pedunculatis hirsutis; alabastris (calycis) rostrato-acuminatis; corolla tubulosa breviter bilabiata (lobis conformibus ovatis subacutis) extus pilis longis pluriseptatis insigniter barbata. — Savaii, Samoan Islands, in the deep, interior forest. The calyx in anthesis apparently splits down one side to near the middle. Corolla an inch long; the bearded whitish hairs which cover the outer surface, especially of the limb, are remarkable. In structure they resemble those of the petioles and branches of the two following species. Stamens 2, as of the genus; anthers exerted from the throat. Fruit not seen.

The following are the Feejean species of our collection.

*CYRTANDRA MILNEI* (Seem, in *Bonplandia*, 9, p. 257, absq. char.): caule crasso; ramis petiolis costaque foliorum rufo-villosissimis, pilis longis multiseptatis superne attenuatis; foliis (5 - 8-pollicaribus) ovalibus utrinque acutis vel acuminatis serratis pilosis; pedunculis brevissimis plurifloris; bracteis amplis; calyce pedicello longiori tubuloso fere aequaliter 5-dentato persistente fructus ovatum includente. — Feejee Islands. This remarkable species we have in fruit only; the corolla and stamens therefore unknown to me. The very shaggy petioles 3 or 4 inches long; the blade of the leaf conspicuously veiny. Fructiferous calyx 7 to 10 lines long, cylindraceous or tubular-cyathiform, glabrate, longer than the included even full-grown fruit.

*CYRTANDRA DOLICHOCARPA* (sp. nov.): frutescens; ramis gracilibus, junioribus cum petiolis pedunculisque (unifloris?) pilis longis rufescentibus multiseptatis (modo *C. Milnei*) barbatis; foliis subaequalibus lanceolato-oblongis acuminatis denticulatis supra hispidulis subtus

breviter fulvo-pubescentibus; calyce longe tubuloso fructu cylindrico siliquaeformi (1 £ - 2-pollicari) acuto £ brevior sero deciduo. — Sandalwood or Mbua Bay, Vanua-levu, Feejee Islands. A solitary specimen, in fruit only. Evidently allied to *G. Milnei*, by the pubescence, tubular calyx, &c. The latter is made out from vestiges which remain upon one side of one of the fruits, showing that it attains fully an inch in length. Yet it is exceeded by the singularly elongated fruit, which, except in form, resembles that of other species of *Cyrtandra*, i. e. is corticate, probably fleshy when fresh, but juiceless, and indehiscent. The stamens must determine whether its relationship is with *Fieldia* or *Whitia* (the latter probably no good genus); but other Polynesian species exhibit a similar, only less elongated fruit.

CYRTANDRA INVOLUCRATA, Seem. 1. c. A very imperfect specimen, from Ovolau, appears to belong to this species (the involucre fallen); but my specimen from Dr. Seemann wants the flowers, that of the Expedition the fruit, and both the corolla, — so that I cannot properly identify them nor furnish a specific character. In ours, the calyx is rostrately acuminate in the bud, the lobes subulate from a broad base and about the length of the ovoid-campanulate tube.

CYRTANDRA ANTHROPOPHAGORUM (Seem. 1. c.): frutescens, minutim fusco-pubescentibus; foliis oblongis acuminatis subserratis (3 - 5-poll.); pedunculis petiolo brevioribus paucifloris, pedicellis flore longioribus; calyce ad medium 5-fido, lobis subulato-lanceolatis corolla (semipollicari) dimidio brevioribus; fructu ovato-oblongo. — Ovolau. The flower is described from scanty materials in the collection of the Expedition, the young fruit from that of Dr. Seemann.

CYRTANDRA PRITCHARDI, Seem. 1. c. Ovolau. Dr. Seemann's materials are probably much better than ours.

The Feejee Islands are apparently as rich as the Sandwich Islands in species of *Cyrtandra*. Besides those above mentioned, Dr. Seemann has the following undescribed ones, which are not in the Exploring Expedition's collection: *C. acutangula*, with square branches; *C. Vitiensis*, with a tubular calyx; *C. coleoides*, and *C. ciliata*. None of these wholly accords with one collected by Prof. Harvey, nor with the characters of Bentham's *C. calycina* and *C. latifolia*. The former must, by its calyx, be of the same group with *O. Vitiensis*, *C. Milnei*, &c.

#### *Gentianaceae.*

ERYTHRAEA SAB^EOIDES. *Schenkia sabceoides*, Griseb. in Bonplandia, 1, p. 226. This plant was not met with by the naturalists of

Wilkes's Expedition. But having examined a specimen of Seemann's no. 2272, and of Remy's no. 375, from Oahu, I cannot regard the plant as other than a close congener of the plant which it most resembles, viz. *Erythrcea spicata*. The leaves are broader and rounder, being broadly oval, the tube of the corolla proportionally shorter and its lobes broader; the sepals are less narrow and more carinate, or, if you please, winged on the back. But this varies somewhat, even in the sepals of the same flower, and at most is only a matter of degree, the sepals being carinate, at the base sharply so, in *E. spicata*. So other American species effect a transition in this respect to *Gyandra*, Griseb. (*Erythrcea chironioides*, Torr.). Grisebach describes the stigma of his *Schenkia* as "capitulatum," or "crassiusculum"; but there must be some mistake or confusion here. For in Seemann's own specimens, which I have examined, as also in those of Remy, the stigma is very large and just as in *E. spicata*, that is, appearing as this organ is characterized by Grisebach in the section *Spicaria*, but upon maceration separating completely into two nearly orbicular flat divisions.

In *Erythrcea* generally I cannot verify the character "corolla supra capsulam contorto-marcescens."

LIMNANTHEMUM KLEINIANUM, Griseb. var.? Imperfect specimens of a *Limnanthemum* from the Feejee Islands, said to be "common in Taro ponds, and probably introduced," (and similar ones were collected there by Dr. Harvey,) accord, except in their smaller leaves, with Dr. Seemann's 323, referred by him to *L. Kleinianum*. But they differ from my only Indian specimen of the latter (from Maisor or the Carnatic, coll. Thomson and Hooker) in not having three ribs prominent underneath, in their smaller flowers (the corolla in all too poor for investigation), and in their flat and acute-edged, perfectly smooth seeds. Those of the Indian specimen referred to are not badly represented in Hook. Bot. Misc. 3, suppl. t. 30, in the figures which Grisebach excludes from the species, being\* turgid, obtuse at the margin, and their face minutely muricate by fine spiculae, which, however, may be readily rubbed off.

#### *Solanacece.*

SOLANUM NELSONI (Dunal in DC. Prodr. 13, p. 123?): inerme, pube stellata fulvo- seu flavido-tomentosum; caulibus fruticosis procumbentibus; foliis cordatis vel rotundo-subcordatis integerrimis utrinque molliter tomentosis\* saepius cum axillari parvo; racemo paucifloro

pedunculato demum laterali; floribus extus tomentosus; calycis lobis ovatis obtusis corolla 5-fida plicata triplo breviori; antheris apice attenuatis incurvis filamentis (in sicco bullato-rugoso) subduplo longioribus. *Solarium argenteum*, Hook, and Am. Bot. Beech. ? *S. rotundifolium*, Nutt. in herb. Hook. — Sandwich Islands, on the sands of the low isthmus of Maui. Collected by Nuttall on Kauai, and on Oahu by Remy, no. 442. Without having seen Nelson's specimen in the Banksian herbarium, upon which Dunal, in the year 1819, drew up his character of *S. Nelsoni*, we may presume, notwithstanding some discrepancies, that it is the species here described from ampler materials. But it does not belong to his division *Pachystemonum*. The anthers, although rather short, are strongly attenuate at the summit, and the cells open by a minute and strictly apical pore. Branches perhaps sarmentose. Leaves an inch or two in length and breadth.

SOLANUAI SANDWICENSE (Hook. & Arn.) : fruticosum, inerme; foliis sublonge petiolatis ovatis (basi obtusa vel rotundata) integerrimis undulatis vel angulato-sinuatis supra pube stellata minuta parce delapsa glabratis subtus ramis floribusque cano- seu ochraceo-tomentosis; cymis pedunculatis plurifloris demum lateralibus, pedicellis gracilibus; calycis lobis subulatis corolla fere 5-partita (segmentis aestivatione valde induplicatis, evolutis ovalibus obtusis) 3 - 4-plo brevioribus; antheris oblongis arcuatis apice subattenuatis, poris apicalibus. Ludit indumento tenuiore minus incano, et in var.? £. crassiore furfuraceo. *S. Sandwichense* fy *S. Woahense*, Dunal in DC. — Oahu, Sandwich Islands.

Var. ? *p.* KAVAIENSE : foliis ovato-oblongis magis acuminatis, tomento furfuraceo; calycis lobis angustissimis. — Kauai, on the leeward verge of its tabular summit.

SOLANUM INCOMPLETUM (Dunal, 1. c) : frutescens, subtomentosum, aculeis igneis validis (aut perpaucis aut numerosis, praecipue foliaribus rarissime caulinis) armatum; foliis longe petiolatis ovalibus oblongisve sinuatis vel subpinnatifidis (lobis brevibus obtusissimis) supra stellulato-puberulis subtus cum inflorescentia fulvo- seu ochraceo-tomentosis; pedunculis lateralibus brevissimis plurifloris; calycis lobis brevibus obtusis; corolla profunde 5-fida (alba?), segmentis oblongis arcuatis sursum vix attenuatis, poris apicalibus majusculis; baccis globosis parvis. Hawaii, Sandwich Islands, Nelson (without flowers or fruit), Remy (no. 451, a very aculeate state, in blossom), and fruiting specimens in the collection of the Expedition. Apparently only a foot or so in height, and barely woody at the base. Leaves 1£ to 2 inches long,

and the petiole 6 to 14 lines in length. Berries half an inch or less in diameter.

SOLANUM VIRIDE, Solander, from various South Sea Islands, apparently includes *S. anthropophagorum*, Seemann, from the Feejees.

SOLANUM INAMCENUM, Benth., of the Feejee Islands, does not present tortuous branches; the leaves are seldom oblique; and cymes are often bifid.

SOLANUM AUICORUM, Benth., from Tongatabu. In the same group of islands, Dr. Harvey collected fine specimens; the globular fruit resembling that of the preceding species.

SOLANUM REPANDUM, Forst. The "Feejee Tomato" appears to be a variety of this species, altered by cultivation, the ovary nearly glabrous, the fruit completely so, and "as large as an apple."\*

LTCIUM SANDWICENSE (sp. nov.): glabrum; ramis rigidis; foliis subcarnosis venis spathulatis obtusissimis basi attenuatis vix petiolatis plerisque fasciculatis; pedicellis solitariis folio brevioribus; floribus tetrameris; calycis breviter quadrifidi lobis late triangularibus corollae tubum adaequantibus; corollae lobis tubo suo longioribus patentissimis; filamentis basi glaberrimis; bacca globosa. — Sandwich Islands, on Diamond Hill, Oahu, near Honolulu. DP. Pickering, whose judgment in this regard is critical, records it as undoubtedly indigenous; and it does not accord with any one of Mr. Miers's sixty-nine described

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\* The following is a North American species, which occurs in several collections:—

SOLANUM TORREYI (sp. nov.): perenne, aculeis rectis breviusculis parce armatum vel subinermis, griseo-pubescentibus stellatis scabridis; foliis sinuato-pinnatifidis basi truncata vel subcordata, lobis 3-7, terminali undulato vel repando, costa pinnatis aculeato; cyma terminali demum laterali bifida; pedicellis defloratis recurvis; calycis tubo brevi-campanulato, lobis e basi lata caudato-acuminatis; corolla ampla (1½-2 pollices lata) semiquinquefida violacea; antheris conformibus flavis elongatis apice attenuatis stylo apice incurvo brevioribus; bacca globosa (pollicem lata viridi demum lutea) calyce turn denique 5-partito subtensa. — *Solanum mammosum* f. Engelm. & Gray, PL Lindh. 1, p. 46, no. 281, non Linn. *S. platyphyllum*? Torr. in Ann. Lye. N. Y. 2, p. 227, non Dunal. S.—, Torr. & Gray in Pope, Rep. Pacif. E. R. Surv, 2, p. (172) 16. This species is not rare from the Upper Arkansas to Lower Texas. At New Braunfels, according to Lindheimer, it is common in clayey soil, wherever the original vegetation has been destroyed by men or cattle. It has long survived in the Cambridge Botanic Garden, where it spreads by running subterranean shoots, and the large flowers are rather showy. Having for many years vainly endeavored to identify the plant with some described species, I at length venture to publish it as new.

species. It occurs in no other collection that I know of, yet it was found in a district which has often been botanized over. The peculiarities of the species are its fleshy leaves, and tetramerous flowers, with the corolla so deeply cleft that it falls into Miers's section *Macrocope*. Otherwise it approaches *L. vulgare*, but it is without hairiness, at the base of the filaments. Berry "saline to the taste, but edible."

The North American species, represented in Dr. Torrey's herbarium and my own, on examination, give the subjoined results.\*

\* LYCIA AMERICA BOBEALIS.

§ 1. Flores majores: corolla infundibuliformi-tubulosa, ultra-semipollicaris (9-10 lin. longa, viridula): calyx laxe campanulatus, usque vel ultra medium 5-fidus, lobis subfoliaceis patentibus; anthera mucrone deciduo superata. Glabra.

1. *L. PALLIDUM*, Miers, Monogr. in Contrib. 2<sup>a</sup> p. 108, t. 67, C.; Torr. in Bot. Mex. Bound, p. 154. — New Mexico and adjacent parts of Arizona, Fendler (670, 668<sup>b</sup>), Bigelow, Thurber, Fremont, Newberry.

Forma *a*: filamentis et corolla intus glaberrimis. Spec. Fendler, Newberry, &c.

Forma *p*: filamentis tuboque corollae intus pilosulis (spec. Thurber) vel hirsutis (spec. Fremont e Rio Virgen).

This difference in respect to the smoothness or hairiness of the filaments and base of the corolla inside, in what is evidently the same species, throws doubt upon the value of that character in the rest of the genus. No other evidence of dimorphism is observable. Mr. Miers described the species from the smooth form; yet he noticed (what I have not detected in Fendler's specimens) some hairs below the insertion of the filaments. The lobes of the calyx (1½ to 2 lines long) are seldom "lineari-acutis"; they vary from lanceolate to ovate, and are often very obtuse.

§ 2. Flores mediocres sed breves: corolla semipollicaris vel brevior, limbi rotato-expansi lobis 4-5 tubo mox longioribus. Glabra, foliis carnosis.

2. *L. CAROLINIANUM*, Walt., Michx. — Coast of South Carolina to the Mexican boundary (Texas, Drummond, Coll. 2, 244). I have it not under the numbers of Berlandier cited by Miers. Filaments very densely tomentose-bearded for a short distance just above the insertion.

§ 3. Flores minores: corolla J - ^-pollicaris, lobis tubo (saepissime multum) brevioribus.

\* Calyx profunde 5-fidus, lobis tubo suo longioribus corollae angustae apice breviter 5-lobae dimidium fere attingentibus: pedicelli nulli vel brevissimi. Puberulae, spinosae.

3. *L. MACRODON* (sp. nov.): ramis jupioribus pubescentibus; foliis glaberrimis spathulato-oblancoatis nervis fasciculatis (2-4 lin. longis); pedicellis brevissimis (ad summum sesquilinearibus); calycis minutim viscosi lobis anguste linearibus tubo breviter campanulato (sesquilineari) duplo longioribus; filamentis versus basin hirsutulis. — California, in the interior? Coll. Fremont in Expedition to California, 1849., Herb. Torr. Corolla half an inch long, narrow. Anthers oval-oblong, slightly if at all exerted.



The three following *Solanaceae* of the Sandwich Islands, which I cannot refer to any known genus, are here characterized from materials

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4. *L. PUBERULUM* (sp. nov.) : foliis obovatis vel oblongo-spathulatis subtus univerviis fasciculatis (4-8 lin. longis) cum ramulis gracilibus caucibusque minutim pruinoso-pubescentibus; floribus sessilibus; calycis lobis angusto-oblongis obtusis tubo subhemisphaerico longioribus; filamentis glabris. —Western borders of Texas, near El Paso, C. Wright, no. 1609. \*\* A much branched shrub, 2 to 4 feet high; tube of the corolla white, the margin yellowish-green." Spines numerous and slender. Lobes of the calyx a line and a half long, very blunt. Corolla 4j or 5 lines long, the short lobes recurved, ovate; the tube within pubescent below the insertion of the glabrous filaments: anthers cordate-globular.

\* \* Calyx insigniter 4-5-dentatus, dentibus lanceolatis tubo suo parum brevioribus: pedicelli calyce breviores vel sequilongi. Glabra vel fere glabra, spinoscentis.

5. *L. BREVIPES*, Benth. Bot. Yoy. Sulph. p. 40; Miers, l. c. p. 117, t. 69 C.—Lower California, Hinds and Barclay, Xantus, no. 89? without flowers or fruit. Our herbaria afford no materials for this species. We have nothing from that region, or indeed from elsewhere, with the calyx scarcely a line long, and yet longer than the pedicel, its teeth lanceolate and acute, and the corolla five lines long, or in the imperfect flower figured by Miers three lines long. A fragment in herb. Torr., from California^ Rev. Mr. Fitch, somewhat accords with the character, except in the calyx-teeth, which are very short and broad.

6. *L. RICHII* (sp. nov.): foliis spathulatis (3-5 lin. longis), novellis tenuissime puberulis vel fere glabris; floribus tetrameris; calyce campanulato pedicello (1-2-lin.) longiori vel sequilongo, dentibus lato-lanceolatis acutiusculis tubum subajquantibus; corolla (4 lin. longae) tubo calyce et lobis ipsis duplo longiori intus glabro; filamentis basi villosis. —La Paz, South California, Major Rich. California, Rev. A. Fitch (Herb. Torr.). The latter specimen has the young leaves minutely puberulent, the former scarcely if at all so. Teeth of the calyx inclined to become recurved-spreading. Lobes of the corolla 4, oval, not ciliolate, not exceeded by the filaments. Anthers oblong.

# \* \* Calyx breviter vel brevissime 4-5-dentatus, ssepc hinc vel bi-trilabiatis fissus, dentibus segmentisve latis.

t- Subpuberulum: filamentanuda vel basi vix pilosa (corollam hand superantia).

7. *L. FBEMONTI* (»p. nov.): foliis spathulatis (3-4-pollicaribus) cum pedicellis calycibusque tenuiter puberulis; calyce cylindraco quam pedicellus gracilis breviori, tubo dentibus quadruplo longiori; corolla tubulosa, tubo lobis 5 quadruplo longioribus; filamentis prorsus glabris. (*L. near fragosum*, Miers, in herb. Torr.; Torr. in Pacif. R. R. Exped.4, p. (71) 127.) —Interior of California or country east of it, Fremont, Coll. Exped. 1849. Williams<sup>1</sup>\* Fork of the Colorado, between California and New Mexico, Dr. Bigelow, a form with narrower leaves and smaller, more slender flowers, —i. e. calyx about 2 lines and corolla 4j lines in length; the tube of the latter pubescent inside in lines below the stamens; while in the type of the species, the calyx is 3 lines, pedicels 4-7 lines, and corolla 6 lines in length;

which are both scanty and imperfect. Attention being thus directed to them, perhaps these materials may be supplemented from some other

the latter, I believe, like the filaments, wholly glabrous; the lobes in both not ciliate. Anthers oval.

Var. *p.*? BIGELOVII: pedicellis abbreviatis calyce subturbinato (2 lin. longo) magis dentato vix sequilongis; filamentis corollaque intus basi parce hirsutulis. — Cañons of Williams's Fork of the Colorado, Dr. Bigelow. Perhaps a distinct species; but, as it was collected with one of the above specimens, and the materials of all three are scanty, I cannot venture to consider it so.

•-t- Glabrum: filamenta basi villosa: pulvilli fasciculorum foliorum seepius lanulosi. — Species a longifloris ad brevifloras ordinatse.

8. L. TORRETI (*L. barbinode*, Ton\*, in Pacif. R. B. Exped. 5, p. 363, & Bot. Mex. Bound, p. 154, non Miers, Monogr.): foliis lanceolato-spathulatis crassiusculis (semi-subsesquipollicaribus); pedicellis fasciculatis (2-5 lin. longis); floribus pentameris; corolla tubuloso-infundibuliformi (5-6 lin. longa) calyce subaequaliter 5-dentato quadruplo longiori, lobis suis tomentoso-ciliatis. — Texas, on the Rio Grande, to Fort Yuma, interior of California, along the Mexican boundary, collected by Fremont, Major Thomas, Thurber, Bigelow, Schott, and Wright (1609, in herb. Gray, probably an error, as *L. puberulum* bears this number also: 1604 and 1608 in herb. Torr., but I have no *Lycium* under the former number). Calyx campanulate; the teeth about a third or more of the length of the tube, often tomentose-ciliate. Lobes of the "blue or purple" corolla always bordered by a fine white tomentum, the throat or portion above the insertion of the stamens elongated and narrow, very gradually enlarging upwards, about one third of the length of the tube, nearly equalling the stamens. The flowers abundantly distinguish this species from the next, — for which, however, Mr. Miers mistook an insufficient specimen in herb. Torrey. We now have it in great abundance.

9. L. BARBINODTJM (Miers, l.c. p. 115, t 68, E.): foliis lineari-spathulatis (semi-subpollicaribus); pedicellis (sesquilineam longis) calycem fiequantibus; floribus pentameris; corolla e tubo angusto superne campanulata (3 lin. longa) calyce saepius fisso duplo-subtriplo longiori, lobis brevibus parce pilosulo-eiliatis. — Mexico, on the table land of Durango, Seemann, 2090. Unless a specimen of Thurber's collection from Sonora, in fruit only, belongs here, this species is known solely from Seemann's specimens: from one\* of these the above character is derived. It will be found to accord well with the description published by Miers, but not, as respects the shape of the corolla, with his figure. We ought not to rely too much upon this (as the following species shows); but the phrase "corolla tubo imo coarctato, hinc repente campanulato . . . laciniis . . . margine subciliatis," accords perfectly with an authentic specimen in my herbarium. The corolla, moreover, is only about half the length of that of the preceding species.

10. L. BERLANDIERI (Dunal in DC. *L. stblidum* fr *L. senticosum*, Miers, l. c.): foliis lineari-spathulatis seu linearibus basi attenuatis (4-7 lin. longis); floribus ssepiissime tetrameris pedicello (1J-3 lin.) subdupTvel parum longioribus; corolla (3-3jlin. longa) infundibuliformi fauce ampliata calyce brevi 3-4-plo longiori

collection. From the shape of the unripe seeds it is probable that the embryo is curved.

NOTHOCESTRUM, *Nov. Gen.*

Calyx campanulatus 4-dentatus vel subbifidus, immutatus. Corolla breviter hypocraterimorpha, limbo 4-partito, lobis ovatis sestivatione valvato-induplicatis. Antherae 4, infra faucem insertae, sessiles, lineares, inappendiculatae, loculis introrsum longitudinaliter dehiscentibus. Discus hypogynus nullus? Ovarium globosum, estipitatum, biloculare, loculis pluriovulatis: stylus breviusculus: stigma bilobum: ovula subcampylotropa. Bacca calyce suffulta. Semina subreniformia, majuscula. — Arbores vel frutices, *Cestri* seu *Lycii* facie, Sandwicenses, foliis alternis integerrimis, pedunculis unifloris seu pedicellis in axillis foliorum solitariis vel fasciculatis.

NOTHOCESTRUM LATIFOLIUM (sp. nov.): foliis subpuberulis late ovalibus seu ovatis obtusis; corolla extus subsericea, tubo calyce breviter campanulato duplo longiore; bacca globosa. — Oahu, on the ridge of the Kaala Mountains. "Shrub about 12 feet high." Leaves membranaceous, about 2 inches long. Pedicels fascicled. Calyx 3 lines long. Corolla white? its tube half an inch long; the lobes not half the length of the tube, their margins strongly induplicate and the sinuses plaited. Anthers almost two lines long.

NOTHOCESTRUM LONGIFOLIUM (sp. nov.): glabrum; foliis oblongo-lanceolatis oblongisve basi attenuatis; pedunculis solitariis; calyce obtuse 2-4-dentato longiuscule campanulato; bacca (immatura) elongato-oblonga.— Oahu, on the mountains behind Honolulu, at

mnnc breviter quadriloba none altius 4-fida. — Texas and the adjacent parts of Mexico along the Rio Grande, from its mouth to Monterey and to the borders of Arizona, Berlandier (1411, 1426, 1788, 3022), Gregg (199), Wright (540, 542, 1610), Bigelow, Thurber, Schott. Corolla "white," fully 3 lines long; the lobes varying from one fourth to one third the length of the undivided portion, or in the older flowers sometimes reaching almost to the middle. Stamens and style usually exerted. Calyx with 4 broad, blunt, equal or unequal teeth, sometimes splitting deeply on one or two sides. Berries red.

11. L. PARVIFLOHUM (sp. nov.): foliis lineari-spathulatis (2-5 lin. longis); floribus tetrameris brevi-pedicellatis; corolla (2 lin. longa) calyce 2-3-plo longiori, fauce ampliata, lobis tubo dimidio brevioribus. — Arizona (Sonora), Thurber\*, also Dr. Parry, without indication of particular locality. Perhaps this may pass into the foregoing; but the flowers are smaller, and the corolla proportionally much shorter. Calyx either equally 4-toothed or 2-3-cleft. Stamens inserted very low down on the corolla. Pedicels a line or a line and a half in length.

the elevation of 1,500 feet. Leaves 4 to 7 inches long, thin. Pedicels 6 to 9 lines long. Corolla not seen. Testa of the immature seeds reticulated.

**NOTHOCESTRUM BREVIFLORUM** (sp. nov.): arboreum, fere glabrum; foliis anguste oblongis ellipticiy corollce tubo calycem 2-4-lobum vix superante. — Hawaii, "between the Great Crater and the upper base of Mouna Roa. A tree 20 feet high, with the trunk 5 inches in diameter and the wood greenish: habit of *Solandra viridis*; the flowers greenish, but small." Pickering. Leaves 2½ to 4 inches long, rather coriaceous. Calyx 4½ lines long, 4-nerved. Corolla, &c. nearly as in *N. latifolium*, but shorter. Fruit not seen.

#### *Scrophulariacee.*

**CALCEOLARIA PETIOLARIS**, Cav., is the name of this species, as written by Cavanilles; but every succeeding author, except Sprengel, has changed it to *G. petiolaris*, which makes a decided misnomer, and has caused already the introduction of two useless synonymes.

**CALCEOLARIA BARTSLJEFOLIA**, "Wedd. Chlor. And. Andes of Peru, above Baños. This we had thus named in our collection long before the appearance of Weddell's work, so obviously appropriate is the specific name.

**CAPRARIA CALTCINA** (sp. nov.): glabra, humilis; foliis lanceolatis seu linearibus paucidentatis, dentibus grossis divaricatis plerumque versus basim; floribus in axillis solitariis; calycis laciniis foliaceis pedunculo aequilongis seu longioribus corollam adaequantibus capsulam superantibus; staminibus 4; stigmatibus emarginato. — Hunter's River, New South Wales. The only ground of suspicion as to the correctness of the habitat is, that all the species before known are American. This is related to *C. biflora*: it differs in its solitary and short-peduncled flowers, and its calyx of twice the size, with lanceolate, foliaceous, accrescent divisions, in flower 4 lines, in fruit half an inch long, sometimes slightly denticulate.

#### *Verbenaceae.*

**LIPPIA SERIPHIOIDES** (sp. nov.): fruticosa, intricato-ramosissima, puberulo-scabrida; ramis rigidis; foliis minimis (1 - 2½-lin. longis) fasciculatis lineari-spathulatis cuneatisve saepius trilobis margine revolutis; capitulis globosis demum elongandis ex axillis breviter pedunculatis solitariis vel subracemosis; bracteis ovatis concaviusculis calyce oblongo

breviter bifido brevioribus; antheris superioribus saepe (non semper) e connectivo glanduloso-appendiculatis. — Rio Negro, North Patagonia, on the upland plain. This, I believe, occurs in the Hookerian herbarium, in the collections of Tweedie and of Gillies, and was by the latter called *Verbena rubiginosa*, a name never published, and now preoccupied in *Lippia*.

CLERODENDRON INERME, R. Br., var. *p.* OCEANICUM: foliis majoribus (2½-5-pollicaribus) magis acuminatis; calyce truncato denticulis 5 minutis; cymis nunc 5-7-floris. — Samoan, Tonga, and Feejee Islands. This must be Forster's *Volkameria inermis*, and perhaps Sprengel's *Clerodendron Commersonii*. I have seen no intermediate forms (though they probably occur) between this and the true *C. inerme* of India, &c, which has smaller and blunter leaves, and, as described by Schauer, a distinctly 5-toothed calyx, "dentibus lato-triangularibus acutis."

CLERODENDRON, sect. TETRATHYRANTHUS. Limbus calycis et corollae quadrilobus, fere regularis.

CLERODENDRON (TETRATHYRANTHUS) OVALIFOLIUM (sp. nov.): foliis ovalibus obtuse acuminulatis integerrimis basi subangustatis (cum petiolo ramisque teretibus) glabris; cymis plurifloris corymboso-paniculatis canescenti-puberulis; corolla hypocraterimorpha, tubo (ultra-pollicari) calycem obtuse 4-lobum pluries excedentibus, lobis 4 rotundatis inter se asqualibus stamina adaequantibus.— Feejee Islands. Differs from the next somewhat in the foliage, but strikingly in the shape of the corolla.

CLERODENDRON (TETRATHYRANTHUS) AMICORUM (*Clerodendron Amicorum*, Seem, in *Bonplandia*, 10, p. 249): foliis ovali- seu cuneato-obovatis (9-11-pollicaribus) in petiolum brevem attenuatis integerrimis cum ramis subteretibus glabris; cymis multifloris corymboso-paniculatis canescenti-puberulis; corollae tubo subinfundibuliformi calyce 4-lobo quadruplo lobis *ijm's* duplo triplove longiori; staminibus modice exsertis. — Samoan and Friendly Islands. Corolla stouter, its tube shorter (at most an inch long) and enlarging upwards, and the limb larger than in the preceding. The tetramerous flowers remind us of Labillardière's genus *Oxera*, of New Caledonia, but in all other particulars it is a *Clerodendron*. Since the above character was drawn up, Dr. Seemann has published the species as a new one, under the same name, comparing it with *C. inerme*, but without noticing\* the tetramerous character.

NESOGENES EUPHRASIOIDES, A. DC. (*Myoporum? eupkrasioides*, Hook. & Arn.), which was collected upon several of the Coral Islands,—a plant with much the aspect of *Hedeoma pulegioides*, or of some *Lythrum*,—proves to be no shrub, but probably an annual, and no Myoporineous plant. The anthers are distinctly two-celled, and the ovules are erect. Without doubt it is a true Verbenacea, but I know not any genus which it particularly approaches. The generic character, as corrected and completed, is as follows:—

Char. gen. Calyx obconicus, 10-nervis, 5-dentatus, dentibus triangulatis, post anthesin auctis patentibus. Corolla bilabiata, labio superiori bipartito, inferiori tripartito, lobis rotundatis consimilibus, posticis paullo brevioribus. Stamina 4 fertilia, didynama, cum vestigio filamenti quinti: antheroe biloculares, didymae, loculis paullo divergentibus (haud confluentibus) basi aristulatis. Discus hypogynus nullus. Ovarium ovatum, biloculare, loculis uniovulatis: stylus terminalis, filiformis: stigma parvum indivisum. Ovula e basi loculi erecta, anatropa. Drupa sicca, nucumentacea, parva, calyce inclusa, epicarpio tenuissimo, endocarpio crustaceo, bilocularis (vel dissepimento evanido unilocularis), disperma vel abortu monosperma. Semen cylindraceum, testa reticulata, albumine parco. Embryo teres: radícula infera cotyledonibus aequilonga. — Herba sesquipedalis, ut videtur annua, hirtello-scabra, caulibus nunc basi lignescentibus, ramis foliosis; foliis oppositis parvulis ovatis basi angustatis in petiolum attenuatis integerrimis, inferioribus quandoque subcrenatis; floribus parvis in axillis saepe geminis; pedicellis calyce brevioribus minutissime bibracteolatis mox decurvis; corolla caerulescente?

#### *Myoporinea.*

The ordinal character in the Prodrômus respecting the stamens, "absque vestigio quinti superioris," disregards Brown's character, "quandoque rudimentum quinti, raro polliniferi." It may be indirectly made out that Brown here refers to *Myoporum*, and I suspect that he had a Sandwich Iskhd representative of this group in view, in which the stamens are really isomerous with the lobes of the corolla in all the numerous flowers which I have been able to examine. This character in *M. Sandwicense*, (which has escaped the notice of all preceding observers, except, probably, of Brown, who must have had this plant under examination,) along with the increase in the number of the cells of the ovary, would fully warrant the establishment of a separate

genus. But the fifth stamen is wanting in *M. (Pentaccelium) bontioides* of Japan, and in the allied *M. Chinense*. The Japanese species sometimes has the cells of the ovary reduced to four (unless there is a slip or misprint in Zuccarini's detailed description) ; while, on the other hand, one of the original species, *M. Icetum*, Forst.,\* has a 3-celled and 3-seeded putamen; and this not by the abortion of a half-carpel, for the ovary in the flower I examined was found to be trilocular with a single ovule in each cell. All this militates against De Candolle's primary division of the genera, and against the validity of his genus *Polyccelium (Pentaccelium, Zucc)*. The alternative evidently now is the establishment of two genera, *Polyccelium* and *Pentaccelium*, or their reduction to mere sections of *Myoporum*. The latter is, I confidently suppose, the better view, and the species in question may be disposed as follows: —

§ 1. PENTACCELIUM (*Pentaccelium, Zucc*). Ovarium 4-6- saepius 5-loculare. Stamina 4, didynama. \*

MYOPORUM CHINENSE. *Polyccelium Chinense, A. DC. Prodr. 11, p. 706.* — China.

MYOPORUM BONTIOIDES. *Pentaccelium bontioides, Zucc. Fam. Nat. Fl. Jap. 2, p. 27, t. 3. Polyccelium bontioides, A. DC. 1. c.* — Japan.

§ 2. POLYCCELIUM. (*Polyccelium, A. DC. 1. c pro parte.*) Ovarium 5 - 8-loculare. Stamina 5 vel 6, petalis isomera.

MYOPORUM SANDWICENSE (*M. tenuifolium, Hook. & Am. Bot. Beech, p. 93, vix Forst. & R. Br. Polyccelium Sandwicense, A. DC. 1. c.*): glabrum; foliis oblongo-lanceolatis acutissime vel tenuiter acuminatis integerrimis, inferioribusve nunc parce serrulatis; fasciculis 3 - 8-floris; pedicellis petiolum subsequantibus; corolla late campanulata ad medium usque 5-fida; staminibus 5; drupa 4 - 8-loculari. Ludit floribus 6-meris 6-andris, foliis aut 2 - 3-pollicaribus angustis aut 3 - 5-pollicaribus multo latioribus. — Sandwich Islands, leg. Menzies, Beechey, Gaudichaud, Douglas, Nuttall (*Prinastrum cauliflorum, Nutt. in Herb. Hook.*), Remy (nos. 461, 462, 463), &c, on almost all the islands. Variable in the foliage, &c One form is recorded as "a decumbent shrub"; another, as "a tree, forty feet high." But no mention is made of its wood, which, according to Hooker and Arnott,

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\* "Stamens 5," in the generic character of Hook. f. Fl. N. Zeal., is an evident lapsus or misprint.

on the authority of Menzies, has the fragrance of sandal-wood, and was formerly exported as such to China. Stamens all antheriferous and alike, or two of them frequently a little exceeding the others, or with larger anthers. Seed cylindrical: albumen thin, or sometimes wanting. Embryo cylindrical; the cotyledons as long as the radicle.

*Plantaginaceae.*

Notes upon the dimorphism and tendency to diclinism in the flowers of many species of *Plantago* have been published in Man. Bot. N. U. S., the Botany of the Mexican Boundary, and in Silliman's Journal for Nov. 1862, p. 419.

PLANTAGO ORBIGNTANA, Steinh. ex Decaisne, appears to be only an andine variety of *P. hirtella*, a perennial analogue of *P. Virginica*, and which, like that species, occasionally has the long-stamened and opeivflowered form fruitful. Of the var. *Orbignyana*, only the form with short stamens and connivent-closed corolla is known. In our specimens, the style projects from the apex of the closed corolla in anthesis; so that these flowers are not self-fertilized, as has been supposed, but cross-fertilized, as in analogous cases.

PLANTAGO PAUCIFLORA, Lam., Barnèoud, &c. (*P. barbata*, Forst., &c. *P. polymorpha*, Banks & Soland. *P. monanthos*, D'Urv., Hook. f. &c.) — Fuegia. The distinctions between *P. barbata* and *P. monanthos* have been reduced by Dr. Hooker to two; viz. the want of beard at the base of the leaves in the latter, and the basal portion of the calyx scarcely exceeding the calyx in the former. The character derived from the beard would be expected to break down on consideration of Dr. Hooker's varieties of the two, and of what we know of other species. In fact, antarctic specimens with copious beard or wool, and with broad and toothed leaves, — and even some of Hobker's own, from Hermite Island, with long, narrow, entire leaves, — exhibit the funnel-shaped persistent portion of the capsule after dehiscence of twice or thrice the length of the calyx. Decaisne's distinctions in respect to the ovules and seeds are invalidated by Dr. Hooker's excellent figures, which represent four seeds in each cell of *P. monanthos*. These antarctic forms being evidently all of one species, Forster's name of *P. barbata*, being inapplicable to the whole species and not very much earlier than Lamarck's, may properly enough give place to the latter. I suspect that Dr. Hooker's specific diagnosis has been drawn between the common antarctic species and the following one, confused with



*P. barbata* of Forster. I have seen no Chilian specimens referable to the latter; but they very probably exist.

PLANTAGO UNCIALIS, Decaisne. (*P. paneiflora*, var. *major*, Barnèoud? *P. barbata*, var. *uncialis*, Wedd. *P. andicola*, Gillies in herb. Hook.) — High Andes of Chili, close to the snow. In this the globular-ellipsoidal, 4-seeded capsule dehisces below the middle, and the persistent portion is decidedly shorter than the sepals.

PLANTAGO PRINCEPS, Cham. & Schlecht. This remarkable species, of the Sandwich Islands, certainly includes *P. Queleniana* of Gaudichaud (as Chamisso suspected); and I am constrained to append to it the following as varieties, although they appear so different that they would naturally be taken for species. If so, many such are making in the Sandwich Islands.

Var.  $\delta$ . LAXIFOLIA : caule 1 - 2-pedali minus lignoso; foliis magnis (4 - 7-pollic.) submembranaceis oblongo-lanceolatis ovalibus seu obovatis basi in petiolum alatum angustatis 7 - 9-plinerviis, basibus laxe imbricatis; capsula plerumque 4-sperma. — Hawaii, growing among stones by the sea-side, at the northern base of Mouna Kea.

Var.  $\gamma$ . HIRTELLA: foliis praesertim subtus cum pedunculis pilis crispatis hirsutis, petiolis angustis; capsula disperma: cast, fere praecedentis. — On the tabular summit of Kauai.

PLANTAGO PACHYPHYLLA (sp. nov.) : acaulis; caudice crassissimo lanato; foliis crasso-ooriaceis ovali-oblongis ligulato-lanceolatisve integerrimis 5-11-nerviis glabratis vel tomentulosis puberisve scapo multo brevioribus; spica elongata densiflora; floribus basi lanatis (denique saepius glabratis); bractea sepalisque ovatis obtusis vel obtusissimis; corollas lobis ovatis obtusis vel obtusissimis vel post anthesin acutatis; ovulis in quoque loculo 2 - 4. — Sandwich Islands.

Var.  $\alpha$ . \*MAVIENSIS : latifolia; foliis 9-11-nerviis (cum petiolo brevi lata 5 - 7 poll, longis 1½ - 2 poll, latis) subtus scapisque (pedalibus) lana decidua tomentosis; caudice erecto percrasso. Subsexus masculinus, staminibus (styloquoc) longe exsertis; ovulis in utroque loculo 2 - 4 haud gravidis. — Maui, on Mouna Haleakala, alt. 7,500 feet. Aspect of *P. Aucklandica*.

Var.  $\beta$ . HAWAIENSIS : caudice repente minus lanato; foliis ovato-lanceolatis seu latiuscule lanceolatis seu lineari-ligulatis raro denticulatis 5 - 9-nerviis in petiolum breviusculum vel brevissimum attenuatis cum scapo (1 - 2-pedali) glabratis vel hirsutiusculis, tomento saepius evanido; sepalis plerumque ciliolatis capsula ellipsoidea 4 - 6-sperma

paullo brevioribus. — Subvar. GRACILIS, *longipes*; petiok) gracili 1 - 2<sup>^</sup>-pollicari lamina lanceolato-oblonga 3 - 5-nervi aequali; scapo gracili; spica laxiflora; capsula oblonga calycem subduplo superante.— Hawaii, on Mouna Kea and Mouna Loa to the elevation of 6,000 to 8,000 feet, and in the environs of the Great Crater. Subvar. *gracilis*, Hawaii, Remy, no. 429.

Var. y. KAVAIENSIS : depauperata; foliis oblongis cum petiolo lato brevissimo 1J-2-pollicaribus; spica laxiflora cum scapo gracillimo semipedali: caet. var. *p.*—Kauai, on the tabular summit. Aspect rather of *P. eriopoda*.

Barnèoud's *P. Brongniartii* (briefly described from a single specimen of Gaudichaud's collection, and not identified by Decaisne), on account of the narrow and very acute lobes of the corolla and the acute bracts, would appear to be rather a depauperate state of *P. princeps* than any other. Still, from its being ranked with *P. macrocarpa* and with *P. virescens* (which is *P. eriopoda*, Torr.\*), and the leaves described as fleshy and obtuse, it may prove to be one of the depauperate forms of the polymorphous species here described.

## 2. Additional Note on the Genus RHYTTDANDRA. By ASA GRAY.

This genus I established on a flowering specimen in the Feejean collection of the South Pacific Exploring Expedition; and afterwards (in the Memoirs of the Academy, 5, p. 334, in 1854) I indicated its close relationship to *Marlea*. To the characters assigned, which should distinguish it from the latter, namely, the camerate anther-cells, the strictly one-celled ovary, and the bifid style with slender lobes, may be added the thin and deplanate epigynous disk. That of *Marlea* forms a large and globular stylopodium, well described by Endlicher, and figured by Clarke, and so conspicuous that it may have misled Benth; or else there is some slip in his character, "ovary adhering to above the middle," in the Flora Hongkongensis.

But the object of this note is to state that specimens of *Rhytidandra Vitiensis* in fruit have now been detected among some undetermined

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\* *Plantago eriopoda*, Torr., includes *P. attenuata*, James in Long's Exped.; *P. lanceolata* y & J (pro parte), Hook. Fl. Bor.-Am.; *P. virescens*, Barnèoud; *P. Richardsonii* and *P. oUongifolia*, Decaisne; *P. salsuyinosa*, Nutt. ined.

plants of the collection. So that the detailed character of the genus may be completed' as follows:—

Drupa ovata, subacuminata (ultra-semipollfcaris), sarcocarpio tenui, putamine osseo ruguloso. Seminis testa membranacea: albumen carnosum copiosum, per cotyledones tenui-foliaceas orbiculares fere bipartitum: radícula supera cylindrica quam cotyledones dimidio brevior.

3. *Synopsis of the Genus PENTSTEMON, By ASA GRAY.*

PENTSTEMON, Mitchell, L'Her.

Sect 1. EUPENTSTEMON. (*Pentstemonum* sect. 1-4, Benth. in DC.) Antherarum loculi per anthesin divaricati seu divergentes, usque (in *P. baccharifolio* vix) ad basin dehiscentes, apicibus pi. m. coadunatis.

§ 1. (ERIANThERA, Benth.) Fruticuli vel suffrutices ramosissimi, foliis crasso-coriaceis parvulis. Inflorescentia stricte racemosa, nempe pedunculis fere semper unifloris. Corolla violacea seu purpurea, speciosa, leviter bilabiata, fauce ampliata. Anthers lana longa densa pneditae! loculis usque ad suramum apicem hiantibus, effoetae peltatim explanatae. Am. Bor.-Occidentales.

1. *P. MENZIESII*, Hook. British Columbia to the Rocky Mountains, and those of California. — On comparison of all the specimens within reach, I confidently conclude that all the genuine members of this section (for *P. frutescens*, Lamb, cannot be of the group) are forms of one species, — for which *P. Menziesii* is the most appropriate name. *P. Scouleri*, Lindl. is the earliest published name under this genus; but that belongs to a form with narrowest leaves and sepals, which other botanists may keep distinct, — until they learn how small reliance can be placed upon the particular shape of the divisions of the calyx in this genus. The sterile filament varies from rather strongly bearded to almost naked. The forms which have been indicated as species are:—

a. LEWISII. (*P. Menziesii*, Hook. *P. Lewisii*, Benth. in DC. *Gerardia fruticosa*, Pursh.) Folia elliptica basi attenuata, seu obovato-oblonga, serrato-dentata: calycis segmenta lanceolata vel ex ovato lanceolato-acuminata. — Hartweg's no. 1878 and Bourgeau's from the Rocky Mountains have the broadest sepals, which are also glandular-pubescent.

0. DOUGLASII. (*P. Douglasii*, Hook., spec, fructif. *P. crassifolius*, Lindl. Bot. Reg. 24, t. 16, florif.) Folia integerrima, saepius obovato-lanceolata: calycis segmenta ex ovato lanceolato-acuminata.

y. SCOULERI. (*P. Scouleri*, Dougl., Lindl. Bot. Reg. t. 1277.) Folia obovato-lanceolata vel oblanceolata, plerisque argute serrata: calycis segmenta ex lanceolato attenuato-acuminata.

d. NEWBERRYI. (*P. Newberryi*, Gray, in Pacif. R. R. Exped. 6, p. 82, t. 14.) Folia var. a. cum calycis fere var. y.: corolla rubropurpurea? — Dr. Newberry noted the corolla as "crimson." If really of the red series, I was justified in characterizing it as a new species; but I much suspect that the color is purple. The corolla is that of *P. Menziesii*, somewhat reduced in size.

§ 2. (FRUTICOSI.) Frutices vel suffrutices ramosi (3 - 6-pedales), ramulis floridis saepe herbaceis, foliis coriaceis parvis parvulisve subpctiolatis. Inflorescentia paniculata pluriflora. Corolla bilabiata, labio superiore pi. m. arcuato-incurvo, inferiore deflexo vel patente. Antherae glabrae, usque ad apicem dehiscentes, effoetae explanatae. Californici.

\* *Breviflori*; corolla profunde bilabiata ringente flavescente, labiis tubo sequilongis vel sublongioribus. Folia basi attenuata.

2. *P. MICROPHYLLUS*, Gray, in Pacif. R. R. Exped. 4, p. 119. Cinereo-puberula; foliis ramealibus primariis deciduis vel ad squamas minimas reductis, fasciculorum lineas 2 tantum longis obovatis retusis integerrimis; sepalis lanceolato-ovatis acutis. — Williams's Fork of the Colorado^ between New Mexico and California. Corolla and stamens unknown. Probably allied to the next. A style that remains indicates a rather short corolla.

3. *P. ANTIRRHINOIDES*, Benth. Subcinereus, fere glaber, ramossissimus; foliis spathulato-lanceolatis oblongisve integerrimis; pedunculis diphyllis saepius unifloris; sepalis ovato-rotundis; corolla lutea nuda, labiis amplis; filamento sterili superne dense barbato.

4. *P. BREVIFLORUS*, Benth. Floribus exceptis glaberrimus; foliis lineari- seu oblongo-lanceolatis argute serrulatis; pedunculis plurifloris; sepalis ex ovato acuminatis aut glabris aut glandulo^o-hirsutis; corolla extus glanduloso-barbata flavescente intus purpureo tinctorum, tubo perbrevis; filamentum sterili glabro. — The beard, generally so conspicuous on the summit of the unexpanded corolla, is sometimes almost wholly wanting.

\* \* *Longiflori*; corolla (plerumque coccinea) longe tubulosa cylindrica, labiis brevibus, superiore erecto subincurvo, inferiore patente 3-partito.

i— Foliis basi attenuatis.

5. *P. TERNATUS*, Torr. Bot. Mex. Bound, p. 115; Gray, in PL Coll. Xant., no. 63, Jour. Bost. Soc. Nat. Hist. Fruticosus, glaber; foliis lineari-lanceolatis ternato-verticillatis denticulatis; sepalis lanceolato-ovatis; corolla "pallide coccinea" pollicari; filamentum sterili a basi ad apicem valde barbato.

6. *P. CORYMBOSUS*, Benth. Decumbens; ramulis foliisque oblongis obtusis subintegerrimis pubescentibus; cyma corymbosa terminali; sepalis lineari-lanceolatis; filamentum sterili glabro ex Benth. in spec. nostris longitudinaliter parce barbato. — Known only from Coulter's Californian collection, no. 629, and from good specimens gathered in Wilkes's Exploring Expedition.

-J--I- Foliis basi obtusis vel retusis.

7. *P. CORDIFOLIUS*, Benth. Sarmentosus, etiam scandens, pruinoso-puberulus vel glabratus; foliis ovatis vel subcordatis ssepe denticulatis parce dentatisve scabridis, venis supra impressis; floribus plerumque resupinatis; sepalis ovato-lanceolatis; corolla ultrapollicari coccinea; filamentum sterili dense barbato. — "Runs over tall bushes like a *Lonicera*"; and, as the bright scarlet flowers are profuse, it would be a great acquisition to the gardens.

Probably a variety of this, or possibly an allied species, is the plant collected in Cajon Pass by Dr. Bigelow, in Whipple's Expedition, with vestiges of fruit only, which I unfortunately, but very doubtfully, referred to *P. Lewisii*.

§ 3. (AMBIGUI.) Suffruticosus, foliis coriaceis, inflorescentia paniculata. Corolla miniata, speciosa, superne ampliata, labiis brevibus, superiore suberecto, inferiore tripartito reflexo. Antherae glabræ, reniformes, effætæ propter rimam leviter incompletam  
\* (nempe imam basin loculorum non attingentam) haud explanatæ.

8. *P. BACCHARIFOLIUS*, Hook. Bot. Mag. t. 4627; Gray, in Bot. Mex. Bound, p. 114 W. Texas, 439, 1479, coll. Wright. A well-marked, showy species; the anthers making a slight approach to the structure in the section *Saccanthera*.

§ 4. (ELMIGERA, Reichenb., sine char.) Herbae, plerumque glaberrimæ, foliis integerrimis, caulibus sessilibus lanceolatis seu lineari-

bus, paniculis virgatis laxifloris. Corolla coccinea tubulosa, pi. m. bilabiata, labio superiore erecto concavo, inferiore patente vel deflexo. Antherae glabrae, loculis a basi ad *subapicem* dehiscentibus, apice vero clausis, effoetis ergo haud explanatis. Filamentum sterile nudum.

9. *P. BARBATUS*, Nutt. Elatus, floribundus; corolla eximie bilabiata, labio inferiore deflexo ad faucem vulgo barbato; antherae loculis (etiam in alabastro juniore divergentibus) maxime divaricatis.— Mexico; common.

0. *TORREYI*. (Gray, in Bot. Mex. Bound, p. 114. *P. Torreyi*, Benth. in DC. Prodr.) Corolla fauce minus barbata vel nuda, labiis vulgo (praesertim superiore) paullo longioribus. — Rocky Mountains in Colorado Territory to Northern Mexico. Clearly a mere form of *P. barbatus*, the name of which was not well chosen. (581, Fendl.; 440, 1474, Wright; 395, Hall & Harbour.)

y. *WISLIZENI*. (*P. coccinea*, Engelm. in Mem. Wisliz., p. 107.) Pauciflorus, statura facie corollisque superne dilatatis *P. imberbis*, sed loculis antherae divaricatis. — Chihuahua, Wislizenus. The specimens are quite intermediate between *P. barbatus* and *P. imberbis*, the corolla more bilabiate than in the latter, but less so than in the former, especially than in the var. *Torreyi*, the lobes of the lower lip broader, shorter, and apparently less recurved. The absence of beard in the throat is of small consequence; the strongly divaricate anther-cells assign the plant to *P. barbatus* in preference.

10. *P. IMBERBIS*, Trauttv. (*P. Humboldtii*, Don. *Chelone imberbis*, H. B. K.) Sesquipedalis, laxiflorus; corolla superne sensim dilatata, labiis brevibus, inferiore haud deflexo nee recurvo; antherae loculis diu parallelis (ut videtur nunquam divaricatis). Mexico. Under no. 1274 of Coulter's Mexican collection, I have both this and *P. barbatus*.

§ 5. (SPECIOSI.) Herbae, plerumque glaberrimae, foliis integerrimis, caulinis sessilibus, floribus thyrsoido-paniculatis speciosis. Corolla e purpureo seu violaceo caerulea superne ventricoso-ampliata, limbo breviter dilabiato, lobis rotundatis aequaliter patentibus. Antherae laxae pilosae vel hirsutulae, vel in eadem specie nunc glabrae, loculis divaricatis a basi vix ad summum apicem dehiscentibus, effoetis haud explanatis.

11. *P. GLABER*. (*P. glabra*, Pursh. *P. Erianthera*, Nutt. in Fras. Cat., non Pursh. The latter name frequently inappropriate, not pub-

lished with a character, and applied by Pursh to a different species; so that Pursh's good name has priority, and is altogether to be preferred. *P. Gordoni*, Hook. Bot. Mag. t. 4319.) *Glaberrimus*; foliis saepius glaucescentibus, caulinis lanceolatis seu ovato-lanceolatis; sepalis late ovatis margine submembranaceis aut muticis aut acumine nunc brevissimo nunc longiusculo terminatis; filamentis sterilibus apicem versus breviter hirsuto, baud raro in stirpibus tam indigenis quam cultis pilis evanidis glabro. — Upper Missouri to the mountains of Utah and New Mexico.

3. OCCIDENTALS. (*P. speciosus*, Dougl., Lindl. Bot. Reg. t. 1270.) Fere var. *a*; foliis caulinis vulgo angustioribus; antheris cum filamentis sterilibus glabris. — Interior of Oregon, in and near the Rocky Mountains.

y. ALPINUS. (*P. alpinus*, Torr., Benth. in DC. Prodr.) Humilior (4-12-poll.), strictior; sepalis e basi ovata seu oblongo-lanceolata sensim longe acuminatis. — Rocky Mountains, on both sides. (No. 259, coll. Parry.) This has the anthers and the tip of the sterile filament more commonly or more abundantly hairy than in the ordinary *P. glaber*, into which it manifestly passes. The acuminate portion of the sepal green, firm, and marginless.

d. CYANANTHUS. *P. cyananthus*, Hook. Bot. Mag. t. 4464, raised from seeds from the upper valleys of the Platte, in the Rocky Mountains, I know only from the published figure. I had mistaken it for a large form of *P. acuminatus*, in Botany of Mexican Bound. Survey; but it clearly must stand next to *P. glaber*, var. *alpinus*; from which it appears to differ only in its greater height and robustness, large and dense thyrsus, and its broader (cordate-ovate) and acuminate upper cauline leaves. Probably it is no more than a particularly well-grown state of the above plant. All the varieties are showy, and the species is one of the handsomest in cultivation.

12. *P. STRICTUS*, Benth. in DC. Prodr. *Glaberrimus*, subglaucus, virgatus; caule gracili; panicula angustata; foliis caulinis longe linearibus; floribus vix evolutis fere *P. glabro* sed multo minoribus. — tVind River Mountains, near the sources of the Sweet Water of the Platte, Fremont. The specimen is too incomplete for much investigation. It may prove to be an extreme form of *P. glaber*.

13. *P. FREMONTI*, Torr. & Gray, ined. Pruinoso-puberulus, spithameus et ultra; foliis imis spathulatis, caulinis lanceolatis sessilibus; panicula stricta spiciformi nuda, cymulis approximatis plurifloris brevissime pedunculatis; sepalis oblongo-ovatis acutis margine membranaceis; corolla (9 lin. longa) anguste infundibuliformi vix bilabiata;

antheris parce hirsutis; filamento sterili apice dilatato hinc barbato. — "On the Uinta plains, very abundant and in large patches. June 5, 1844." Fremont. Clearly of this section, notwithstanding the pruinose pubescence.

§ 6. (GENUINI.) Herbse variae. Corolla aut modice aut vix bilabiata, labiis lobisve vulgo patentibus. Anther® glabrae, valvulis haud raro denticulato-ciliatis, loculis a basi ad summum apicem usque rima continua dehiscentibus, effoetae apertae, plerumque explanatae.

Undique glaberrimi glauci (summo caule *P. ccerulece* quandoque excepto), foliis integerrimis coriaceis, caulinis arete sessilibus seu amplexicaulibus: inflorescentia thyrsoida virgata, pedunculis cymularum plerumque brevissimis seu vix ullis tri - plurifloris: corolla superne pi. m. dilatata, vix bilabiata, lobis patentibus vel patentissimis planis.

✦- *Gceruliflori*; corollis haud pollicaribus lsete azureis seu purpureo-ceruleis; filamento sterili apice ssepissime dilatato flavo-barbato.

14. *P. C^ERULEUS*, Nutt. (*P. angustifolius*, Nutt. in Fras. Cat., Pursh.) Spithamaeus; foliis lineari-lanceolatis, superioribus apiceque caulis vulgo minutim pubescentibus; sepalis lanceolatis sensim acuminatis margine saepius ciliolatis albo-membranaceis. — Upper Missouri and Platte, etc. Nuttall probably included forms of the next species under his *P. caruleus*, probably with good reason. The pubescence of the stem, not mentioned by Nuttall, is alluded to by Pursh. It is evident in a specimen said to be an original one of Bradbury's, in Rafinesque's, now Mr. Durand's, herbarium, in that of Nuttall, in herb. Acad. Philad. (from the Platte), and in that of Fremont from the Wind River Mountains, in Dr. Torrey's herbarium; — which are the only genuine ones before me. But the same thing, only perfectly glabrous and the sepals less white-margined, is Geyer's no. 154 (*P. cceruleus*, Hook, in Kew Jour. Bot. 3, p. 299) ; and also Richardson's specimens from the north, on which *P. acuminatus*, *p. minor*, Hook. Fl. Bor.-Am. is partly founded; and these pass insensibly into such specimens as Parry's no. 264, which is undoubtedly a narrow-leaved state of *P. nitidus*, Dougl. So that one ought really to add the next species to *P. ccerulens*, diverse as are the extreme forms.

15. *P. ACUMINATUS*, Dougl., Lindl. Bot Reg. t. 1295. (*P. nitidus*, Dougl., Benth. in DC. Prodr. *P. secundiflorus*, Benth. 1. c. *P. Fendleri*, Gray in Pacif. R. R. Exped. 2, p. 168, t. 5, & in Bot. Mex.



Bound, p. 114, excl. syn. *P. cyananth.*) *Spithamaeus ad sesquipedalem; foliis radicalibus spathulatis, caulinis lanceolatis oblongis ovato-lanceolatis vel praesertim superioribus subcordatis rigidis laete glaucis; thyrsos elongato floribundo; sepalis aut ovatis aut lanceolatis corolla 6-10 lin. longa; capsula acutissime acuminata.* — Saskatchewan and interior of Oregon, along the mountains and elevated plains to Chihuahua. (No. 576, Fendler; 245 and 463, Wislizenus; 1473, Wright; 258, Parry, a form nearly similar to *P. secundiflorus*, Benth.; 264, Parry, and 390, Hall and Harbour, passing to *P. cceruleus.*) Lindley, in publishing *P. acuminatus*, describes the sterile filament as slightly hairy and hooked at the point, but figures the tip dilated. So I find the tip dilated and more or less yellow-bearded in the only flowering specimens I have from the interior of Oregon, collected by Mr. Spalding. Bentham's character, "filamento sterili filiformi glabro," which has been misleading, I have verified only in Hall and Harbour's no. 385, which in other respects is just *P. secundiflorus*. There is no question about the propriety of reducing all these synonymes to *P. acuminatus*.

+ ^ *Grandiflori; corollis sesquipollicaribus speciosissimis; foliis caulinis praesertim superioribus rotundatis amplexicaulibus vel connatoperfoliatis; sepalis haud acuminatis; filamento sterili' apice adunco leviter dilatato: cymulis 2 - 5-floris absque pedunculo communi.*

16. *P. GRANDIFLORUS*, Nutt. (*P. Bradburii*, Pursh.) *Tripedalis; foliis omnibus distinctis; pedicellis abbreviatis; corolla subito inflata caesio-casrulea; filamento sterili apice vix barbulato.* — Wisconsin and Iowa to Kansas. A very handsome species in cultivation, and the earliest to flower. It is singular that it has not yet been figured. I have never observed the sterile filament bearing a small two-lobed anther, as Nees records in Prince Neu-Wied's Travels; on the contrary, in the plants now for many years cultivated in the Cambridge Botanic Garden, this filament is absolutely wanting in about one blossom out of twenty.

17. *P. MURRAYANUS*, Hook. Bot. Mag. t. 3472. *Bi - tripedalis; foliis superioribus floralibusque in laminam orbiculatam connatis; pedicellis gracilibus; corolla sursum modice sensim ampliata laete rubra; filamento sterili glaberrimo.* — E. Texas (coll. II. 292, Drummond; 282, Lindheimer, &c.) and Arkansas. In Mr. Durand's herbarium is a specimen of *P. Murrayanus* from T. J. Hale of Wisconsin, said to have been found at Dubuque, Iowa (where Dr. Hor collects *P. grandiflorus*) ; but I suspect there is some mistake about it.

✦✦✦ *Rubriflori*; corollis vix ultrapollicaribus rubris vel coccineis; foliis inferioribus oblongis, superioribus subovatis seu lanceolatis amplexantibus; caulibus saepius elatis.

18. P. CENTRANTHIPOLIUS, Benth. (Hook. Bot Mag. t. 5142.) Sepalis lato-ovatis; corolla pollicari kermesina tubulosa superne viz ampliata, limbo brevi aequali; filamento sterili glaberrimo. — California. The corolla is bright carmine, the lobes equal, except that the two upper are united higher, and equally spreading, scarcely longer than the breadth of the throat.

19. P. PUNICEUS, Gray in Bot. Mex. Bound, p. 113. Cymulis plurifloris densioribus; sepalis ovatis seu oblongis; corolla pollicari vel minore kete coccinea tubulosa fauce leviter ampliata, limbo amplo subsequali, lobis rotundatis; filamento sterili sub apice barbato. — Arizona.

20. P. WRIGHTII, Hook. Bot. Mag. t. 4601. Cymulis paniculae laxae virgatse paucifloris; sepalis oblongis apice patentibus; corolla haud pollicari laete roseo-rubra superne ventricoso-dilatata, limbo amplo, lobis rotundatis patentissimis, filamento sterili hinc longe denseque barbato. — W. Texas and Arizona. Length of the corolla and breadth of its limb about equal.

\* \* Undique glaberrimus, subglaucus, elatus; foliis crebre seu ovato-lanceolatis coviaceis, caulinis superioribus in laminam amplexicaulem connatis: panicula laxa, elongata, cymuli 3-9-floris pedunculatis: corolla (pollicaris) caeruleo-purpurea, tubo superne inflato, limbo bilabiato, lobis latissimis patentissimis; filamentum sterile glabrum.

21. P. SPECTABILIS, Thurber, in Pacif. R. R. Exped. 4, p. 119 (63), & Bot. Mex. Bound. I.e.; Hook. Bot. Mag. t. 5260. — California to W. Texas. (1475, Wright.)

\* \* \* Glabri prater inflorescentiam calyces corollasque minutim viscoso-pubentes; foliis lanceolatis, vel superioribus e basi dilatata amplexicauli ovato-lanceolatis sensim acuminatis integerrimis: panicula laxa, pedunculis paucifloris: corolla sesqui - bipollicaris, lobis suboequalibus patentibus: filamentum sterile fere glabrum. Mexicani.

22. P. GENTIANOIDES, Don. (*Ckelone gentianoides*, H. B. K. Nov. Gen. & Sp. 2, t. 172.) Corolla violacea, vix sesquipollicaris, supra

calycem usque ad faucem valde ampliata campanulata: pedunculi abbreviate

23. *P. HARTWEGI*, Benth. (*P. gentianoides*, Bot. Reg. 1838, t. 3; Bot. Mag. t. 3661.) Corolla bipollicaris, coccinea vel sanguinea, superne sensim leviter dilatata tubuloso-infundibuliformis: pedunculi 2 - 3-flori elongati.

\* \* \* \* Undique fere glabri; foliis pinnatipartitis, segmentis angusto-linearibus: panicula laxiflora: corolla purpurea, haud pollicaris, superne ampliata, lobis subsequialibus: filamentum sterile apice barbatur.

24. *P. DISSECTUS*, Ell. Bot. 2, p. 129; Chapm. PL p. 289.— Georgia.

\* \* \* \* \* Glabri, vel pruinoso- seu viscoso-puberuli, angustifolii; foliis filiformi-subulatis linearibus vel lineari-spathulatis, omnibus integerrimis; racemo simplici seu panicula virgata laxiflora. (Cf. spp. subsequentis foliis quandoque integerrimis glabris.)

-i- Inflorescentia stricte racemosa, i. e. pedunculis unifloris, infimis rarissime bifloris; corolla vix bilabiata.

\*w- Foliis angustissimis fere filiformibus glabris.

25. *P. TENUIFOLIUS*, Benth. Elatus, ramulosus, foliosus, subpuberulus; racemo elongato laxo; corolla (pollicari purpurea?) superne valde ampliata, lobis brevibus; filamentum sterili imberbi. — Mexico.

26. *P. LARICIFOLIUS*, Hook. & Am. (*P. Jilifolius*, Nutt. ined.) Semipedalis, cespitosus; caudicibus crebre foliatis; caulibus floridis gracilibus simplicibus; racemo 4- 8-floro; corolla (semipollicari purpurea), tubo superne ampliato; filamentum sterili barbato. — Utah.

27. *P. AMBIGUUS*, Torr. in Ann. Lye. N. Y. & Marcy, Rep. t. 16. Subpedalis ad bipedalem, paniculato-ramosus e basi lignescens; foliis inferioribus linearibus basi attenuatis, superioribus subulato-filiformibus vel aceroso-subulatis; racemis laxifloris; corolla ("alba purpureo tincta" 5 - 8 lin. longa), limbo amplo patentissimo pi. m. obliquo; filamentum sterili glabro. — Rocky Mountains of Colorado Territory to Arizona. — Forma vera: corollae tubo semipollicari ssepius incurvo superne vix dilatato, limbo explanato semipollicem diametro, fauce fere undique hirsutula; filamentum sterili quandoque antheram parvam gerente. —

To this belong Bentham's var. *foliosus*, Fendler's no. 569 (probably, for the flowers are wanting), 459, &c. of Wislizenus, 1471 of Wright,

742 of Thurber, &c. But some of Wright's specimens, and no. 74 and a part of 15<sup>C</sup> of Wislizenus's, have the tube of the corolla as short and funnel-shaped as in the following.

3. THURBERI (*P. Thurberi*, Torr. in Pacif. R. R. Exped. 7, p. 15, bot. appx.). Corolla minor, brevior, haud semipollicaris, tubo magis dilatato, fauce lineis 2 barbatis antice instructa.— Here belong Dr. Antisell's specimens from the Burro Mountains, and Thurber's 1056 from Ojo de Gavilan, New Mexico, as described by Dr. Torrey, from Prof. Thurber's notes. The distinctions are well taken; but the specimens mentioned above make me hesitate to admit the species.

♣ ++ Foliis lineari-lanceolatis seu lineari-spathulatis ssepius puberulis vel pruinoso-pubescentibus; caulibus basi lignescentibus.

28. P. GAIRDNERI, Hook. Fl. Bor.-Am. Spithamasus, basi ramosissimus; pedicellis brevibus oppositis vel alternis; sepalis glanduloso-viscosis; corolla semipollicari; filamento sterili longitudinaliter barbato. — Mountains of the Northwest Coast. The naturalists of Wilkes's Expedition collected a flowering specimen in Washington Territory.

29. P. DASTPHYLLUS, Gray in Bot. Mex. Bound, p. 112. Pruinoso-vel subglanduloso-puberulus; caule subsimplici; racemo laxo paucifloro; pedicellis alternis vix bracteolatis; corolla purpureo-cerulea fere sesquipollicari; filamento sterili glabro\_\_\_Arizona and New Mexico. (1478, Wright.)

+ H- Inflorescentia racemoso- seu virgato-paniculata, pedunculis piersisque 2 - 5-floris; sepalis ovatis; caulibus erectis vulgo simplicibus.

+• Ultrapedalis; pedunculis alternis brevibus 1 - 2-floris; corollis puniceis subpollicaribus.

30. P. LANCEOLATUS, Benth. Pruinoso-puberula vel glabella, pedicellis calycibusque subglandulosis; filamento sterili glabro. — Mexico; 184, Hartweg; 57 and probably 441, Gregg. In my specimens of Hartweg's collection, as in others, I do not always find the "pedunculi communes subnulli"; but some of them are uniflorous.

++ ++ Bi - tripedalis; pedunculis oppositis elongatis 2 - 5-floris; panícula quam in caeteris laxiori; corollis "caeruleis" (an purpureis?) superne ampliatis sesquipollicaribus.

31. P. STENOPHYLLUS, Gray in Bot. Mex. Bound, p. 112. Glaber, foliis linearibus 3 - 4-pollicaribus, superioribus minoribus angustissimis;

filamento sterili glaberrimo. — Mexico, Cosiquiriachi, Wislizenus, 186. Arizona, 1477, Wright

++ ++ H+ Semi-sesquipedalis, cum foliis ssepius minutissime pruinoso-puberulus; pedunculis pedicellisque brevibus ; corollis purpureis ultra-semipollicaribus, fauce valde ampliata, limbo breviter bilabiato, labio superiore minus patente.

32. P. VIRGATUS, Gray, l. c. Caule e basi simplicissimo; foliis linearibus seu lineari-lanceolatis 1½-4-pollicaribus; panícula elongata angustissima multiflora nunc secunda, pedunculis plerumque oppositis; corolla roseo-lilacina; filamento sterili glaberrimo. — New Mexico; 580, Fendl.; 1476, Wright.

33. P. LINARIOIDES, Gray, l. c. Multicaulis e basi suffrutescente, cinereo-pallidus, foliosissimus; foliis (pollicaribus vel brevioribus) inferioribus spathulato-superioribus angustissimo-linearibus, floralibus subulatis; panícula angusta subsecunda; pedunculis omnibus alternis, inferioribus 2-5-floris, superioribus unifloris; corolla pallide caesio-purpurea, palato barbato; filamento sterili longitudinaliter barbato. — New Mexico and Arizona; 1472, Wright; 331, 1115, Thurber.

-i-K-i- *AxiUiflori*, nempe ramis (e caulibus caespitoso-humifusis) usque ad apicem subaequaliter foliosis.

34. P. C2ESPITOSUS, Nutt. in Jierb. Acad. Philad. (*P. pumilus*, Benth. quoad pi. Fremont., non Nutt.) Depressus, cinereo-puberulus; ramis confertis e basi humifusa vel repente adscendentibus foliosissimis (1-3 poll, longis) ; foliis lanceolato- seu lineari-spathulatis mucronato-apiculatis aveniis (5-9 lin. longis) ; pedunculis axillaribus brevibus secundis mox decurvo-patentibus apice folioso-bibracteatis flores 1-3 assurgentes brevi-pedicellatos grentibus; sepalis e basi latiore marginibus scariosa lineari-lanceolatis foliaceis; corolla (6-9 lin. longa) cseruleo-purpurea tubulosa, tubo superne sensim subampliato intus plicis 2 intrusis percurso, limbo breviter bilabiato, lobis subsequialibus; filamento sterili longe barbato. — Rocky Mountains, Nuttall (a diminutive specimen in herb. Acad. Philad.), Fremont (a poor specimen in herb. Torr.), Parry, Hall and Harbour, coll. 1862 (no. 393), at the Middle Parjp, also on "rocky ledges of the upper Platte, growing in spreading decumbent patches: flowers blue, with purplish tips, and streaked with pink lines, first found by Mr. J. Harbour." Parry in litt. Very fine and full specimens (received as this article, is going to press) are given in the recent collection above men-

tioned, both of the form gathered by Nuttall, with the leaves only about half an inch long and scarcely a line wide, and of a luxuriant form, with larger leaves, and flowers three-fourths of an inch long on longer pedicels. The leaves on decumbent branches are all turned to the upper side, and often falcate, while the peduncles are rigidly turned to the lower side of the branch. The species is a well-marked one, and the most dwarf of the genus.

\* \* \* \* \* Aut pi. m. pruinoso- seu viscoso-pubescentes, aut serratifolii, aut panicula interrupta cymulis densifloris: inflorescentia saepius thyrsoides; corolla nunquam coccinea.

4- Boreali-Americani; corollis lyiud rubris.

++ Filamento sterili longitudinaliter flavo-barbato; corolla superae campanulato- seu infundibuliformi-ampliata parum bilabiata.

a. Foliis lanceolatis subintegerrimis, saltern superioribus floribusque viscoso-pubescentibus; panicula stricta, pedunculis brevibus appressis.

35. *P. PUMIUS*, Nutt. Forte *P. albidus* forma alpina, nana (3 - 4-pollicaris), pauciflora, foliis caulinis basi paullo attenuatis, corolla glabriuscula. — Little Goddin River in the Rocky Mountains, Wyeth. Fremont's specimen, referred here in the Prodrömus, must belong to the preceding species.

36. *P. ALBIDUS*, Nutt. (*P. teretiflorus*, Nutt. in Fras. Cat. *P. viscidulum*, Nees, Bot. Appx. in Neu-Wied. Trav. p. 18.) Subpedalis; foliis majoribus saspe oblongo- seu ovato-lanceolatis; panicula quasi spicata subverticillatim interrupta cymulis plurifloris vel in depauperatis pauciflora; sepalis lanceolatis viscido-pubentissimis; corolla J-pollicari e purpureo albida, tubo superne sensim modice ampliata, limbo imberbi; barba filamenti sterilis breviuscula subinterrupta. — Upper tributaries of the Missouri to W. Texas.

37. *P. CRISTATUS*, Nutt (*P. erianthera*, Pursh, non Nutt.) Subpedalis; panicula spiciformi, cymulis 3 — 4-floris; sepalis lineari-lanceolatis attenuatis hirsutissimis; corolla pollicari violaceo supra calycem late infundibuliformi-ampliata, labio inferiore intus et filamento sterili pilis longis insigniter barbatis. — Upper Missouri to the Rocky Mountains.

38. *P. JAMESII*, Benth. (*P. albidus*, Torr. in Ann. Lye. pro parte.) Spithamscus ad pedalem, puberulus; foliis lineari-lanceolatis saepe denticulatis rigidis; inflorescentia pprecedentis; sepalis lanceolatis e

basi sat lata gradatim attenuatis viscido-puberulis; corolla ultrapollinari pallide purpurea supra calycem subito inflata campanulata, labio intus vix barbato; filamento sterili minus quam in *P. cristato* barbato. — Eastern side Rocky Mountains and vicinity, to New Mexico (575, 579, Fendler) and the adjacent parts of Texas. Nearest to *P. cristatus*, from which it plainly differs in the narrower leaves, more abruptly ampliate corolla, shorter and less abundant beard, and the calyx more viscid-puberulent, as in *P. albidus*.

b. Foliis latioribus saepius serratis, caulinis plerisque amplexicaulibus; panicula vulgo nuda laxiflora.

39. *P. COB<sup>EA</sup>*, Nutt. Fedalis, raro bipedalis, viscoso-puberulus; foliis pvatis oblongisve argute serratis vel denticulatis; panicula pauciflora cum sepalis oblongis vix acutis viscoso-pubescente; corolla bipollinari ex albido purpurascens supra calycem subito inflata late campanulata intus glabra. 'Kansas to Texas. (142, Lindheimer; 577, Fendler; 1834, Berlandier, depauperate.)

40. *P. DIGITALIS*, Nutt. Elatus (3 - 5-pedalis), praeter flores pi. m. viscosos saepissime glaberrimis; foliis tantum serrulatis, caulinis (3 - 6-pollinaribus) lanceolatis vel superioribus ovato-lanceolatis e basi lata sursum sensim attenuatis; thyrsis nudo laxo plurifloro; corolla ultrapollinari alba superne e tubo angusto campanulato-ampliata, lobis brevibus subaequalibus, filamentis sterilibus parcius barbato. — Illinois to Arkansas, Louisiana, and Georgia.

0. *MULTIFLORUS*, Chapman, Fl. (*P. multiflorus*, Chapm. ined. *P. crassifolius* Shuttlew., fide Benth.) is I suppose rightly placed by Dr. Chapman under this species, — a form from the pine barrens of Florida and Georgia, with the corolla smaller and narrower, less abruptly ampliate. But I have not seen sufficient materials.

41. *P. TUBIFLORUS*, Nutt. —judging from the insufficient specimens cited in the Prodrômus (from Herb. Torr.), where the name of "Engelman" should be Leavenworth — is probably a slender variety of *P. Digitalis*, with the corolla less ampliate, tubular-funnel-form, and the sterile filament less bearded. But sufficient materials are not in hand. —Arkansas.

\*\*\* Filamento sterili longitudinaliter saltern secus apicem dilatatum flavo-barbato; corolla minus ampliata (*P. glauco* excepto) evidentiùs bilabiata. *Cismontani* vel *montani*; inflorescentia haud glomerato-condensata.

- a. **Multiflori**; panicula thyrsoides vel racemiformi nuda, foliis (caulinis aut argute serrulatis aut subintegerrimis) superioribus ad bracteas parvas diminutis, pedunculis vulgo tri-plurifloris; corollae labio superiore saepius parum brevior.

These species with the two preceding, all very difficult of definition in the herbarium, need re-examination in the living state. I have examined fresh flowers only of *P. Digitalis* and *P. pubescens*, — than which no two species are more clearly distinct, although in dried specimens they may not always be readily identified. From the shape of the corolla, *P. glaucus* should also be re-established. And I am obliged to intercalate an unpublished species of Nuttall, *P. kumilis*, between the latter and *P. gracilis*, Nutt., here reduced to *P. pubescens*. The two new species which follow are choice fruits of Messrs. Parry, Hall, and Harbour's collection, during the present season, which, with other good materials, have come to hand just in time to find a place in this article as it is passing into the printer's hands (November, 1862).

42. **P. PUBESCENS**, Soland. (*P. Icevigatus*, Soland. *P. hirsutus*, Willd. *P. Machayanus*, Hortul.) Sub-1 - 3-pedalis, viscoso-pubescentis vel fere 'glaber; foliis caulinis (nunc lineari- nunc ovato-) lanceolatis; thyrsis laxiflora; corolla albida caerulescente vel purpurascens superne sensim paullo ampliata ieviter obcompressa sub labio inferiore plicis 2 introrsis sursum barbatis percursa, fauce subclausa; filamentis sterilibus deorsum longe denseque barbato.— Canada to Florida and Texas. In the fresh flowers the two introrse plicae of the lower side of the corolla, and the throat somewhat closed by the approximation of the base of the lower lip to the rather fornicate upper one, are characteristic.

£. **GRACILIS**. (*P. gracilis*, Nutt.; Bot. Mag. t. 2945, excl. descr. Graham; Bot Cab. t. 1541.) Subglaber; foliis caulinis et thyrsis angustatis; corolla vulgo graciliori, plicis haud barbatis. — Saskatchewan to Texas. Clearly this is only a slender variety of *P. pubescens*, with the flowers commonly rather narrower, and its beard (always unreliable in this genus) reduced to some scattered hairs on the lower lip. Intermediate forms abound.

43. **P. HUMILIS**, Nutt. in herb. Acad. Philad. *P. gracili* Nutt. (*P. pubescenti* var. *gracili* supra) maxime affinis, sed vulgo humilior (3-9-pollicaris), foliis pallidioribus, thyrsis etiam strictiore, corolla saturate caerulea brevior (haud ultra-semipollicari) fauce satis ampliata hiantes plicis sub labio inferiore obsoletis. — Rocky Mountains, Nuttall



(a very depauperate doubtless alpine specimen in herb. Acad. Philad.); common about Pike's Peak and vicinity, Parry, no. 257 (Enum. p. 27), Mr. Howard, and in taller specimens than before seen, Hall and Harbour, 1862, no. 387, on low mountains, "an early and very pretty species," confirming its close relationship with *P. graeillis*. Yet this cannot be regarded as a variety of *P. pubescens*.

44. *P. GLAUCUS*, Graham; Lindl. Bot. Mag. 1.1286. Spithameus ad ultrapedalem, prater inflorescentiam floresque viscosos glaber; foliis subglaucis, (radicalibus subovatis,) caulinis lanceolatis seu basi dilalata ovato-lanceolatis; thyrsos subcompacto (sepalis ovato-lanceolatis); corolla pollicari supra basim ventricoso ampliata lilacina seu violacea, fauce ampla hiante, plicis sub labio inferiore (pilis longis parce villosis) vix ullis.—Saskatchewan, or in the Rocky Mountains, Drummond.

Var. 3. *STENOSEPALUS*: thyrsos brevi compacto; sepalis lanceolatis longe attenuato-acuminatis. *P. glaucus*, Gray, Enum. PL Parry, p. 27. Rocky Mountains, about Pike's Peak, Clear Creek, &c, Dr. James in herb. Torr., Dr. Parry, 261, 262, and coll. 1862, distributed by Hall and Harbour, 399. — Corolla, as in the figure *P. glaucus* in the Botanical Register, abruptly much ampliate, almost as much so as that of *P. Digitalis*, but more gibbous, very distinctly bilabiate, the lower lip a little exceeding the upper.

45. *P. HALLII* (sp. nov.). Nanus, 3-5-pollicaris, multiceps, prater inflorescentiam calycesque (occulo armato) minutissime glandulosos glaber; foliis glauco-pallidis integerrimis lineari-spathulatis seu linearibus basi attenuatis; thyrsos vel potius racemo simplici 4-10-floro, pedicellis calyce brevioribus; sepalis ovatis oblongisve margine late scariosis ssepius erosis; corolla subpollicari e basi brevissima inflata ventricoso-campanulata caeruleo-purpurea, labiis brevibus subsequilongis, superiori fere ad medium bilobo inferiori trilobo intus glabro, filamentis sterilibus hinc barbato. — Rocky Mountains near Clear Creek, &c, in the alpine region, coll. 1862, Parry, Hall and Harbour: no. 388 distrib. Hall and Harbour. — A most beautiful species, from the size of the flowers as compared with that of the stem, and their bright color. Corolla nearly an inch long, more inflated than that of *P. glaucus*, the contracted base being very short, decidedly bilabiate, but the lips only 3 or 4 lines long, very deeply colored; the tube appears much paler. Radical and lower cauline leaves one or two inches long, including the narrowed base or petiole, 1½ to 2 lines wide towards the summit, thickish; the floral ones reduced to 6 or 3 lines long, and scarcely at all

dilated at the insertion. Flowers solitary or in pairs in the axils, the short peduncle usually bibracteate, forming a short racemose inflorescence. Beard of the sterile filament short, but copious and extending well down one side. This charming *Pentstemon* may appropriately bear the name of one of its zealous discoverers.

6. *Bi-triflori*; caulibus usque ad apicem aequaliterfoliatis; pedunculis unifloris plerisque ebracteatis; corollas tubo vix gibboso, Jabiis aequilongis.

46. *P. HARBOURII* (sp. nov.). Nanus, 2 - 4-pollicaris; caulibus multicapitibus pruinoso-puberulis usque ad apicem 2 - 3-florum aequaliter foliosis; foliis fere glabris crassiusculis obovatis oblongisve obtusissimis integerrimis vel repandis; pedicellis alternis cum calyce subaequilongo viscoso-pubescentibus; sepalis ovatis breviter acuminatis seu lato-lanceolatis margine haud scariosis; corolla purpurea (7 - 9 lin. longa), tubo cylindraco limbo breviter bilabiato, labio superiori profunde bilobo, inferiore profunde trilobo intus ad faucem hispido-barbato; filamentum sterili apice dilatato hinc deorsum barbato. — Rocky Mountains of Colorado Territory, in the high alpine region, no. 396 of Hall and Harbour's distribution; found only by Mr. J. P. Harbour, whose name it should bear. Leaves thickish, glabrous or minutely pruinose, 4 to 8 lines long, 3 to 5 lines wide, sometimes retuse; the uppermost closely sessile by a more or less narrowed base, the lowest, or those of sterile shoots, ovate and tapering into a slender petiole. Pedicels in the axils only of the uppermost leaves, and alternate, in flower 1£, in fruit 2 or 3 lines long. Corolla bluish purple, slightly viscous-pubescent; the tube slightly widening upwards; the lips about 3 lines, the similar and spreading rounded lobes 1 £ to 2 lines long; a copious and rather stiff beard in the throat or on the base of the lower lip. Capsule not exceeding the calyx.

+++++ Filamento sterili apice barbato: corolla manifeste bilabiata, tubo vix aut ne vix ampliato. *Transmontani*, panicula interrupta, cymis multifloris condensatis, floribus pro genere parvis 5 - 8 raro 9 - 11 lin. longis.

a. *Serratifolii*; foliis ovatis seu ovato-lanceolatis ssepius argute dentatis, caulinis superioribus basi subcordata amplexicaulibus; sepalis vix scarioso-marginatis; floribus minus confertis.

47. *P. OVATUS*, Dougl. Puberulus, latifolius; sepalis ovatis seu lato-lanceolatis; corolla purpureo-cerulea. Oregon to British Columbia.

48. *F. PRUINOSUS*, Dougl. Pubescens; foliis caesiis; inflorescentia (sasse quasi verticillata) et praesertim sepalis (lanceolatis longe attenuato-acuminatis) viscoso-villosis; corolla lsete cyanea. — Priest's Rapids of the Columbia River; found only by Douglas, long ago lost from the gardens.

*b. Integrifolii*; foliis glaberrimis fere semper integerrimis, caulinis lanceolatis oblongisve; sepalis saltern marginibus albo-scariosis; palato vulgo barbato; thyrsos spiciformi interrupto saepius quasi verticillastrifloro.

49. *P. ATTENUATUS*, Lindl. Bot. Reg. t. 1295. Sesqui-bipedalis; foliis raro paucidenticulatis; inflorescentia villosa seu pi. m. viscoso-pubescente; cymis plerisque breviter pedunculatis; sepalis ovato-lanceolatis anguste scarioso-marginatis; corolla ochroleuca vel caeruleo-purpurea ultra-semipollicari. — Lewis and Clarke's or Kooskooskie River. The figure in the Bot. Register depicts the flowers as ochroleucous. Bentham writes, "corolla sulphurea." But in similar specimens collected on the Kooskooskie by the naturalists of Wilkes's Expedition it is noted that the "corolla is blue"; while Hooker remarks that those of Douglas's specimens were purple. The color is probably various. Mr. Spalding's specimens from Clearwater, in the same district, have the inflorescence and calyx varying from rather slightly viscid-pubescent to merely puberulent; the color of the flowers not recorded.

50. *P. CONFERTUS*, Dougl.; Lindl. Bot. Reg. t. 1260. Glaberrimus, semi - sesquipedalis, strictus; floribus dense glomeratis; cymis praeter infimas fere sessilibus; sepalis lato-lanceolatis seu ovatis latissime albo-scariosis margine saepius eroso-dentatis vel laciniatis aut acutis aut in acumen saepe longum viride productis; corolla angusta 5-6 lin. longa, sulphurea.—Interior of Oregon and Rocky Mountains.

51. *P. CAERULEO-PURPUREUS*. (*P. procerus*, Dougl., in Bot. Mag. t. 2954; Bot. Cat. t. 1616. *P. Tolmiei*, Hook. FL Bor.-Am. 2, p. 97. *P. micranthus*, Nutt. in Jour. Acad. Philad.) Spithameus ad bipedalem; corolla caeruleo-purpurea.—Plains of the Saskatchewan, and through the Rocky Mountains to the coast range of Oregon and British Columbia. I find nothing beyond the color of the flowers to distinguish this from *P. confertus*; and the name *P. procerus* is singularly inappropriate for a plant like this, never tall, and ordinarily one of the lowest of the genus. The sepals are most variable, and the variations are not in relation with the color of the corolla.

~~H~~ +++++ Filamento sterili glaberrimo.

*a*\* Serratifolii, confertiflori, panicula stricta multiflora; corolla parum bilabiata.

51. *P. DEUSTUS*, Dougl. in Bot. Reg. t. 1318. (*P. ilicifolius*, Nutt. ined.). Glaber; foliis ssepe laciniato- seu pectinato-serratis, caulinis oblongis seu lanceolatis; cymis pedunculatis, sepalis lanceolatis acuminatis; corolla flavida semipollicari, tubo parum ampliata. — Interior of Oregon; a rare species; but it has been collected by Douglas, Nuttall, and (on the Spokane River) by the naturalists of Wilkes's Exploring Expedition. Also by Dr. Lyall, on the Kootenay River, in 1861. Corolla more slender than in Lindley's figure.

52. *P. HETERANDER*, Torr. & Gray in Pacif. R. R. Exped. 2, p. (9) 123, t. 8. Glaber (calyce minute puberulo excepto), virgatus; foliis lanceolatis seu lineari-oblongis argute denticulatis; panicula spiciformi' interrupta gracili; cymulis subsessilibus; sepalis lanceolatis; corolla albida semipollicari, tubo parum ampliata; filamento sterili quandoque antherifero. — Sierra Nevada, interior of California.

*b*. Subintegrifolii, laxiflori, pedunculis 1 - 3-floris; corolla bilabiata.

53. *I\ WHIPPLEANUS* (sp. nov.). Pedalis; caule debili foliisque membranaceis ovatis oblongisve subserrulatis glabris; panicula parva; pedunculis plerisque oppositis 1-3-floris; sepalis lineari-lanceolatis longe attenuatis laxis cum inflorescentia viscoso-pilosis; corolla pollicari superne valde ampliata bilabiata, labio superiore brevior suberecto bilobo, inferiore trilobo intus parce barbato; filamento sterili glaberrimo apice dilatato undnato.— Arroyas in the Sandia Mountains, New Mexico, east of the Rio Grande, Dr. J. M. Bigelow, in Whipple's Expedition, Oct. 1853. Stem slender, apparently diffuse from a decumbent base, leafy. Leaves thin; the radical ones petioled, 3 inches long; the cauline 2 - 1 ½ inches long, sessile, or the upper partly clasping by the rounded base, ovate-acuminate; only the floral ones reduced in size, these with the peduncles and flowers more or less viscid-pubescent. Peduncles nearly as long as the floral leaves: pedicels short. Sepals 5 lines long, very attenuate, even narrower than those of *P. Jamesii*; the corolla almost as ampliate as that of *P. cristatus*, but very distinctly bilabiate, its color not recorded. Except for the beardless filament and broader and thin leaves, this should stand with the above-named species.

— Mexicani; panicula laxiflora; corollis roseis atro-purpureis violaceis, etc. superne ventricosampliatas; foliis argute serratis vel denticulatis sensim acuminatis.

54. *P. CAMPANULATUS*, Willd. (cum synon. Prodrumi). Praeter inflorescentiam pi. m. viscosam glaber; foliis caulinis distinctis lanceolatis ovato-lanceolatis seu linearibus argute serratis; panicula elongata nuda racemiformi secunda; corolla superne aut tubuloso- aut campanulato-ventricosa; filamento sterili paullo barbato. — Common in cultivation, under various forms.

55. *P. PERFOLIATUS*, A. Brongn. Viscoso-villosus; foliis caulinis ovatis connato-amplexicaulibus denticulatis; panicula interrupta foliosa; filamento sterili fere glabro.

Sect. 2. *SACCANTHERA*, Benth. Anthene sagittate vel hippocrepiformes, oculis apice confluentibus rima unica deorsum usque ad medium dehiscentibus, basibus saccatis. Transmontani; inflorescentia paniculata. Corolla plerumque speciosa, violacea seu lilacina, superne ampliata, limbo breviter bilabiato.

\* Undique viscoso-pubescentis, grandiflorus; foliis amplis subserratis, superioribus cordato-amplexicaulibus.

56. *P. GLANDULOSUS*, Lindl. Bot. Reg. t. 1262; Bot. Mag. t. 3688. *P. staticifolius*, Lindl. Bot. Reg. t. 1770. — Oregon.

• \* Puberulus vel glaber; foliis argute serratis vel pinnatifidis.

57. *P. VENUSTUS*, Dougl., Lindl. Bot. Reg. t. 1309. (*P. amoenus*, Xunze?) Glaberrimus, erectus; foliis lato- seu ovato-lanceolatis argute dentatis subcoriaceis; panicula thyrsoides laxiuscula; sepalis ovato-lanceolatis; corolla ultrapollinari e tubo angusto superne dilatata, lobis ciliatis; filamentis omnibus superne antherisque parce pilosis rariusve glabris. — Oregon.

58. *P. DIFFUSUS*, Dougl., Lindl. Bot. Reg. t. 1132; Bot. Mag. t. 3645. (*P. serrulatus*, Menzies in Hook. Fl. Bor.-Am.?) Puberulus; caulibus adscendentibus; foliis ovatis seu ovato-lanceolatis superioribus subcordato-amplexicaulibus crebre serratis; panicula saepius foliosa, cymulis densifloris; sepalis ovatis acuminatis nunc laciniatis; corolla haud pollinari; antheris glabris; filamento sterili apice barbato. — Oregon to British Columbia.

59. *P. RICHARDSONII*, Dougl., Lindl. Bot. Reg. 1.1121; Bot. Mag. t. 3391; Bot. Cab. t. 1641. (*P. laciniatum*, Nutt. in herb. Acad.

Philad.) Fere glaber; caule saepius ramoso; ramis patentibus; foliis ovato-lanceolatis seu angusto-lanceolatis incisus vel laciniato-pinnatifidis, ramealibus saepe alternis; panicula laxa; corolla pollicari violacea; filamento sterili apice parce barbato. — Oregon. *P. argutus*, Paxt., of the gardens appears to be a form of this, or a hybrid between it and the foregoing species.

60. *P. TRIPHYLLUS*, Dougl., Lindl. Bot. Reg. t 1245. Fere glaber, ramosus; foliis lanceolatis seu linearibus paucidentatis pinnatifidis rigidulis, inferioribus ternis vel quaternis, superioribus quandoque oppositis, ramealibus nunc alternis; panicula laxa foliosa; corolla semipollicari violacea superne parum ampliata; filamento sterili superne dense barbato. — Oregon to British Columbia.

\* • \* Glaberrimus vel pubero-glandulosus; foliis integerrimis; filamento sterili apice complanato glaberrimo vel glabriusculo; pedunculis paucis gracilibus 3 - 6-floris.

•K- Corolla semipollicari (caerulea) superne parum ampliata; antheris glabris secus rimam minute denticulatis.

61. *P. GRACILENTUS*, Gray in Pacif. R. R. Exped. 6, (Bot.) p. 83. — Mountains of North California, Dr. Newberry. Lower leaves lanceolate, attenuate into slender petioles, the upper linear, attenuate at the base.

-i- H- Corolla ultrapollicari superne infundibuliformi-ampliata, limbo leviter bilabiata; antheris secus rimam hirtello-ciliatis basi aut hirsutis aut glabris.

62. *P. HETEUOPHYLLUS*, Lindl. Bot. Reg. t. 1809; Bot. Mag. t. 3853. Glaberrimus vel pruinoso-puberulus, vix glaucus; foliis caulinis lineari-lanceolatis vel anguste linearibus basi attenuatis; racemo virgato, nempe pedunculis unifloris raro bifloris; corolla rubro-purpurea. — California. It is to be hoped that the color of the flowers may hold constant in this species; for there are specimens which, in the shape of the leaves and in the inflorescence, in the herbarium appear quite ambiguous between this and the next species.

63. *P. AZUREUS*, Benth. PL Hartw. p. 327, no. 1819. (*P. glaucifolius*, Gray in Pacif. R. R. Exped. 6, 1. c. *P. Jaffrayanus*, Hook. Bot. Mag. t. 5045, forma latifolia.) Glaberrimus, glaucus; foliis caulinis anguste aut lato- vel ovato-lanceolatis, inferioribus nunc spathulato-oblongis, superioribus arete sessilibus e basi lata sibi cordato-ovatis seu ovato-lanceolatis; panicula virgata; pedunculis 1 - 3-floris: corolla

pulcherrime azurea, tubo basi rubro-purpureo. — California. The above names all evidently belong to one species, variable as to the foliage, of which the *P. azureus* of Hartweg's collection represents the narrowest-leaved state, and *P. Jaffrayanus* of the Botanical Magazine the broadest.

64. *P. Laffius*, Gray in Jour. Bost. Nat. Hist. Soc. Subpedalis, pube brevi molli glandulosa caesio-pruinosis; caet. fere praecedentis. — Fort Tejon and vicinity, Xantus, Wallace. This is likely to be a glandular-downy variety of *P. azureus*.

*Species incertae seu vix cognitae.*

*P. FRUTESCENS*, Lamb, in Kåns. Linn. Soc. 10, p. 259, t. 6. That this was collected in the Ural^fegion (in the Government of Perm, by Georgi, 1773) — far away from its known congeners — seems to be made out by the ticket in "Willdenow's herbarium, cited by Ledebour (Fl. Ross. 3, p. 222). So that Lambert was probably misled in some way as to the habitat " Kamtschatka and Unalaschka "; and my memoranda made in 1839 enable me to certify that there was no specimen in Lambert's herbarium to authenticate Pursh's habitat, "On the Northwest Coast, *M. Lewis*!" Lambert's figure makes it clear enough that the species does not belong to the section *Erianthera*.

*P. canosobarbatum*, Kellogg in Proceed. Calif. Acad. Nat. Sci., Sept. 1859, (which is translated as meaning Gray-bearded Pentstemon,) I cannot make out.

*P. rostriflorum*, Kellogg, 1. c, with cream-yellow flowers, is equally unknown to me.

*Saccularia Veatckii*, Kellogg, 1. c, from Cerros Island, off California, of which two flowers were communicated to Dr. Torrey, one of them showing a small sterile filament, is probably a *Russelia*.

*Addenda.*

*P. MENZIESII* (p. 56), var. ? LTALLI : ramis (an caulibus ?) herbaceis virgatis sesquipedalibus; foliis lanceolatis tenuioribus elongatis (vix coriaceis 2 - 3£ poll, longis) ; caet. y. *Scotderi*. — Between Fort Colville and the Rocky Mountains, Dr. Lyall, ex herb. Hook. A most remarkable form, if not a distinct species.

Dr. Lyall also collected true *P. acuminatua*, Dougl., on the Wallawalla, with the dilated tip of the sterile filament bearded, as figured by Lindley,—and further north he obtained the rare *P. pruinosis*, Dougl.

4. *Revision of the North American Species of the Genus CALAMAGROSTIS, Sect. DEYEUXIA.* By ASA GRAY.

The species of *Calamagrostis* which possess the rudiment of a second flower (*Deyeuxia*, Kunth.), that have as yet been detected in Eastern North America, I can discriminate as follows : —

*Panicle loose and open even after flowering, and the (mostly purple-tinged or lead-colored) strigose scabrous glumes not closing in fruit: hairs of the base of the flower about as long as the hyaline lower palea am sometimes a little shorter, not surpassed by those of the rudiment; awn slender, straight, about equalling the palea. Leaves flat; culm tall\**

1. *G. CÁN AD EN sis*, Beauv. Glumes ovate-lanceolate, acuminate, barely a line and a half long; awn very delicate, not exceeding the hairs of the flower. — Subarctic America (from Bear Lake) and throughout Canada to Pennsylvania and New Mexico above Santa Fe" (Fendler, 957).

2. *C. LANGSDORFFII*, Trin. Glumes lanceolate or oblong-lanceolate, attenuate-acuminate, 2ℓ to 3 lines long, often cinereously strigose-scabrous; awn stouter and often slightly exceeding the palea.— Labrador and Newfoundland to Behring Straits, Sitcha (*G. strigosa*, Bongard), and south to the White Mountains of New Hampshire in the alpine region (W. Boott), Santa Fé, New Mexico (Fendler, 969), and Oregon (Tolmie, Nuttall, 01 *Columbiensis*, Nutt. in herb., &c). Also Greenland (Wormskiold, fide spec, ex herb. Lehmann.); Scandinavia (*C. elata*, Blytt. *C. phragmitoides*, Y&r. *elata*, Anderss., — and it has the aspect of the last-named species, but the rudiment is manifest); Russia; and Siberia (*C. purpurea*, Trin., &c). 01 *hirtigluma*, Steud., is certainly this species, but not *Arundo Granlandica*, Schrank. *C. Langsdorffii* has been much confounded with 01 *strigosa*, perhaps even by Wahlenberg himself; whose *Arundo strigosa* would seem from the original figure and description to be the *C. strigosa* of Hartmann (01 *Hartmanniana*, Fries), while all recent Scandinavian authors take it to be another, closely related, strict-panicled species, and from Wormskiold's herbarium we have the open-panicled and long-haired *C. Langsdorffii* under this name. The latter may be what Wahlenberg communicated to Bongard. At least, spikelets received by me from herb. Hook., as "01 *strigosa*, Sitcha" (whether from Bongard is not stated), belong to 01 *Langsdorffii*.



\* \* *Panicle strict, its branches short and erect or oppressed after flowering, and the glumes mostly closed: lower palea membranaceous or even of nearly as firm texture as the glumes, scabrous: awn stouter,*

*-t- Hairs of the base of the flower copious, nearly equalling or only about\* one third (or rarely one half) shorter than the thin-membranaceous lower palea, not surpassed by those of the rudiment: awn straight or slightly bent, barely exceeding the palea. Leaves narrow and mostly inclined to be involute. Northern and Arctic species, also European,*

3. *C. STRIGOSA*, Wahl., under *Arundo*, according to Fries, Anderson, &c. Glumes lanceolate and gradually subulate-acuminate, considerably exceeding the flower, 2½ to 3 lines long, scabrous on the keel; awn from or below the middle of the palea. — Referring to the remarks under the preceding species, I have only to add, that I have never seen an American or even a Greenland specimen of *O. strigosa*, as understood by Fries (Herb. Norm.) and all recent Scandinavian botanists, but have drawn the character from specimens of Fries and Blytt. The Canadian specimen mentioned by Grisebach in *Flora Rossica* probably belongs, like the Sitcha plant, to *O. Langsdorffii*, which, in the unexpanded state, might be confounded with it. The rudiment of the second flower, in all the specimens examined, is short and wholly or almost naked!

4. *C. LAPPONICA*, Trin. Glumes oval-ovate or lanceolate-ovate and short-acuminate or acute, about 2 lines long, little exceeding the flower; awn from slightly or much below the middle of the palea (hairs scarcely or nearly one half shorter than the flower). — Labrador and Greenland (*C. Grœnlandica*, Kunth.), and Arctic sea-coast. Lower Canada, Pursh, *Canad. Herb.*!

5. *C. STRICTA*, Trin. Panicle larger and more lobulate, the spikelets more numerous, smaller (about a line and a half long), and more crowded than in the preceding; glumes lanceolate- or ovate-oblong, obtuse or acute; awn from the middle of the palea or lower. — Canada to the Arctic regions, the Rocky Mountains, &c. Spikelets mostly (but not always) larger than in the Scandinavian plant. Ledges at Willoughby Lake, N. Vermont, W. Boott: a rather luxuriant form, with spikelets nearly two lines long, resembling *C. chalybcea*, Fries, being to *C. stricta* what that is to *O. Laponica*. Indeed, these two species • appear to run together.

**-i- -i-** *Hairs of the base of the flower slightly or one half shorter than the membranaceous lower palea and commonly surpassed by those of the rudiment: awn stout, divergent or bent when dry, but not twisted, not surpassing the glumes. Culms tall: leaves broad and flat. HJastem United States.*

6. C. CONFINIS, Nutt. Panicle elongated, its rather slender branches spreading in anthesis but soon appressed; glumes oblong-lanceolate and very acute, 2 lines long; hairs copious, slightly or one third shorter than the thin-membranaceous lower palea, which bears an awn much below its middle; grain glabrous. — In swamps, Pennsylvania and New York.

7. C. NUTTALLIANA, Steud. (*C. coarctata*, Torr., not of Kunth under *Deyeuxia*.) Panicle contracted and spike-like; glumes lanceolate and subulately long-acuminate, serrulate-scabrous on the keel, fully 3 lines long; hairs of the base of the flower scanty and barely half the length of the chartaceous-membranaceous and keeled lower palea on the dorsal side, longer on the other side, where they nearly equal those of the copious tuft at the summit of the otherwise naked rudiment; awn from half-way between the middle and the tapering summit of the palea; grain crowned with a bearded tuft. — Moist grounds, Massachusetts to North Carolina.

**-i- ~~K~~ -i-** *Hairs of the base of the flower short and commonly not copious, not reaching to the middle of the lower palea, at least on the lower side of the flower: awn from towards the base of the firm-membranaceous palea, mostly bent or diverging above, spirally twisted when dry. Leaves usually flat.*

8. C. PORTERI, n. sp. Leaves broadly linear, a woolly-bearded ring at the junction with the sheath; panicle elongated, linear, with the branches appressed; glumes lanceolate, barely acute, pale, and rather scarious, 2 or ~~2~~<sub>4</sub> lines long; hairs of the flower and of the short rudiment scanty, nearly equal in length on the upper side of the flower and attaining about its middle, very short or wanting on the lower side; awn equalling the palea, suprabasilar, twisted. — Huntingdon County, Pennsylvania, at Pulpit Rocks, and between Alexandria and Huntingdon, in the mountain region, on wooded and dry hillsides, Aug. 1862, Prof. Thomas C. Porter. Stems 2 to 4 feet high. Leaves 2 to 3} lines wide, tapering gradually to a slender point. Panicle 5 to 6 inches long, not purplish. This is an American analogue of *G. varia* or *montana* of Europe; but in that the glumes are more acute, the beard of the rudiment far longer and more copious, **and** the **awn** longer.

9. *C. SYLVATICA*, DC. Panicle contracted; glumes ovate-lanceolate, sharply acuminate, about 3 lines long; hairs only one fourth of the length of the flower, but the plumose elongated rudiment with its hairs reaching to or much above the middle of the flower; awn suprabasilar, twisted, exceeding the palea and the glumes.—Arctic coast (*C. purpurascens*, R. Br.), Saskatchewan (a specimen in Bourgeau's collection has the second flower sometimes imperfectly, sometimes perfectly formed), &c, and Rocky Mountains.

10. *C. PICKERINGII*, Gray, Man. ed. 2. (*C. sylvatica*, var. *breviseta*, ed. 1.) Panicle pyramidal, contracted after flowering, purplish; glumes ovate-oblong, obtusish or obtusely somewhat pointed, 2 lines or less in length; hairs, both those at the base of the flower and of the short rudiment, scanty and very short, only one fourth or fifth the length of the very obtuse lower palea, which bears half-way between the middle and the base a stout and straight or bent (but not twisted) awn not surpassing the flower. — White Mountains of New Hampshire, in the alpine region, Aug. - Sept. A luxuriant and smaller-flowered variety of this was gathered far below the alpine region, at Echo Lake, Franconia, by Wm. Boott, Esq.; its spikelets only a line and a half long. Hairs wanting at the base of the back of the lower palea, as in allied species. Rudiment always less than half, and often only a quarter of the length of the flower, and sparingly plumose with short hairs, or merely tipped with a few such hairs, or not rarely perfectly naked!

From the western side of North America are some forms of *Calamagrostis* as yet imperfectly known to me. The species in the books peculiar to that region are perhaps reducible to two, viz.:—

*C. ALEUTICA*, Bongard. Some spikelets from an authentic specimen, supplied from the Hookerian herbarium, show that I had correctly (in Proceed. Acad. Philad., July, 1862, p. 334) referred here the *C. pattida*, Nutt. in herb. Acad. Philad., a name changed by Mr. Buckley to *ft albicans*. The species is a well-marked one, with spikelets 3 lines or more in length, the equal palea of nearly the same texture as the glumes, short hairs at the base of the flower, and a short straight awn. From the character in the Reliquiae Hsenkeanae I infer that *Deyeuxia Nutka'ensis*, Presl., is the same thing.

*C. DESCHAMPSIODES*, Trin. Judging from the figure of Trinius and the description in the Flora Rossica, to this may perhaps belong one of Nuttall's species published by Mr. Buckley under the name of *ft rubescens*.

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# PHYSIOGRAPHIC!! SKETCH

OF THAT PORTION OF THE

## ROCKY MOUNTAIN RANGE,

AT THE HEAD WATERS OF SOUTH CLEAR CREEK, AND EAST  
OF MIDDLE PARK: WITH AN ENUMERATION OF  
THE PLANTS COLLECTED IN THIS DISTRICT  
IN THE SUMMER MONTHS OF 1861.

BY

O. C. PARRY, M.D.

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[FROM THE AMERICAN JOURNAL OF SCIENCE AND ART, VOL. XXXIII, 1862.]

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## PJITSIOGRAPHICAL SKETCH, &c



WITH the exception of a few isolated peaks and elevated ridges in connection with the Appalachian mountain range, in no instance reaching an elevation of 7000 feet above the sea level, the truly alpine vegetation of the North American continent is confined to the remote region of the Eocky mountains. Here alone, within temperate latitudes, do we meet with mountain ranges where the summer sun is reflected from snowy wastes, and in which occur peaks attaining an elevation of over 12,000 feet.

Our previous knowledge of the general external features and peculiar vegetation of this alpine district, has been derived from the researches of various explorers, who have traveled hastily over this heretofore inhospitable region, noting the most prominent features of scenery along the ordinary routes of travel, determining the latitude and longitude of various fixed points, mapping out the direction of water-courses, sketching in the more prominent mountain ranges, and rarely, (as in the case of James, Douglas, Drummond, Nuttall, and Fremont,) making collections of its plants. From all these different sources of information, extending through the present century, we have derived a considerable though still imperfect knowledge of the peculiar natural features of our American Switzerland.

Within the past few years, however, the discovery of gold deposits in this portion of the mountain range has attracted thither an adventurous and enterprising population, settling with wonderful celerity its picturesque valleys and introducing into its wild recesses many of the arts and comforts of civilized life. These various social movements have afforded facilities for the prosecution of researches in natural history which were not enjoyed by the early pioneer explorers of this region.

In order to improve this opportunity, the writer was induced to make a journey to this region during the past season, (1861,) with the especial object of studying its alpine vegetation and making collections of its native plants. With this view a station was selected near the foot of the dividing ridge, at the head waters of South Clear Creek. From this point an extensive scope of alpine exposure was brought within the range of an ordinary day's journey. Here, among the pine-wooded slopes on both sides of the **Snowy Bange**, coursing along its alpine

brooks, clambering over its precipitous rocks, floundering through snow-drifts, and mounting to its irregular crests and high alpine peaks, was spent most of the summer months of 1861. The scientific results of the observations here made, are presented in the following brief sketch and the accompanying list of plants.

The first impression made upon the traveller in approaching the mountain barrier from the broad undulating slope of the Great Plains, is the irregularity of outline and apparent want of system in the grouping and arrangement of the different ridges which compose the general mass of the mountain range. Some of the higher peaks rear their snowy summits at considerable distances from the dividing crest, and are met with at irregular points along the eastern slope. Numerous cross ridges interrupt the general parallelism of the principal ranges, and the actual "divide" is mostly obscured from view by elevated projecting spurs. The streams with their impetuous currents foaming along their rocky channels descend in a zigzag course, making their passage through intervening ridges by deep precipitous chasms. On reaching the more elevated mountain district, the valleys become more open, and frequently spread out into oval-shaped basins, to which the name of *bars* has been applied by the miners. Towards the head waters of the various streams, these basin-shaped portions of the principal valleys, beset with scattering groves of pine, encircled by steep ridges, generally clothed with heavy growths of spruce or exhibiting occasionally smooth grassy slopes, are known as *parks*. These are the miniature representatives of those larger open stretches of country which occur at the head waters of the Platte and Grand rivers, forming North, South, and Middle Parks.

In approaching the dividing ridge, by following up any of the principal streams by which the mountain range is penetrated, the open parks give place to narrow valleys, generally heavily timbered with pine and spruce. The water-courses force their way through narrow rocky *cañons*, or, obstructed by beaver dams, spread out into marshes occupied by a tangled growth of willow and alder bushes.

The smaller tributaries which collect the waters that trickle from alpine snows ebb and flow with the diurnal changes of temperature, increasing in volume as the sun ascends to relax the icy bonds of a protracted winter, and again contracting as the clear night once more asserts the reign of perpetual frost. These alpine brooks constitute one of the most attractive features of Rocky mountain scenery, and along their borders grow some of the finest plants of this region. Their course is that of a continuous *torrent*, presenting in their rapid descent a perpetual sheet of foam, rivalling in whiteness the snows in which they have their 'sources. Their waters of crystal purity and delicious

coolness glisten in the deep shade of overhanging pines, and moisten with their spray such choice plants as *Mertensia Sibirica*^ *Cardamine cordifolia*, *Saxifraga cespitalis*, and a most elegant and conspicuous *Primula* (311) near *P. nivalis*.

In mounting up the steep ridges which border their course, to reach their alpine sources, the view of the surrounding country is entirely shut in by the heavy growth of pines, including on the higher ridges and abrupt slopes, *Pinus contorta* with its slender tapering trunk and stiff scanty foliage; while on more level spots, or occupying depressed basins forming sub-alpine marshes, *Abies alba* and *Abies balsamea* shoot up their tapering spires. The usual undergrowth in these pine woods is composed of *Vaccinium JHyrtillus*, *Shepherdia argentea*^ *Berberis Aquifolium*, *Pachystima Afyrsinities*, &c.

In moist springy places and along the borders of marshes we find *Gaultheria Myrsinities*, *Pedicularis surrecta*^ *Senecio triangularris*, *Mitella pentandra*, *Habenaria dilatata*, *Pyrola rotundifolia*, var. *uligmosa*, &c. As a rarity, in scattered localities, we here meet with the charming *Calypso borealis*.

On approaching the limits of arborescent growth, indicated at first by a stunted appearance of the common varieties of pine, as well as the more frequent occurrence of the alpine species, *Pinus flexilis*, we at length come somewhat abruptly upon open stretches, characterized by their peculiar vegetation and general aspect as truly alpine. Some few trees straggle for a variable distance up the abrupt rocky slopes, but in these situations they plainly exhibit the severity of the exposure by deformed and blasted trunks, often nearly prostrate, and showing by a uniform bending of their upper branches the direction of prevailing fierce winds, and the weight of wintry snows. These arctic forms are confined almost exclusively to a single species of pine, heretofore undescribed, (*Pinus arinlata*^ Engelm.) belonging to the same group as *Pinus flexilis*, James.

Beyond this there is a succession of alpine exposures, characterized by extensive patches of snow scattered irregularly over the mountain slopes, generally indicating the accumulation of drifts; being most abundant and persistent in recesses near the higher elevations. At other points a rough *talus* of rocks is spread over the surface, the separate blocks being of every conceivable shape, and loosely aggregated, forming numerous fissures. In these burrowing recesses the Siberian squirrel finds a congenial abode, and salutes the traveller with his reiterated bark, often the only animate sound to break the solitude of these alpine deserts. Through these loose masses quarried out by nature's hand, we often hear beneath our feet the gurgling of invisible streams, connecting by these subterranean channels elevated snow-banks with lower alpine brooks. Among these

rock crevices we meet with many of the rare and attractive plants of this district, including *Aquilegiabrevistyla*, *Viola b/flora*, a variety of *Ribes lacustre*, *Senecio Fremontii*, *Oxyria renijormis*, *Polygonum Bistorla*, &c.

Other portions of these mountain slopes are covered with a sward of alpine grasses, mingled with *Carices* and mountain clovers, all characterized by their peculiar tough, matted, and penetrating roots. In connection with these, almost every square yard presents a botanical feast of the most attractive and varied features. Neat little tufted plants of the most cerulean blue, including *Polemoniumpulcherrimum*, *Mertensia alpina*, *Myostis nanOj* Torr., (*Eritrichium aretioides* ?) spot the surface. In scattered localities the bright yellow disk of *Actinella grandijlora* is conspicuous, while the varieties of alpine *Phlox*, *Primula angustifolia*, *Trifoliwm Parryii*, &c, supply almost every tint to complete a floral rainbow. Here also by a close inspection we discover such tiny plants as *Thalictrum alpinum*, *Oentiana prostrata*, and others almost hidden in the confused mass of matted foliage. In moist depressed places, and along the spongy margins of alpine lakes, we meet constantly with an alpine *iSalix*, *Caltia leptosepala*, and a white *Trollius* near *Americanus*.

Toward the summit of the dividing ridge we find plants whose names plainly indicate the frigid climate to which they belong. Here grows the elegant flowered *Claylonia* which I have called *megarhiza*, sending its deep taproots into the crevices of rocks whose projecting angles shelter its succulent foliage from the rude blasts that sweep over these bald exposures. Affecting similar situations we meet with an alpine *tiynthyris*, (255,) with its glossy foliage and neat spike of pale blue flowers.

On the summit of the crest, which here presents a flattened irregular surface, composed of weather-worn rocks imbedded in the coarse *debris* of its disintegrating granitic masses, we find *Tri/olium nanum*, *Stenotus pygmceus*, *Papaver nudicauh*, *Saxifraga serpyllifolia*, *Gentiana frigida*, and others, all indicative of a rigorous climate, whose brief summer is thus elegantly adorned by these arctic forms of vegetation. Among the rarities of this district we may notice the newly discovered [or re-discovered] *Chionophila*, (256,) *Pedicularis iSudetica*, and several others well known in the Old World, but now for the first time added to the North American flora.

Such is a general and very imperfect sketch of the prominent features of the vegetation belonging to this elevated district, taking for a sample the alpine ridge at the head waters of *Mad Creek*, to which from my frequent visits I involuntarily applied the name of *Mount Flora*.

In my solitary wanderings over these rugged rocks and through these alpine meadows, resting at noon-day in some sunny nook,



overlooking wastes of snow and crystal lakes girdled with mid-summer ice, I naturally associated some of the more prominent mountain peaks with distant and valued friends. To two twin peaks always conspicuous whenever a sufficient elevation was attained, I applied the names of *Torrey* and *Gray*; to an associated peak, a little less elevated but in other respects quite as remarkable in its peculiar situation and alpine features, I applied the name of *Mount Engelmann*. Thus following the example of the early and intrepid botanical explorer, Douglas, I have endeavored to commemorate the joint scientific services of our *triad* of North American botanists by giving their honored names to three snow-capped peaks in the Eocky mountains. With such innocent scientific pleasantry I felt at liberty to amuse the solitary hours of my mountain excursions, often wearied, but always enjoying with the keenest zest the magnificent scenery and rich botanical treasures that lay scattered along my varied path.

No description indeed can do justice to the grand features of scenery brought to view from the elevated points and commanding crests of this broad mountain range. While to the east the comparatively level plain stretches out like a boundless sea, in every other direction rise elevated peaks and snow-girt ridges, hemming in deeply sheltered valleys. An obscure parallelism of the principal ridges is here for the first time noticeable, more evidently marked however by the occurrence of culminating points forming broken lines extending northwest and southeast than by any continuity of the principal ridges. The *watershed* itself is a very irregular line, difficult to trace with the eye even from the most elevated points. This is owing to a very marked peculiarity of the range which exhibits the higher culminating points disposed quite constantly on the eastern slope of the divide, with which they are generally connected by depressed spurs. It is from these offsetting peaks that the most comprehensive views are obtained, and the general topography of the range can be best studied.

It may be noticed also that the most feasible *passes*, over the Snowy Range, are met with where the dividing ridge is inclined to an east and west course. In such situations the streams flowing thence north and south, respectively have their sources in the most depressed portions of the range, usually only a short distance apart.

In such a position, near the head waters of South Clear Creek is found the depression known as *Berthoud's Pass*, discovered by an Engineer of that name, while engaged in making a reconnoissance, for the location of a direct road from Denver to Salt Lake. In this pass the elevation at the highest point does not reach above the limits of arborescent growth, the dividing waters on either side heading but a few feet apart, in a pine grove.

Farther observation will be required, to show how far the accumulated snows of winter may offer obstructions to a through route, accessible at all seasons. The practical difficulties interposed by the steep ascent of the main abrupt slope can no doubt be readily overcome, by the construction of embankments and zigzags. When the principal height is once gained, farther progress is easy in either direction, by the usual appliances of road construction, for which the proper materials of stone and lumber are abundant, and of excellent quality.

The westward view takes in that irregular scope of country, including Middle Park, with its broad open spaces, encircled by broken ranges of mountains.

These mountains send down into the plain below, numerous spurs, heavily timbered with a magnificent growth of spruce, (*Abies alba*). Between these ridges, deeply sheltered valleys collect the tributary streams, forming the head waters of Grand River. The projecting mountain peaks on this side do not attain the height of those met with on the eastern slope, but the general surface is more elevated; the lowest depressions, occurring in the basin of *Middle Park*, being considerably higher than, corresponding points on the great plains to the eastward. Hence the streams are less rapid, and the vegetation indicates a colder and more humid climate.

Here during the rainy season, in the months of July, and August, the different surface exposures give rise to variable atmospheric currents, which, meeting at various points, occasion a rapid development of clouds and aqueous precipitation, such as characterizes the sudden showers in this peculiar district. Here in fact may be studied to the best advantage, (though not always under agreeable circumstances), the formation of clouds, in their endless variety of shape, density, and progressive development. These at times may be seen gradually accumulating about the summits of snow covered peaks, thence spreading over the horizon, and extending to the zenith, causing a regular steady rain; while at other times a sudden gust calls attention to a rapidly forming angry cloud, which sweeps over the surface in a well defined path, scattering rain, hail, or snow in its wake.

The regular afternoon showers which occur on the eastern slope are readily explained by referring them to the junction of heated air, charged with moisture, ascending from the great plains, with the descending currents of cold air from the snowy range, by which the moisture of the former is precipitated. As soon as the equilibrium is established, the rain passes off, and a sky more or less clear succeeds, followed almost invariably by clear nights and bright mornings. This series of phenomena, often succeeding with remarkable regularity from one day to

another, continues during the months of July and August, constituting a rainy season.

The principal object of my journey being the collection of plants, I may here very properly conclude this sketch of the general features of scenery, and climate.

The accompanying list of plants prepared from my collections, and notes, by Prof. Gray and Dr. Engelmann, will serve to give a more precise view of the botany of this region, particularly of the alpine district, to which my attention was specially directed.

Travelling over a path so ably investigated by early explorers, I have still been rewarded for my labors by the discovery of several interesting novelties, as well as by adding quite a number of alpine plants, well known in the Old World, to our North American Flora.

Should circumstances prove favorable, it is the intention of the writer to continue these observations during the coming season, over a wider section of country lying to the west and south of the investigations of the past season.

*Enumeration of the Plants; by A. GRAY, aided by notes of Drs. ENGELMANN and TORREY, and upon the habitats, &c., by Dr. PARRY.*

[The numbers are those under which the specimens have been distributed. Their order is followed, excepting a few transpositions to bring allied species together, when it could conveniently be done.]

1. *Erigeron grandiflorum*, Hook. FL Bor.-Am., t. 123; var. *elatius*. "In moist shady places, near the upper limit of the arborescent growth. Rays tinged with pink or purple." The specimens (a span to a foot in height) are considerably taller than Drummond's plant, from the summit of the Rocky Mountains much farther north, and the cauline leaves more clasping. Its affinities are with our American species of the section *Stenactis* on the one hand, and with the following species on the other, notably with the form named *E. alpinum* var. *ericalyx* by Ledebour from the Altai.

8. *Erigeron uniflorum*, L., the true, "with black-woolly involucre, like Bourgeau's specimens from the snowy region of the Rocky Mountains farther north. "Near the base of the bare alpine ridges."

3. Varieties of the last (one with blue, the other with nearly white rays), far less pubescent.

4. *Erigeron macranthum*, Nutt.

5, 6, 11, 33. *Erigeron compositum*, Pursh; different forms; the last smoothifolius and the same as *E. pedatum*, Nutt. No. 5 is a var. *discoideum*, wholly destitute of rays. Drummond long ago gathered specimens with very short rays. No. 33, is a single specimen of the same discoid variety.

7. *Erigeron acre*, L., var. Just the *E. Droebachensis* of the Flora Danica, which we have from Labrador.

9. *Erigeron Bellidiastrum*, Nutt. A plant of the plains.

10. *Arnica angustifolia*, Vahl., var. *discoideaf latifolia*. There is a discoid species in California; but none of the common species have before been met with in this condition.

2. *Arnica cordifolia*, Hook.

12. *Boltonia latisquama* (sp. nov.): foliis lineari-lanceolatis et magnitudine capitulorum inter *A glastifoliam* et *diffusam* media; squamis involucri spathulatis vel obovatis nervo crasso excurrente mucronatis vel cuspidatis; pappo pluri-squamellato et 1-2-aristato. "Near the mouth of the Kansas river, Sept.; growing in large clumps, 3 to 5 feet high, in rich soil." Well marked by the broad and rounded, abruptly tipped scales of the involucre.

13. *Aster (Orthomeris) glaucus*, Torr. & Gray, (*Bucephalus glaucus*, Nutt.) Abundant and very fine specimens of a rare and interesting plant, by aid of which the species should be characterized anew.\*

14. *Machceranthera (D'ieteria) canescens*, Gray, PL Wright.

15. *Solidago Missouriensis*, Nutt., a dwarf, subalpine variety.

17. Another dwarf variety of the above species.

16. *Solidago humilis*, ft Torr. & Gray; to be restored to *S. Virgaurea*,

18. The var. *alpina* of the above (i. e. *S. Virgaurea*, *alpina*, Bigelow), resembling the plant from the summit of the White Mountains, New Hampshire, but only an inch or two high.

19. *Senecio aureus*, var. *Balsamitce*, with leaves more pinnatifid.

20. *Senecio canus*, Hook., with few and large heads.

22. The same species with more numerous and smaller heads.

21. *Senecio lugens*, Richards., but the scales of the involucre not at all sphacelate at the tip.

23. *Senecio exaltatus*, Nutt., var. *minor*. A form of *S. lugens*.

24. *Senecio integerrimus*, Nutt. A rare species.

25. *Senecio triangularis*, Hook., in beautiful specimens.

26. *Senecio eremophilus*, Richards.

27. *Senecio Fremontii*, Torr. & Gray. Taller and well developed specimens of this alpine species, mostly a foot high.

28. A low, apparently more alpine variety of the preceding, with monocephalous stems, and leaves all tapering at the base.

29. *Palafoxia Hookeriana*, Torr. & Gray.

30. *Aplopappus spinulosus*, DC.

31. *Coreopsis involucrata*, Nutt. This, with the two preceding, and a specimen of *Pectis angustifolia*, Torr., were gathered on the plains.

32. *Arnica angustifolia*, Vahl; the tall, leafy-stemmed form common in that region, and approaching *A. Chamissonis*. Bourgeau collected the same on the Saskatchewan.

33. 35. *Townsendia sericea*, Hook.

34. *Cirsium edule*, Nutt. ? "A common subalpine species, 3 to 6 feet high; flowers yellowish."

*Cirsium foliosum*, DC, or a plant generally agreeing with Hooker's character, was sparingly collected in the bare alpine region.

36. *Euphrosyne xanthifolia*, Gray, PL Wright. *Cyclachcena xanthifolia*, Fresen.

\* *Aster Engclmanni*, Gray, coll H. Engelmann, in Exped. Lieut. Bryan, I believe till unpublished, is another fine species of this section. The same was collected by Dr. Lyell of the British Oregon Boundary Commission, in the Cascade Mountains.

37. *Antennaria dioica*, E. Br. 39. Var. *rosea* of the same.  
 38. *Antennaria Carpathica*, DC.  
 40. *Iva axillari* S. J. Pursh.  
 41. *Artemisia borealis* Pall.  
 42. *Artemisia Richardscmiana*, Bess. A form with looser pubescence and acute lobes to the leaves.  
 43. *Artemisia frigida*, Willd.  
 44. *Artemisia filifolia*, Torr. From the region where Dr. James first collected it.  
 45. *Artemisia Canadensis*, Michx.; a canescent form.  
 46. *Actinella aculis*, Nutt. Probably *Actinea integrifolia*, Torr.  
 47. 60. *Aplopappus (Stenotas) pygmaeus*. *Stenotas pygmaeus*, Torr. & Gray, Fl. 2, p. 237. "Found only on the highest crests of the snowy range, and on the dividing ridge, growing in scattered patches." A most interesting rediscovery of a plant before known only from a single specimen, gathered by Dr. James during his hurried visit to the alpine region, in Long's Expedition.  
 48. *Orindelia squarrosa*, Dunal.  
 - 49. *Limosyris viscidiflora*, var. *y. L. ciliata*, Torr. & c.  
 50. *Helianthus {pumilus, Nutt.?)*: caule 1-3-pedali hispido oligocephalo; foliis oppositis ovato-lanceolatis subintegerrimis cinereo-hispidis (novellis resinoso-atomiferis) juxta basin triplinerviis breviter petiolatis, summis lanceolatis subsessilibus saepe alternis; involucri disco paullo brevioris squamis oblongis exappendiculatis obtusiusculis vel breviter acutatis extus albo-villosis; fl. disci luteis; acheniis glabris versus apicem parce hispido-ciliatis; pappi paleis subulatis corolla paullo brevioribus cum paleolis interpositis extus marginibusque appresse hispidis.  
 44 On a rocky hill bordering the upper Clear Creek." Dr. Hayden also collected it on the Laramie Mountains. His specimens, being too far advanced, I had confounded with *H. rigidus*; but the plant is nearer *IT. Ictiflorus*. If it is not Nuttall's obscure *H. pumilus* it must be a new species. The latter is said to have the heads "apparently sessile," from which it may be inferred that they were not well developed in Nuttall's specimen. In ours they are on slender peduncles.  
 57. *Helianthus orgyalis*, DC. This seldom occurs in collections.  
 51. *Aplopappus (Pyrocoma) Parryi* (sp. nov.): caule pedali superne subviscoso-puberulo apice corymboso-polycephalo, pedunculis brevissimis; foliis submembranaceis fere glabris angusto-oblongis obtusis integerrimis, inferioribus subspathulatis in petiolum attenuatis, summis basi latiore subamplexicaulibus; involucri campanulati squamis lato-lanceolatis tenuiter coriaceis apice subfoliaceo laxo; ligulis plurimis parvis; acheniis glaberrimis; pappo albo haud rigido. "Hillsides and pine woods, upper Clear Creek." A well-marked species, with somewhat the aspect of a *Sericocarpus*, especially of *S. Oregonensis*; heads half an inch long; the rays 15-20, yellow, narrowly linear, but little longer than the disk-flowers. Pappus white in the flowering specimens (unknown in the mature state) nearly equalling the disk-corollas. "These specimens grew in the shade; in open ground the leaves are not so thin."  
 52. *Senecio cernuus* (sp. nov.): mox glaber; caule gracili sesquipedali apice paniculato-polycephalo; foliis lanceolatis basi in petiolum

## Enumeration of Plants of the Rocky Mountains. 11

marginatum subciliatum longe attenuatis parce argutissime dentatis vel subintegerrimis; capitulis parvulis (vix semi-pollicaribus) in pedicello 1-2-bracteolato nutantibus discoideis; involucri bracteolis parvis laxis subcalyculato; ovarii glaberrimis. "Dry hillsides, and in the crevices of rocks, upper part of Clear Creek, sometimes growing in close bunches." A species entirely new to me, well marked by its small nodding or cernuous heads; and its leaves (either broadly or narrowly lanceolate) tapering into wing-margined petioles of an inch or two in length. No ray flowers; those of the disk yellow.

63. *Arnica mollis*, Hook. ? a dwarf form.

54. *Arnica angustifolia*, Vahl; the alpine form, as of the Rocky Mountains farther north, and of the N. W. coast.

55. *Chcenactis achilleafolia*. Hook. & Am.

56. *Senecio amplexens*, (sp. nov.): lana parca mox decidua glabratus; caule (sesquipedali e radice perenni) apice nudo 1-2-cephalo; foliis membranaceis repando-subdentatis oblongis plerumque obtusissimis, radicalibus in petiolum alatum dcurrentibus, caulinis presertim superioribus e basi lata (integerrima vel utrinque 1-2-dentata mine subhastata) semi-amplexicaulibus; pedunculo gracili; involucri calyculato pilis brevibus atropurpureis parvis munitis; ligulis elongatis linearibus aureis apice saepius 2-3-fidis; acheniis glaberrimis. "In the mountains high up, at the foot of the snowy range." This is quite distinct from any North American species known to me. Compared with *S. frigidus*, it is far less woolly, even when young, and not at all hairy, except some purple hairiness of the involucre; the latter is calyculate with linear scales of about one-third the length of the proper involucral scales; and the thin and green leaves are from 3 to 5 inches long, the cauline ones half clasping or more by a broad base, not at all inclined to be spatulate. Head nearly as large as in *S. frigidus*, the rays longer, an inch or more in length. Pappus equalling the disk-flowers.

58. *Villanova ckrysanthemoides*, Gray, PL Wright; a more pubescent form.

59. *Chrysopsis villosa*, Nutt., var. approaching *hispida*, *mollis*, &c, all probably forms of *C. villosa*.

61. *Actinella grandijlora*, Torr. & Gray in Bost. Jour. Nat. Hist. Soc, 5. "Scattered over the alpine ridges, growing singly or branched from a deep tap root, 6 to 9 inches high." A most splendid dwarf alpine plant, which, having caused seeds to germinate, I hope to introduce into the gardens. The heads, with their numerous rays fully expanded, are nearly 3 inches in diameter, and bright yellow. It was before known only by the single specimen gathered by Fremont, in Dr. Torrey's herbarium.

02. *Gaillardia aristata*, Pursh.

63. *Senecio aureus*, L., var. *alpinus*: caule scapiformi 1-2-cephalo tripollicari bracteato; foliis radicalibus coriaceis rotundatis seu obovato-oblongis fore aveniis integerrimis vel apice subtridentatis. This doubtless was collected near the snow line. I believe it is an alpine and extremely reduced form of *S. aureus*, var. *borealis*, and that *S. subnudus*, DC, may also be reduced to *S. aureus*.

64, 60. *Macrorhynchus troximoides*, Torr. & Gray; broad-leaved and narrow leaved.

65. *Troximon glaucum*, Nutt., var. *foliis laciniatis*.

67. *Troximon parviflorum*, Nutt. Probably a depauperate form of the last.

68. *Lygodesmia juncea*, Don.

69. *Crepis runcinata*, Ton\* & Gray.

71. *Hieracium Fendleri*, Schultz Bip. in Bonpl. 1861, p. 174. *Crepis ambigua*, Gray, PL Fendl.

72. *Hieracium triste*, Willd.

73. *Afulgedium pulchellum*, Nutt.

74. *Atrage alpina*, L.: the same as Fendler's, i. e. var. *Ochotensis*.

75. *Thalictrum alpinum*, L. Very rare as an American plant, found before only on the eastern borders of this continent, Anticosti, &c.

76. *Thalictrum sparstjlorum*, Turcz.; vide Gray, PJ. Wright, adn. p. 8: forma ovarii breviter stipitatis unacum pagina inferiori foliorum resinoso-atomiferis. Maximovicz, commenting in the Flora Amurensia upon my identification of *T. clavatum*, Hook, (non DC.) with *T. sparsiflorum*, indicates a difference between the American and the Siberian plant in the length of the filaments and of the stipe. The latter is variable; the former is subsexual; both short and long filaments occur in Richardson's specimens. I am able to compare the fruit of a Hudson's Bay specimen with that of one of Tilings, of the Fl. Ajanensis, and to pronounce them precisely alike. In the latter the leaves are resinous-atomiferous underneath, as they are in Dr. Parry's specimens, in which similar atoms thickly beset the carpels. The oval sepals appear to be white. *T. Fendleri*, Engelm., from the mountain region farther south is really much allied to this; but that has dioecious instead of hermaphrodite flowers, linear and conspicuously pointed instead of barely oblong anthers, the achenia oblique (instead of dimidiate) and sharp-edged, the ribs straighter and stronger.

77. *Ranunculus affinis*, R. Br.

78. *Ranunculus Cymbalaria* Pursh.

79. *Ranunculus glaberrimus*, Hook.; var. *foliis omnibus integerrimia*, radice magis fibrosa. Mr. Spalding's specimens from the interior of Oregon connect this with Hooker's species.

80. *Ranunculus Eschscholzii*, Hook, (an Schlecht. ?) But perhaps an alpine form of No. 77. Some specimens under this number, with finely-cut leaves tend to confirm this suggestion.

81. *Ranunculus amoenus*, Ledeb.? I have before seen no American *Ranunculus* like this. It accords well with an authentic specimen of *R. amoenus*, but not so well with Ledebour's figure. This species has been joined by Ledebour himself to *R. affinis*, to which I should never think of referring our plant, with its large and very broad, overlapping petals. The fruit was not collected. It grows "in the high alpine region, in scattered patches near snow-banks: fl. June."

82. *Clematis Douglasii*, Hook.

83. *Trollius laxus*, Salisb., var. *albiflorus*. *T. Americanus*, Hook. Fl. Bor.-Am. "In moist or marshy places below snow-banks, associated with No. 91, June 21. Stem 6 to 12 inches high. Flowers white: these often frozen to a crisp recover perfectly in bright sunshine." The

pure white and broader sepals, lower stature, and alpine station, distinguish this from the ordinary form of the Northern United States. Regel in FL Ajan., reduces all the proposed species of this group to three, with many varieties, some of them too closely connecting *T. patulus* with the American species.

84. *Delphinium elatum*, L., a species which doubtless includes *D. intermedium*, *palmatifidum*, *flexuomm*, *villosum*, and *cuneatum*, DC. Also, I suppose, in part *D. exaltatum*, Hook. FL Bor.-Am., being more like that species than the next is; but it is not the plant of our Alleghany region. Like most of the present collection, the specimens are particularly good and neatly prepared. "It grows in large patches, on the moist borders of alpine brooks, near the limit of arborescent growth. Stem 3 to 5 feet high, the flowers vivid blue-purple."

85. *Delphinium scopulorum*, Gray, PI. Wright. This is the same as one of Bourgeau's collection from the Saskatchewan, distributed as *D. exaltatum*. The spurs on the lower petals appear to be constant.

86. *Aconilum nasutum*, Fisch. (*A. Columbianum*, Nutt.) "Two very distinct varieties, one, 1½ to 3 feet high with greenish white flowers, growing in shady places along the borders of streams; the other with deep blue flowers, in more open places, not so tall, and inclined to twine about adjacent bushes."

87. *Anemone multifida*, DC, with both red and white flowers.

88. *Pulsatilla Nuttalliana*, Gray.

89. *Aquilegia ccerulea*, Torr. Most beautiful specimens, from the district where Dr. James discovered this striking species. Limb of the petals apparently white, contrasting with the purple-blue sepals: spurs 2 inches long.

90. *Aquilegia vulgaris*, L., var. *A. brevistyla*, Hook. In the high alpine region.

91. *Caltha leptosepala*, DC. Borders of alpine brooks, with No. 84, <del>fec</del>

92. *Thlaspi cochleariforme*, DC? Hook., *T. Fendleri*, Gray, PJ. Wright Although the silicle is less winged than in Delessert's figure, it is likely that the plant of the Rocky Mountains is not distinct from the Siberian; but I have not yet seen the evidence to justify its combination, as Dr. Hooker proposes, with *T. montanum* and *T. prcecoz* as well as with *T. alpestre*.

93. *Draba Johannis*, Host. (*D. nivalis*, DC) Probably to be included among the forms reduced to *D. hirta* in the Fl. Ajanensis and elsewhere. In the high alpine region.

94. *Turritis patula*, Graham.

95. *Erysimum pumilum*, Nutt.; but the stigma is two-lobed or emarginate. "In the alpine region, low; flowers light sulphur-yellow." This may really be identical with Gaudin's *E. pumilum*, of the Swiss Alps, and it has equally a slender style and erect siliques. But it appears to pass into our *E. asperum* just as *E. pumilum* does into *E. Cheiranthus*. Not a single species of this group of *Erysimum* is well defined.

96. *Draba streptocarpa* (sp. nov.): radice § Holargis more bienni vel subperenni rosulam amplam caulesque floridos foliatos (spithamaeos) proferente; foliis integerrimis setis simplicibus et bifurcatis villosopididis, radicalibus spathulato-lanceolatis acutiusculis in petiolum marginatum longe attenuatis, caulinis sessilibus; racemis saepe paniculatis; pet-



alis aureis calyce duplo longioribus; siliculis linearibus (vel imperfectis oblongo seu ovato-lanceolatis) hispidulo-ciliatis caeterum glabris, maturis eximie spiraliter tortis; stylo longo.—Forma vero *alpina* bipollicaris, siliculis (immaturis) brevioribus. "On rocky cliffs bordering the upper Clear Creek, extending into the high, alpine region, where the dwarf form was found in flower in July, while the larger form lower down was mostly with ripe fruit." A most interesting species, allied to *D. aurea*, and with similar bright yellow, mostly retuse or emarginate petals. The leaves appear as if veinless, except the strong midrib, are all entire, and are beset, and especially ciliate, with long and rigid, shaggy, spreading, simple or simply forked hairs, far more bristly than in *D. aurea*, and with no fine stellate pubescence intermixed. Leaves of the radical clusters 1 to 1½ inches long; the cauline ones half an inch or so in length, oblong or oblong-lanceolate, the upper ones on their upper face, like the upper part of the stem, sometimes becoming glabrous. Racemes many-flowered. Style a little shorter than the ovary; stigma emarginate-capitate. Fructiferous pedicels 3 lines long, more or less spreading. - Silicles when well developed from half to two thirds of an inch long, either minutely or strongly hispid-ciliate, and twisted like an auger, the turns 3 or 4; but many of them, especially the later ones, are shorter and with only one or two\* twists: the style 1½ to nearly 2 lines long.

103. *Draba aurea*, Vahl, Hook. A form with smaller and narrower leaves than in Hooker's figure, and with simple elongated racemes. It accords very well with the plant cultivated several years ago under this name in Kew Gardens, and has a similar (at most biennial) root. *Draba* No. 6, of Bourgeau in Paliser's Expedition, is apparently the same; while Burke gathered in the Rocky Mountains specimens agreeing with Hooker's figure. All have a short and fine pubescence, and minutely hoary, plane or slightly twisted silicles, the style from a line to a line and a half in length. But, as in other Cruciferous plants, no great reliance can be placed on the length of the style. In New Mexican specimens, var. *stylosa* (*D. aurea*, Pl. Fendl., No. 43, p. 10, and in coll. Bigelow, Pacific R. R. Rep. iv, p. 66,—both ramose forms), the style is quite as long as in *D. streptocarpa*. I have seen no Greenland specimens.

*Draba alpina*, L.; a form apparently of this species, with one or two leaves on the scape, and a rather conspicuous style, was gathered on the summit of the snowy range.

97. *Draba nemorosa*, L.

98. *Arabis hirsute*, Scop.

99. *Cardamine cordifolia*, Gray, Pl. Fendl.

100. *Sisymbrium canescens*, Nutt.

101. *Physaria didymocarpa*, Gray (*Vesicaria didymocarpa*, Hook.): var. f racemis fructiferis elongatis; siliculis minoribus corrugatis minus inflatis. "Dry gravelly bluffs of upper Clear Creek, growing in bunches a foot in diameter: the vegetation more luxuriant than *P. didymocarpa* of the plains, of which it is probably only a mountain variety." If so, it is a remarkable one. There is an unpublished species, *P. Newberryi*, allied to *P. Geyeri*, collected by Dr. Newberry in the interior of New Mexico.

102. *Erysimum asperum*, DC, the form with orange-colored flowers, *E. Arkansanum*, Nutt., collected on the plains.

SINCE the first part of this Enumeration was published, Dr. J. D. Hooker's most interesting memoir, entitled "Outlines of the Distribution of Arctic Plants," has been received. This is of great importance in the study of any alpine or subalpine collection like the present, and has given occasion to a few remarks in the following pages. The memoir itself I expect to give some account of hereafter.

No. 79. Mr. Black, the obliging Curator of the Hookerian Herbarium, calling my attention to this member, enables me to correct an obvious error in my naming, in the first part of this enumeration. The plant is not *Ranunculus glaberrimus*, Hook., but an abbreviated subalpine state of *R. alismacefolius*, Geyer (the same as No. 306 of his collection), to which Bentham refers the *R. Flammula* of American authors.

I am well satisfied to see that Dr. Hooker, in his important paper on the Distribution of Arctic Plants, reduces *R. Eschscholtzii* to *R. nivalis*, L. Some specimens of Parry's No. 80 probably belonged to *R. affinis*.

104. *Cleornella tenuifolia*, Torr., from the district in which Dr. James discovered this species, so long taken for the original *C. Mexicana*.

105. *Cieome integrifolia*, Thunb. & Gray. The *C. serrulata* is probably a nonentity, or a mere variety of this.

106. *Viola biflora* L. This arctic-alpine species of the Old World had been traced all the way round to N. Japan and Kamtschatka, but was not before known as American, unless perhaps recently to Dr. Hooker, who has recorded it in his Tabular View,—perhaps on Dr. Parry's specimens, which may have reached him in time; or perhaps Bourgeau may have met with the plant.

107. *Viola Muhlenbergii*, Torr.\* with some pubescent specimens belonging to the next.

108. *Viola Muhlenbergii*, var. *pubescens*, passing into *V. adunca*, Smith (*V. longipes*, Nutt.); which, except in its longer (seldom crooked) spur, as closely answers to the *V. arenaria* and *pumila*, as the ordinary *V. Muhlenbergii* does to the *V. sylvatica*, of the Old World. *V. adunca* should therefore have been added to the synonyms adduced by Dr. Hooker, infringing all of this group under *V. canina*. Parry's specimens answer well to Bourgeau's from Saskatchewan.

109. *Viola Nuttallii*, Pursh; from the plains.

110. *Viola palustris*, L. From the alpine region, apparently, and the true *palustris*. The plant of our White Mountains is rather *V. epipsila*, Ledeb. Dr. Hooker goes a step too far in referring our *F. blanda* (with its lanceolate sepals and white flowers) to *V. palustris*. Our difficulty is to keep *V. blanda* clear of *V. primulcefolia*, and that dear of *V. lanceolata*.

111. *Geranium Carolinianum*, L.

112. *Geranium Richardsonii*, Fisch. & Mey.: "var. *stylis profundius divisis nudiusculis*." Engelm.

113. *Geranium Fremontii*, Torr.: "var. *Parryi*; caulibus pedunculisque patenter glanduloso-villosis; foliis minus profunde incis, laciniis ultimis dentibusve ovatis obtusiusculis." Engelm.—The deflorate pedicels are sometimes declined.

114. *Gaura coccinea*, Nutt.

115. (*Enothera lavandulcefolia*, Torr. & Gray.

116. (*Enothera albicaulis*, Nutt., with pinnatifid leaves.

11\*7. The same with undivided leaves.

118. *Stenosiphon virgatus*, Spach.

119. *Epilobium tetragonum*, L. Just like Swedish specimens.

120. *Epilobium alpinum*, L. The same genuine form was gathered by Mr. H. Engelmann at Bridgets \*ass.

121. *Epilobium alsinifolium*, Vill. The same as the larger form in the alpine region of the White Mountains of New Hampshire. Dr. Parry notes it as probably a form of the last, and so we have regarded it.

122. Nearly the same as No. 119, but nearly smooth.

123. *Epilobium latifolium*, L. Perhaps its most southern station.

125. *Epilobium paniculatum*, Nutt.

124. *Gayophytum ramosissimum*, Torr. & Gray.

126. *Menizelia albicaulis*, Dougl.

127. *Mentzelia (Bartonia, Nutt.) nuda*, Torr. & Gray.

128. *Sednm Bhodiola*, L. The female plant. "Along the borders of alpine brooks."

129. *Sedum rhodanthum* (sp. nov.): floribus hermaphroditis plerisque tetrameris pedicello plus duplo longioribus; sepalis linearibus; petalis late roseis lanceolatis sensim acuminatis stamina (oppositopetala eis infra medium adnata) paullo superantibus; ovariis rectis; stylis filiformibus: cset. ut in *S. algido* videtur. "High alpine region in moist places, at greater elevation than the preceding: fl. July." Petals nearly half an inch long, of a clear and deep rose-color, while those of *S. at gidum*, of the Altaic Alps are described and figured as yellow, or dull rose-color with age, and blunt. As the stamens are adnate to the petals nearly as high as in *S. algidum*, it cannot be the doubtful *S. euphorbioides* of the elder Schlechtendal, from Arctic Siberia, which Ledebour, who took it up, regards as a possible variety of *S. algidum*.

130. *Sedum stenopetalum*, Pursh. All our species should be elaborated anew.

131. *Silene Drummondii*, Hook. The species of this group are much confused in the Flora of North America.

134. *Silene Scouleri*, Hook.

137. *Silene Menziesii*, Hook.

132. 133. *Lychnis apetala*, L. (*L. brachypetala*, Hornem.) Uniflorous and pauciflorous forms.

135. See *Gentiana*, among the Monopetalisc.

136. *Stellaria longifolia*, Muhl.

138. *Cerastium vulgatum*, the var. *Behringianum*, and *C. arvense*, L. mixed.

139. *Sagina IAnncei*, Presl.

140. *Arenaria Fendleri*, Gray, Pl. Fendl.

141. *Arenaria arctica*, Stev., var. *y*, Torr. & Gray.

142. *Claytonia arctica* (Adams), var. *megarhiza*: foliis caulinis lanceolato-spathulatis seu lineari-spathulatis basi attenuatis quasi petiolatis; racemo intra folia subsessili (an semper?). *C. megarhiza*, Parry in litt., a name very probably to be adopted. "High alpine stations, extending to the crest of the snowy range; flowers from June to August. Grows in crevices of rocks, its large tap root penetrating to a great depth. Flowers, profuse, white with greenish-purple veins."—The large perpendicular root (about an inch in diameter), with the radical leaves and flowers, are just as in large specimens of *C. Joanneana*, Roem. & Schult. (d *acutifolia*, Ledeb. Fl. Alt. and Ic. Pl. Ross., t. 372, non Pall., Willd.) of which, confirmed by Trautvetter in Fl. Taimyrensis, I conclude that *Cl arctica*, Adams (published two years earlier) is only a more arctic form. But the leaves of the cauline pair in our plant are much longer and narrower, tapering into a petiole, and they closely subtend the short raceme; wherefore this fine plant would most naturally, and perhaps more correctly, be taken as specifically distinct from the arctic-alpine Siberian one; in which view Dr. Parry's name is appropriate for it. I have seen no intermediate form. But after the experience we have had of the variability of the foliage of Claytonias, I prefer to risk the view here taken.

Aided by Dr. Parry's excellent specimens, I have now reviewed my MS. notes upon Pursh's *C. lanceolata* (which has been such a puzzle), and upon the related perennial species. It will be seen that Pursh's name, descriptive phrase, and figure do not accord; also that he adds, "*Pall. MSS.*," and states that he found in herb. Lamb. "a specimen collected by Pallas in the eastern part of Siberia, perfectly agreeing with the present species,"—doubtless the *C. Joanneana*, Roem. & Sch., of which I have seen Pallasian specimens. I have reason to think that Pursh's plate was made up from this Pallasian specimen and from the materials he had from Lewis, which last also perhaps comprised portions of two species. The radical leaves figured, which certainly are not "lanceolate," are probably from the Siberian plant; the cauline of the plate are not "ovate," and are narrower than I have observed them in any Siberian specimens,—in which, however, they are said to vary from ovate to elliptical: the naked corm, resembling that of *C. Virginica*, must belong to that *Claytonia* of the Rocky Mountains, &c, which is so nearly related to *C. Caroliniana*, but with sessile, oblong, linear-oblong, or even linear-lanceolate leaves, when dry 3-nerved from the base, i. e., the *C. lanceolata* of Hooker's Flora, and the *C. Caroliniana*, var. *sessilifolia*, Torr. in Pacif. R. R. Rep., 4, p. 70. Now, my notes, made in the year 1839, upon Pursh's materials in the Lambertian herbarium, state that the specimen there ticketed *C. lanceolata* by Pursh is the tuberiferous or corm-bearing plant, above-mentioned, and which may therefore, if permanently distinct from its eastern relatives, retain that name. With it is a specimen, ticketed by Pursh "*C. lancifolia*?" having lanceolate-ovate cauline leaves. This may have furnished the model for the flowering stem of Pursh's figure, but it is not accompanied by any root or any radical leaves; while, as to the corm-bearing species, these bear only single or very few radical leaves, and mostly

none at all when the conn produces its flowering stem. The *C. lanceolata* of Hooker's Flora, as to the specimens, so accurately characterized in his remarks, is the same cormiferous species as Pursh's. But his specific phrase and the closing remark are evidently more or less influenced by Pursh's figure. The present discovery of a great tap-rooted *Claytonia* in the Rocky Mountains renders it not unlikely that Lewis and Clarke may have gathered the two species,—this without the root,—and that Pursh may have confounded them. However that may be, the names of the species concerned should stand as follows:—

^ *C. LANCEOLATA*, Pursh, fide herb., &c, for the corm-rooted plant of the Rocky Mountains and California, with sessile narrow leaves. Yet this is quite likely to prove a variety of *C. Caroliniana* (which also inhabits the valleys of the Rocky Mountains, both in New Mexico and in the British possessions), and that again runs insensibly into *C. Virginica*. It would appear that *C. lanceolata* extends to Kotzebue's Sound (Hook. & Am., Bot. Beech. Voy., p. 123), and to the opposite Asiatic coast (Cham, in Linnaea, 6, p. 563). But Hooker and Arnott's *C. Virginia*\* from the latter region is probably

*C. TDBEROSA*, Pall, in Willd. Rel., ex Schult. Syst. 5, p. 436. *C. Virginica*, Willd. Herb. If I may rely on my notes taken in the herbarium of Willdenow in the year 1839, this plant of Pallas, with leaves, as narrow as those of our *C. Virginica*, has the cauline ones closely sessile, and a *fusiform caudex* (so that the *C. Virginica* of Fenzl in the Flora Rossica is factitious); and I suppose that *C. Esfihscholtzii*, Cham. 1. c, is the same plant. Also that *C. acutifolia*, Pall, in Willd. Rel. 1. c, is a broader leaved form of it, verging towards

*C. ARTICA*, Adams. This species (to which I dubiously append Parry's No. 142) was founded upon the most reduced and arctic state of the species to which belong *C. Sibirica*, Pallas in herb. Willd., but not of Linnaeus,\* *C. Joanniana* of Schultes, *C. acutifolia* of Ledebour, and *C. arctica*, var. *maxima*, of Charnisso.

143. *Talinum pygnceum* (sp. nov.), Gray in coll. H. Engelmann, Exped. Bryan. I know not if this is yet published. Parry's specimens closely resemble those gathered by H. Engelmann at Bridgets Pass, in the year 1856, except that they are larger and finer. It is an acaulescent species, with a fusiform perennial root, the crown bearing a cluster of linear or spatulate-linear leaves, with one-flowered and mostly bi-bracteate peduncles in their axils.

144. *Ceanothus Fendleri*, Gray, Pl. Fendl.

145. *Ceanothus velutinus*, Dough, near the var. *Icevigatus*, Torr, & Gray.

146. *Berberis Aquifolium*, Pursh, var. *repens*.

147. *Papaver alpinum*, L. (*P. nudicaule*). High alpine.

148. *Callirrhoe involucrata*, Gray, Pl. Fendl., &c.

149. *Ribes lacustre*, Poir. An alpine form: "the common alpine Gooseberry, fruit reddish, hispid; flowers brownish," fewer in the ra\*

\* The statement respecting the *C. Sibirica* of the Linnaean herbarium the Flora of North America, 1, p. 476, and for which I am responsible made out by my MS. notes, which, on the contrary show that *C. Sibirica* is entirely *C. alpinoides*, Sims.

cence than in the common plant. This is probably *R. setosum*, Dougl.; at least it is the plant cultivated under that name, many years ago, by Loddiges.

150. *Bibes cereum*, Dougl. "Fruit reddish or amber-colored, insipid."

151. *Ribes hirtellum*, Michx. "Fruit dark purple, very acid."

152. *Ribes prostratum*, L'Her.

153. *Rhus trilobate* Nutt., a variety of *R. aromatica*.

154. *Archangelica Gmelini*, DC. Dr. Hooker, in his paper on arctic plants, has referred not only the *A. littoralis* or *Norvegica* of N. Europe, but also *A. Gmelini* and *A. atropurpurea* to *A. officinalis*. I have already in more than one place insisted that *A. Gmelini* (the *Physolophium* of Turczaninow, *Ccelopleurum* of Ledebour, &c.) is a good *Archangelica*; but for want of good fruit of *A. ojlcnalis* and *A. littoralis* I am unable to judge whether the latter connects *A. Gmelini* with the former. But I have no question (theories of derivation apart) that our *A. Gmelini* and *A. atropurpurea* are abundantly distinct, as well in their fruit as in their whole appearance. "Growing in truly alpine situations."

155. *Berula angustifolia*, Koch; a strict form.

156. *Conioselinum Fischeri*, Wimm. Just like the plant of the Northwest coast, and the *O. Tartaricum* of North Europe. But also not different, as far as I can see, from (*O. Canadense*, so that we may extend the synonymy and range as given by Dr. Hooker. It ranges south to the mountains of New Mexico east of the Rio Grande, and in the Alleghanies to North Carolina.

*Leptotamia dissecta*, Nutt., was gathered, a single specimen, at the foot of the Rocky Mountains.

157. *Cymopterus terebinthinus*, Torr. & Gray, var. *C. foeniculaceus*, Nutt.

158. *Cymopterus aMnus* (sp. nov.): caudice cespitoso; foliis pinnatisectis, pinnis 3-5%pproximatis 3-7-partitis, segmentis lineari-lanceolatis acutiusculis vel mucronatis integerrimis seu inferioribus 2-3-fidis; scapo 2-4-pollicari umbel lam subcapitatam gerente; involucellis subunilateralibus 5-7-partitis, segmentis Jincaribus seu lanceolatis viridibus flores aureos adaequantibus; calycis dentibus lanceolato-subulatis persistentibus; alis fructus aequalibus suberoso-incrassatis vix undulatis; valleculis 1-2-vittatis, commissura 4-vittata; carpophore nullo. "On high alpine ridges, along with *Primula angustifolia*, one of the earliest plants to flower." Leaves rather shorter than the scapes, glabrous, not glaucous, the margins minutely ciliolate-scabrous; segments 1£ or 2 lines long, in the smaller specimens only three in number. Fruit (of which very little was gathered) only 2 or 3 lines long. This is most probably the Umbelliferous plant collected by Dr. James in this same district, without fruit, and described in Dr. Torrey's account of James's collection, p. 207, but not named.

160. *Cymopterus montanus*, Nutt

159. *Thaspium montanum*, var. *tenutfolium*, Gray, Pl. Wright.

161. Probably *Thaspium montanum*, Gray, Pl. Fendl. In flower only.

162. *Pachystima Myrsinites*, Raf. (*Myginda myrtifolia*^ Nutt.)

163. *Saxifraga punctata*, L. (*S. cestivalis*, Fisch.)

165. *Saxifraga flagellaris*, Willd.; with scanty runners.

164. *Saxifraga Hirculus*, L. A very condensed, caespitose, high-alpine form, the flowering stems barely two inches high, perhaps the same as *S. propinqua*, Brown, from the arctic shores. *S. serpyllifolia* of Pursh seems very near this, with smaller flowers, &c.

166. *Saxifraga Hirculus*, L. A small form, only 2 or 3 inches high, but quite like the common Arctic American specimens.

167. *Saxifraga cernua*, L.

168. *Saxifraga bronchialis*, L.

169. *Saxifraga nivalis*, L. Dr. Hooker might properly have cited *S. Virginiensis* as the temperate form of this species, and *S. vernalis* as a connecting form. *S. Virginiensis* stands independently in Hooker's list, resting on *S. reflexa*, Hook., from the shores of the arctic sea. I have never seen *S. reflexa*; but, from the character (especially the upwardly dilated filaments) and the fine figures in the Flora Boreali-Americana, I suppose that it is rather a form of *S. Dahurica*, to which *S. flabellifolia*, R. Br., also belongs.

A solitary specimen, from alpine brooks, may be *S. heiracifolia*, but it is too young for determination.

170. *Saxifraga ccespitosa*, L., var.; a very condensed alpine form: *S. uniflora*, K. Br.

171. *Mitella (Mitellaria) pentandra*, Hook.

172. *Heuchera bracteata*, Seringe. An interesting rediscovery of one of plants before known only from a single specimen in Dr. James's collection. According to Dr. Torrey, it accords with the original plant, but is larger-leaved. "Common in crevices of rocks, from the base of the mountains to alpine situations."

173. *Heuchera parvifolia*, Nutt.; a small state. "Strictly alpine, always exhibiting its close spikes, which are never elongated as in No. 174."

174. *Heuchera parvifolia*, Nutt., the taller form, exactly Fendler's No. 264, and Wright's 1098. "Valley of Clear Creek, common." Dr. Parry remarks: "I did not suspect this to be a variety of the former: its loose habit and long inflorescence seem to distinguish it; and no intermediate forms were noticed."

175. *Jamesia Americana*, Torr. & Gray; from the original habitat. The genus was founded, in the Flora of North America, upon a specimen so imperfect that it was omitted in the original account of Dr. James's collection. It is now well known, having been collected by Fendler, &c.; and, as it proves, the discoverer (now recently deceased) is commemorated by a most distinct and interesting genus.

176. *Trifolium dasyphyllum*, Tom & Gray. Less downy than Dr. James's plant is described, the flowers considerably smaller than those of *T. alpinum*.

177. *Trifolium nanum*, Torr. "On the crest of high alpine ridges, in dense patches." This and the preceding are interesting re-discoveries.

178. *Trifolium Parryi* (sp. nov.): Involucrum: glabrum, surculosum, subcaulescens; scapo 3-4-pollicari basi foliato; stipulis ovatis Bercariosis; foliolis oblongis argute dentatis; involucro scarioso 5-7-par-

tito capitulo plurifloro multum brevior, segmentis ovatis obtusis; calycis corolla rubro-purpurea subtriplo brevior, dentibus lato-subulatis tubum campanulatum subaequantibus; legumine sessili 3-4-spermo. "On high, grassy, alpine slopes. Flowers bright-red and purple, conspicuous." A well-marked species, very different from any of our involucrate species—except *T.fucatum*, which has similar, but larger, stipules and corollas\* Leaflets 6 to 12 lines long. Flowers 20 or more in the head, about 9 lines long, the corolla persistent and somewhat ampliate after flowering.

179. *Oxytropis splendens*, Dougl.

180. *Astragalus oroboides*, Hornem. *Phaca oroboides*, DC. *P. elegans*, Hook. I possess a mere fragment, without fruit, of the original *Phaca elegans* of Hooker's Flora; but I have a fine specimen, so named, from Bourgeau's Saskatchewan collection j and "*Phaca* No. 5" of the same collection is just like my original specimen of *P. elegans*, and like *P. oroboides* from Labrador communicated by Dr. Steetz. The latter and European specimens have rather less slender calyx-teeth; but no other difference is manifest. The elliptical and sessile legume has the dorsal suture more or less intruse. "*Phaca* No. 2" of Bourgeau's collection in the Rocky Mountains is probably a variety of *A. alpinus*, but has a shorter stipe to the legume and longer, very slender calyx-teeth.

181. *Astragalus (Phaca, Hook.) nigrescens*. Gray. *Homalobus dispar*, Nutt., and *nigrescens*, Nutt.

182. *Astragalus alpinus*, L. *Phaca astragalina*, DC.

183. *Oxytropis Lamberti*, Pursh., if the flowers are purple as they seemingly are. Also *O. sericea*, Nutt., I presume.

184. *Astragalus*, near *glareosus*, Dougl., but the raceme many-flowered. Fruit not seen.

185. *Astragalus (Phaca, Hook.) pectinatus*, Gray.

186 and 189. *Oxytropis Lamberti*, Pursh.

187. *Lathyrus ornatus*, Nutt. On the lower Platte.

188. *Lathyrus lineavis*, Nutt.

189. *Astragalus gracilis*, Nutt.

190. *Astragalus (Orophaca) sericoleucus*. *Phaca sericea*, 'Suit. Sand hills of the Upper Platte, May: in flower

191. *Oxytropis nana*, Nutt. (*O. arctica*, var.?). "High valleys, rooting in granitic sand, in shade of *Pinus Banksiana*: rare."

192. *Dalea alopecuroides*, Willd. Doubtless from the plains.

193. *Astragalus Parryi*, (sp. nov.): caespitoso-multicaulis e radice crassa, humifus, laxe villosus; stipulis fere discretis liberis ovatis, superioribus ex ovato lanceolato-siibulatis; foliolis 15-21 ovalibus supra glabrescentibus glabrisve; pedunculis folium subaequantibus; racemo brevi 6-10 floro; floribus (6-8 En. longis) subpatentibus; calycis dentibus attenuato-subulatis tubo oblongo-campanulato sequilongis; corolla octoleuca ("viridulo-lutea") carina apice purpurascenti; legumine pollicari hirsuto coriaceo subinflato ovato-lanceolato acuminato incurve uniloculari, suturis utrisque leviter intrusis. *A. succumbens*, Torr. & Gray, in Pacif. R. Road Rep. 2, (coll. Pope) p. 163, non Dougl. "Common in dry gravelly banks along Clear Creek: prostrate, with decumbent branches, matting the ground." Capt. (now General) Pope collected it in flower on the Llano Estacado, and Mr. Gordon in the same condition in the



Raton Mountains. It is with great unwillingness that one adds another species to this great genus, while several in the books are still imperfectly known. I had before referred this to *A. succumbens*, but the forming fruit of Parry's specimens shows that it is very different, and more allied to *A. glareosus*, Dougl. (*A. argophyllus*, Nutt.) yet it can hardly have been confounded with that species.

194. *Eosackia Purshiana*, Benth. Valley of the Platte.
195. *Dalea laxiflora*, Pursh. From the plains.
196. *Sophora sericea*, Pursh. Probably from the plains.
197. *Thermopsis rhombifolia*, Nutt.
198. *Psoralea lanceolata*, Pursh.
200. *Lupinus*. The same as Fendler's No. 168, which was doubtfully referred to *L. laxiflorus*. It cannot be named correctly until the related species are revised.
201. *Prunus (Cerasus) Yirginiana*, L.
202. *Sibbaldia procumbens*, L.
203. *Dryas octopetala*, L.
204. *Geum rivale*, L. A specimen of this in fruit (in herb. Durand) collected at Eureka by Mr. Howard, has the head of carpels sessile; but still it appears to be only *G. rivale*, not *G. geniculatum*.
205. *Geum (Sieversia) Rossii*, Seringe. Large forms, a span high.
206. *Spircea discolor*, Pursh. (*S. aricefolia*, var. *discolor*, Torr. & Gray.)
207. *Spircea opulifolia*, L., a small-leaved form, near the var. *pauciflora*, Torr. & Gray.
208. *Rosa blanda*, Ait
209. *Cercocarpus parvifolius*, Nutt. The plant so long ago collected by Dr. James, but mistaken for the Mexican *C. fothergilloides*.
210. *Rubus deliciosus*, Torr. "A profusely-flowering shrub, abundant from the base of the mountains to the upper valleys, associated with *Jamesia*. Flowers white, never purplish. Fruit small, coarse-grained and insipid, ripening few largish grains." With Dr. Parry, I cannot doubt that this is James's *R. deliciosus*, notwithstanding the discrepancies. Those relating to the berries are principally a matter of taste, under different circumstances. The color of the petals was probably mistaken by the describer. "To this species accordingly belongs my *R. Neo-Mexicanus*, PL Wright.
211. *Rubus Nutkanus*, Mogino.
212. *Rubus Idaseus*, L. "Alpine."
213. *Potentilla fissa*, Nutt. In the mountains.
214. 215. *Potentilla nivea*, L. Slender forms.
216. *Potentilla Pennsylvanica*, L. var. *strigosa*.
217. *Potentilla concinna*, Richards. ? a large form. At least a solitary specimen of undoubted *P. concinna*, from a higher station, is ticketed by Dr. Parry as a dwarf form of No. 217.
- 218, 219, 220, are forms of *Potentilla diversifolia*, Lehm., including *P. glaucophylla* and *P. Drummondii*, Lehm., and probably some others. The whole group requires complete revision and much reduction.
221. *Adoxa Moschatellina*, L.

WE are happy to state that Dr. Parry, assisted by Mr. E. Hall, is now again in the Eocky Mountains, and at the last accounts was about to ascend Pike's Peak. An interesting botanical collection may be expected.

222. *Sambucus racemosa*, L. Apparently just the European plant, and a glabrous state of *S. pubens*, Miclix.

223. *Symphoricarpus montanus*, H.B.K. New to our flora; well marked by its elongated corolla. *S. glaucescens*, U.B.K., appears, in probably authentic specimens, not to be really different.

224. *Loniceru involncrata*, Banks.

225. *Viburnum paucijlorum*, Pylaie.

2C6. *Vaccinium ccespitosum*, Miclix. Just like the White-Mountain plant. "Strictly alpine."

227. *Vaccinium Myrtillus*, L. var. *microphyllum*, Hook. Fl. Bor. Am. Surely a remarkable variety of *V. Myrtillus*, the flowers as small in proportion as the leaves. According to Dr. Parry, it is the "usual alpine form, growing in closely branched masse\*, in the shade of stunted evergreens, taking the place of 228, which is found lower down, in pine woods. Fruit small, purplish, without bloom, mild and rather insipid in taste." Dr. Hayden gathered it on the Black Hills of the Platte.

228. *Vaccinium Myrtillua*, var. ? Tho branchlets less strongly angled, and the leaves less reticulated and toothed than in the European *V. Myrtillus*. In the flowers, <fec, it is as if intermediate between that species and *V. ccespitosum*. Fuller specimens, and the fruit, are wanted.

229. *Pyrola minor*, L. Collected by Fendler (No. 644) as far south as Santa Fé.

230. *Pyrola chlorantha*, Swartz. Dr. Hooker is right in his suspicion that the Greenland plant of Dr. Kane, referred by Durand to *P. chlorantha*, is *P. grandiflora*; but he is quite wrong, as I think, in referring *P. chlorantha* to *P. rotundifolia*, of which *P. grandiflora* is evidently a mere variety.

231. *Pyrola (Moneses) uniflora*, L. "In deep pine woods."

232. *Pyrola rotundifolia*, L. var. *uliginosa*. (*P. uliginosa*, Torr.) "In moist, shady woods; flowers rose-color." This is certainly connected with *P. rotundifolia* through *P. asarifolia*. To the synonyms of *P. rotundifolia*, Dr. Hooker might have addcdtP. *occidentalU*, R. Br., *P. bractea/a*, Hook., *P. picta*, Hook., &c, but should exclude, as I suppose, both *P. chlorantha* and *P. ellipticu*.

233. *Pyrola secunda*, L.

234. *Gaultheriu Mirsynites*, Hook. A rare and peculiar plant.

235. *Mimulus luteus*, L. A slender form.

236. *Collinsia parviflora*, Dougl.

237. *Veronica alpinus*, L.

238. *Gerardia aspera*, Benth. Valley of the Platte.

239. 240, 241. *Castilleia pallida*, Kunth. With red bracts, therefore verging to *C. miniata*, Dougl., which I conclude to be only a red-bracted variety of *C. septentrionalis*, Lindl., which is the form of *C. pallida*, with long, well-developed galea. For a revision of the genus, see Supplement III, infra.

242. *Castilleiapallida*, Kunth; nearer the type of the species (*C. Sibirica*, Lindl.) and *C. occidentalis* Torr.

245. *Castilleia pallida*; the taller and broader-leaved form with longer galea, like the plant of the White Mountains of New Hampshire, *C. septentrionalis*, Lindl.

243. *Castilleia breviflora*. *Euchroma breviflora*, Nutt. in herb. Acad., Philad.

244. *Castilleia Integra*, Gray, 1. c.

246. *Castilleia linariifolia*, Benth. The same as Fremont's plant.

247. *Orthocarpus luleus*, Nutt.

248. *Pedicularis racemosa*, Benth. in Hook. Fl., &c. Fine specimens of a rare and interesting species. "Grows in patches near the limit of trees. Leaves dark-green and shining. Flowers yellowish-white. July, August."

249. *Pedicularis bracteosa*, Benth. 1. c. "Near the foot of alpine ridges; rare."

250\* *Pedicularis Groenlandica*, Retz. Obs. 4,1.1. *P. surrecta*, Benth. 1. c.; a form with larger flowers and longer beak. Torrey was quite right, as it appears, in referring this plant to *P. Groenlandica*. Dr. Parry's specimens well accord with the figure of Retz, except that the beak is perhaps a little longer. Bourgeau collected it in the Saskatchewan district with the beak no longer than Bentham states it to be in the Greenland plant. In the Rocky Mountains it is "not uncommon on the borders of subalpine marshes, or of high alpine ridges; in the former stations tall and slender; in the latter shorter and stronger; flowers reddish-purple."

251. *Pedicularis Parryi*, (sp. nov. sect. *Rhyncolophce*, Bunge, sen *Edentularum*, inter *Unriatas* et *Scapiformes*, Benth.): glaberrima; caule ultra-semipedali submido; foliis lineari-lanceolatis pectin ato-pinnatipartitis petiolatis, caulinis 1-3 parvulis; segmentis linearibus acutis (ad summum 3 lin. longis) cartilagineo-serrulatis; bracteis parvis trifidis; floribus plurimis breviter pedicellatis in spicam angustam subconfertis; calycis membranacei 5-striati demum subinflati breviter 5-dentati dentibus lanceolatis integerrimis intus lanulosis; corollis sordide flavae galea angusta apice incurva sensim in rostrum longiusculum emarginatum haud denticuliferum subdecurvum labium inferius (lobis eroso-crenulatis) multo superantem producta; filamentis glaberrimis. "On alpine ridges. Flowers of a dirty or faded yellow," about half the size of those of the Siberian *P. compacta*; the shape and size of the beak nearly that of *P. ornithorhynca*, which is apparently *P. pedicellata*, Bunge (*P. subunda*, Benth.). Spike naked, 2 to 4 inches long; the lower flowers rather sparse, on pedicels of 1½ to 2 lines in length. The nearest affinity of the species is with *C. compacta*, Bunge, which is larger in all its parts, and

leafy-stemmed, the cauline leaves sessile, their much larger segments pinnatifid or incised, the flowers of the dense spike sessile, the calyx more inflated, the lower lip of the corolla nearly equalling the galea, and two of the filaments slightly bearded.

252. *Pedicularis procera*, (sp. nov. *Blcuspidatarum*): caule 1-J-3-pedali crasso foliato superne cum spica densiflora 9-18-pollicari molliter pubescente; foliis glabris pinnatipartitis, (radicalibus srepe sesquipedalibus pinnatisectis), segmentis lanceolatis laciniato-pinnatifidis, lobis serratis vel. incis; bracteis e basi ovato-lanceolata lineari-elongatis, inferioribus pectinato-pinnatifidis flores superantibus; calyce subaequaliter 5-fido, lobis lanceolatis integris tubo subdimidio brevioribus; corollae (ultra-pollicaris sordidse virido striatae) galea apice cucullata erostri truncata fidentata labium sub-patentem breviter trilobum vix aequante. " Shaded hill-sides, not uncommon in scattered localities." Collected also by Fremont in 1845, and in the Sandia Mountains further south, by Dr. J. M. Bigelow; but only in fruit. A striking species, quite distinct from any other known to me.

253. *Pedicularis Sudetica*, Willd., var. " High alpine; rare." The specimens accord very well with *P. Sudetica*, especially with Russian-American specimens, except the deeply emarginate summit of the galea as almost or quite edentulate. Bunge describes them as " breves triangulifres basi latos;" but they are often subulate. I fancy that *P. nasuta* of Kamtschatka is very near Dr. Parry's plant. *P. Kanei*, of Durand, from Arctic Greenland, does not belong to *P. Sudetica*, as Dr. Hooker supposed, but to *P. lanata*, Willd.; which again, contrary to Bentham and Dr. Hooker, I must regard with Bunge as clearly different from *P. Ursula*. It is much nearer another species which Dr. Hooker refers to *P. Sudetica*, viz. *Langsdorffii*, with which it has been confused, but it is perfectly edentulate. The teeth of the latter, however, are inflexed, and so may escape observation. All the continental American "P. hirsuta" I have seen belongs to *P. lanata*. All these species are well discriminated by Bunge in Ledebour's Flora Kossica.

254. *Synthyris plantaginea*, Benth. Wholly below the alpine region. The same as Fendler's No. 582. Radical leaves mostly obtuse or rounded (rarely at all cuneate) at the base; scape multibracteate. Flowers all short-pedicelled; sepals ovate, obtuse, villous-ciliate, becoming nearly glabrous with age. Corolla pale, very deeply 2-parted or even divided, the upper lip cuneate-obovate, entire or obscurely erose, a little exceeding the calyx, twice the length of the 3-lobed lower lip. Stigma capitellate.—The species of the genus need a complete revision, which I am unable now to attempt. In *S. Hovyhtoniana*, which I formerly had in cultivation, a great diversity was observed in the calyx, (varying from 2-3-parted to 5-parted), corolla, (2-4-parted, as described in the Manual, but the lips or divisions nearly of equal length, the lower not seen very short, as described in the Prodrömus), stamens (either two or four), and even the ovary, which is occasionally tricarpellary.

255. *Synthyris alpina*, (sp. nov.) : spithamaea; foliis radicalibus ellipticis sou evalibus nunc subcordatis creberrime crenatis mox glaberrimis; scapo snperne folioso-bracteato; spica brevi densa; sepalis lanceolatis extus pcesertiin ad margines cum bracteis longissiine villosis; corolla

bipartita, labio superiori latissimo eroso, inferiori multo minori 2-3-partito, lobis angustis; stigmatē capitato. \* Growing in crevices of rocks, on the dividing ridge, at the elevation of 10,000 feet. Very different from No. 254, strictly confined to the high alpine region, with glossy foliage and a neat spike of pale blue flowers." Leaves 1½ to 2 inches long, on slender petioles, rather strongly crenate, a little fleshy, very smooth, or early becoming so, as also the lower part of the scape. Bracts on the upper part of the scape ovate or in the spike lanceolate, sessile, gland-ciliate with very long woolly hairs. Spike only an inch long in flower, very dense, and very woolly; flowers nearly sessile; the corolla larger and more exerted than in *S. plantaginea*. Sepals in flower lanceolate and acute or acutish; but in a fruiting specimen broader and obtuser. Only two stamens seen, which, as in other species, are almost hypogynous.

256. *Chionophila Jamesii*, Benth. "On bare or grassy ridges of the snowy range, July. Flowers pale cream-color." A most interesting re-discovery, enabling us nearly to complete the account of this well-marked genus. The only known original specimen, and a very scanty one, is in the Hookerian herbarium, to which it was contributed by Dr. Torrey, mixed with *Pentstemon Jamesii*, and no specimen is extant in Iris own herbarium. But I presume that Dr. Parry's excellent specimens are of the same species, notwithstanding the striking discrepancies. The calyx, which gives the character to the genus, is gamophyllous almost to the summit, with 5 broad and short nearly equal teeth, considerably amplified, thin, membranaceous, or even scarious. Corolla tubular, slightly dilated upwards, nearly twice the length of the calyx, and with a sort of palate to the lower lip very densely bearded. The original specimen must be in poor condition if this beard was overlooked. Sterile filament much smaller and shorter than the others, smooth. Stigma small, obtuse and entire. Radical leaves in the larger specimens 2 or 3 inches long, lanceolate-spatulate. Scape 2 to 4 inches high, puberulent. Flowers solitary in the axils of the small floral leaves, on very short and ebracteolate pedicels.

257. Vide after 261, 262.

258. *Pentstemon acuminatus*, Dougl. in Bot. Reg. t. 1285, var. *P. nitidus*, Dougl., Benth. *P. Fendleri*, Gray in Pacif. R.R. Rep., 2, p. 168, t. 5. "A wide-spread, variable species, with pale glaucous leaves and palish or bright blue flowers," Bentham describes *P. acuminatus* as with "filamento sterili filiformi glabro." But Lindley, in Bot. Reg., where the species was published, says "apice leviter pilosum, aduncum;" and his figure represents a large state of what I must consider the polymorphous species one form of which I published as *P. Fendleri*, and which is certainly *P. nitidus*. *P. cyananthus*, Hook. Bot. Mag., which in the Botany of the Mexican Boundary I had referred here, is however figured as having hairy anthers, like those of *P. glaber*, and with such a corolla as the latter has, but with narrow sepals. It may be a very well developed form of *P. glaber*, var. *alpinus*.

264. A narrow-leaved variety of the foregoing, clearly of the same species; "from plains east of Denver, with numerous bright blue flowers and narrow linear leaves." Similar specimens from Eureka, Mr. Haw\*

ard, but only a span high, as well as others before me, (among them Jeyer's No. 154, and some of Hooker's *P. acuminatus*, var. *minor*, from Catlton House), manifestly connect this species with *P. cceruleus*, Nutt, the oldest of all these names. *P. secundiflorus*, Benth., is another connecting form.

259. *Pentstemon glaber*, Pursh, var. *alpinus*. *P. alpinus*, Torr. in Ann. Lye, N. Y. Only an alpine form of the next, with more attenuated sepals, the particular shape of which is inconstant in the genus. Dr. Parry remarks: "no doubt a variety of *P. glaber*, being almost exactly a dwarfed representative of that elegant species; and its alpine situation would sufficiently account for its stunted size."

260. *P. glaber*, Pursh, (*P. erlanthera*, Fraser, Nutt.) "Common on dry hill-sides along the valley of Clear Creek; a splendid species, its large, brilliant, inflated, blue corolla streaked with reddish-purple stains." The name first published, with a character, ought to be restored for this species; since the anthers are but slightly hairy, in comparison with those of the section *Erianthera*, and are frequently glabrous, except a ciliation or mere denticulation at the margin of the valves. The beard at the top of the sterile filament is sometimes almost wanting, and sometimes sparsely extended downwards. I cannot doubt that the figure of/\*, *speciosus* in Bot. Ilcg., t 1270, represents this species, and, returning to an old opinion in this regard, should reduce that to the present species.

261, 262. *Pentstemon glaucus*, Graham in Edinb. Phil. Jour. Jnly, 1829, p. 348; Lindl. Bot. Reg. t. 1286. "Rather abundant at the foot of alpine ridges, above the limit of trees; the taller specimens from a lower elevation in the valley of Clear Creek. The more common form has pale cream-colored flowers with greenish stripes, and pale green leaves; there is a more rare, purple-flowered variety; both quite bilabiate." Small specimens of this are found in James's collection, mixed with *P. Jamesii*, Benth., and formerly confounded by Dr. Torrey with *P. albidus*,—to both of which they have some resemblance. The species, however, is more allied to *P. gracifis*, Nutt.; but it has a more inflated corolla even than *P. pubescens*, with which Bentham confounded it. The specific name is far from distinctive or good.

257. *Pentstemon hamilis*, Nutt. in Herb. Acad. Philad.; apparently a reduced, alpine variety of *A glaucus*, with shorter and rather less ampliate corolla. Specimens collected at Enreka by Mr. Howard (in herb. Acad. Philad.) ally Dr. Parry's plant with the *P. gracilis*, as figured in the Botanical Magazine. According to Dr. Parry it is: "the common mountain species, growing in tufts on rocky places; flowers bright deep blue; leaves glossy and bright green; plant varying from 3 inches to a foot in height."

263. *Pentstemon procerus*, Dougl. About a span high, and it is seldom very much taller. There was doubtless some mistake in the imposition of this name; but it is surely only a variety of *P. wngestus*, with purple-blue flowers.

265. *Pentstemon albidus*, Nutt. A common species of the plains. *P. pumilus*, Nutt, is perhaps an alpine state of this. But Fremont's specimens, referred to *P. pumilus* by Bentham, appear to belong to a

remarkably dwarf and tufted, unpublished species, *P. cespitosus*, Nutt., which Dr. Parry has detected the present season, and sent in a letter.

266. *Campanula Langsdorffiana*, Fischer.; Trauttv. & Meyer, »Fl. Ochot, p. 60. *C. heterodoxa*, Bong. Fl. Sitch., an Vest.? Probably also *C. adscendens*, Vest, as it seems to be more allied, except in the size of the flowers, to *C. uniflora* than to *C. rotundifolia*. The calyx-lobes are linear-subulate from a broad base, nearly equalling the corolla, and more or less toothed. Additional specimens, needed to clear up the species, it is hoped may be obtained this summer. It is said to be "common in moist, grassy places on the borders of Upper Clear Creek. Flowers deeper blue than those of *C. rotundifolia*," far larger than those of the next.

267. *Campanula uniflora*, L.

268. *Campanula rotundifolia*, L.; alpine form, like that of the White Mountains of New Hampshire.

• 269. *Valeriana dioica*, L. (*P. sylvatica*, Richards., &c.)

270. *Galium boreate*, L.; a small form.

271. *Gilia spicata*, Torr. & Gray, ined. *Elaphocera spicata* and *E. affine*^ Nutt. in herb. "Growing, with a deep tap-root, in the deep sandy bottoms of Bijou Creek, east of Denver. Flowers light cream-color or flesh-color; the whole plant exhaling a foetid smell, like bone-filings."

272. *Phacelia (Eutoca) sericea*, Gray, Man. "A handsome subalpine."

273. *Cuscuta cuspidata*, Engelm.

274. *Polemonium pulcherrimum*, Hook.; with lobes of the corolla rounder. A form of *P. pule helium*, "A charming alpine plant, adorning the high slopes with its deep blue, nodding flowers; whole plant beset with resinous glands, exhaling a strong odor of musk."

275. *Polemonium cceruleum*, L. "At lower stations."

276. *Polemonium pulchellum*, Bunge; nearly *P. Richardsonii*, Hook. & Arn. "Growing in shade at the farthest limit of bushy tree growth. Flowers delicate faded blue." The limits of species (if such they be) in this genus are indeterminate.

277. *Ipomosa leptophylla*, Torr. Sand hills of the Platte; a characteristic plant of the plains.

278. *Eritrichium aretioides*, DC. *Myosotis nana*, Torr. in Ann. Lye. N. Y., vix Vill. "Rooting in granitic sand at the highest elevations of the snowy range; flowers of the richest caerulean blue." In flower, and with a little of last year's fruit, which, if normal, will distinguish this from the European *E. nanum*. The corolla is a little smaller. I suppose it to be *E. aretioides* of Arctic Russian America, &c, the fruit of which is undescribed. This Dr. Hooker regards as an arctic state of *XL villosum*. But the mature nutlets of our plant are perfectly smooth, and naked on the margins of the very obliquely truncate back.

279. *Primula anguatifolia*^ Torr. in Ann. Lye. N.Y. "Associated with the last. Flowers dull red, changing to purple." An interesting rediscovery of one of James's plants.

280. *Collomia linear is*, Nutt.

281. *Collomia gracilis*, Dougl.

282. *Gilia pinnatifida*, Nutt. ined. The same as No. 655, Fendler.

283. *Gilia (Ipomopsis) aggregata*, Spreng. *G. pulchella*, Dougl.

284. *Mertensia alpina*, Don.; a loosely paniculate, branching, evolute variety. "Common in the valley of Clear Creek, on gravelly banks, growing in irregular clumps, 12 to 18 inches high; flowers dull blue, in May and June."\*

285. *Mertensia Sibirica*, Don. pro parte. *Pulmonaria Sibirica*, Linn. & Pursh, quoad syn. Gmel. *Lithospermum denticulatum*, Lefrm. Asperif. Z. *Sibiricum*. Ledeb. Fl. Alt., & Ic. Pl. Fl. Ross. t. 207. *Pulmonaria denticulata*, Roem. & Schult., Cham., &c. *Mertensia denticulate* Don., DC, Ledeb. Fl. Ross. *Pulmonaria ciliata*, James, Torr. in Ann. Lye. N. Y. 2, p. 224. *Mertensia ciliata*, Don., &c. Besides the greater smoothness, which is variable, this is distinguished from *M. paniculata* by the much shorter and blunt segments of the calyx, and the leaves are glaucescent beneath. No doubt the Linnsean name must be restored to this (the *Pulmonaria Sibirica* of Pallas resuming the name of *M. Pallasii*, Don.); for it is clearly the plant of Linnaeus, and perhaps Pursh's from Canada (but more probably that is *M. paniculata*), and I suspect that Lehmann described his *Lilju denticulatum* from Siberian specimens. Certainly it is not known from Eastern "North America," unless from Labrador. II. Engelmann gathered it at Bridgets Pass in the Rocky Mountains, but my specimens have *M. paniculata* intermixed. Redowskian specimens from Kamtschatka, distributed by Chamisso, are of the present species. It is, writes Dr. Parry, "the common brook-side *Mertensia*, found everywhere along the margins of ice-cold, dashing streams, up to the snow-line, delighting in situations where its pale foliage and delicate blue flowers are bathed in the spray. It grows to the height of 1½ to 3 feet; the stems succulent, the lower radical leaves large and cordate."

286. *Mertensia paniculata*, Don. A reduced and alpine, glabrate state, with much less acute leaves, of that form of *M. paniculata* which answers to *Pulmonaria lanceolata*, Pursh, and *P. marginata*, Nutt. (*M. marginata*, Don., and *M. lanceolata*, DC.) "Moist, grassy places, on the slopes of alpine ridges; flowers bright alpine blue." *M. paniculata* ranges from Hudson's Bay to Lake Superior, New Mexico above Santa Fé "(626, Fendler) and northwestward. The foliage, calyxes, &c, vary, as in other species, from smooth or glabrous to hirsute, but the narrow and acute segments of the deeply 5-parted calyx are always hispid-ciliate. It obviously includes *M. corymbosa* and *M. pilosa*, Don., the *Lithospermum corymbosum* of Lehmann. Dr. Hooker has not seized the characters which distinguish the species from the foregoing.

287. *Mertensia alpina*, Don. *Pulmonaria alpina*, Ton\*, in Ann. Lye. N. Y. "The small-flowered alpine *Mertensia*; flowers dull blue."

288. *Eritrichium glomeratum*, DC. Very fine specimens. "Common on gravelly hill-sides and rocky places from the foot of the mountains to the upper valleys."

289. *Phacelia circinata*, Jacq.

290. *Echinosperrum floribundum*, Lehm. In fruit.

291. *Eritrichium crassisepalum*, Torr. & Gray, in Pacif. R.R. Exped. 2, p. 171. A young state, with broad leaves?

292-294, vacant.

\* For a revision of the species of *Mertensia*, see Supplement, IV.



295. *Lithospermum pilosum*, Nutt. ex char. This is Fendler's No. 626 and Wright's 1562.

296. *Ifeliotropium (Eupfoca, Nutt.) convolvulaceum*, Gray.

297. *Paronychia*, n. sp. apparently, "—a single patch only, found rooting in a sandbar on tipper Clear Creek," not in sufficient good condition for description. "We look for better specimens this year.

297. *Phlox Hoodii*, Richards, Var. *foliis rigidioribus vix lanatis*. *P. rigida*, Benth.? *P. brevifolia*, Nutt. in Herb. *P. muscoides* and *P. bryoides* of Nuttall both belong to *P. Hoodii*.

299. *Gilia (Leptodactylon) pungens*, Benth.

300. *Silcne acaulis*, L.

301. *Dracocephalum parvijlorum*, Nutt. "The only representative of Labi at se in the mountain region."

302. *Salvia Pilcheri*, Torr. Prairies in Kansas. This must be the *S. elongata* of Dr. Torrey in James's collection. It is intermediate between *S. azurea* and *S. farinacea*,—two *Salvias* which would seem to be distinct enough.

303. *Scutellaria resinosa*, Torr. in Ann. Lye. N. Y. Upper Platte.

304. *Gentiana Parryi*, sp. nov., Engelm. in Trans. St. Louis Acad., 2, p. t 10. "Near the foot of alpine slopes." This is, says Dr. Engelmann, "a very handsome species, growing in tufts, each stem bearing several large, purplish-blue flowers with bifid folds, and enclosed by a pair of boat-shaped bracts. Leaves rounded, fleshy, glaucous. Nearly allied to *G. calycosa* and *G. Menziesii*, which, however, have single flowers, without the calyculate bracts peculiar to our species, and to the Siberian *G. septemfida*,) with long folds slit" into numerous bristling lobes." *Engelm.* The plant of Kreuzfeldt, in Gunnison's Expedition, referred to *G. affinis* in the second volume of the Pacific Railroad Report, is of this species, but with narrower leaves, and Fremont's No. 360 (1845) is a small-leaved form of it, which also occurs in Mr. Howard's collection (Herb. Acad. Philad.), in one instance with a six-lobed corolla.

305. *Gentiana frigida*, Ilcnke, var. *algida*, Griseb. \*' Abundant on high alpine slopes, in moist places, growing in small tufts among Grasses and Carices." "Apparently an intermediate form between the European *G. frigida* and the Siberian *G. algida*. Stems lower than in the latter, only 4 or 5 inches high; the leaves narrower; flowers fewer and closely sessile; calyx often partly slit; lobes of the corolla very acute, greenish blue, reddish-brown in the dried state, punctate, the folds truncate and crenate." *Engelm.* This is also in Mr. Howard's collection. New to America, but found as near as Kamtschatka.

306. *Gentiana prostrata*, var. *Americana*, Engelm. 1. c. t. 9, fig. 10-15. "A very small form, single or with few horizontal branches, 1-1½ inches high, found with No. 309. Distinguished from the European and Asiatic forms by the small, 4-parted deeply blue flowers, nearly entire folds, and oblong-linear capsule, attenuated at the base into a short stipe. Chamisso collected the same form in Russian Arctic America." *Engelm.*

135. *Gentiana humilis*, Stev., Engelm. 1. c. fig. 1-5. *G. Fremontii* Torr. in Frem. Rep. "Along the moist grassy banks of Upper Clear Creek, with *Polygonum vivipurum*, almost hidden among the grass. Whole plant succulent, fragile, of a pale sickly color: flowers greenish

with white folds."—" Many leafy, one-flowered, erect or ascending branches, 2-5 inches high, from the base. Distinguished from the allied species, and\*especially from *G. prostrata*, by its larger rosulate lower leaves, which, as well as the oblong-linear cauline leaves, are cuspidate and often mucromite. The capsules on the taller branches are more or le# exsert, on the lower ones I find them often enclosed, or bursting sideways through the integuments. Siberian specimens are absolutely identical with the Rocky Mountain plant." *Engelm.*

307. *Gentiana acuta*, var. *stricta*, Griseb. "Rather common in shady pine woods and moist places on Upper Clear Creek. In shaded places the leaves are pale-green on both surfaces, broad and mostly obtuse; the flowers very pale-blue; in more open localities the leaves are dark-green above, pale below, narrower, the upper most ac\ite, the flowers darker."<sup>41</sup> Stems a foot high, leaves 1-1f inches long, 3-7 lines (the lower ones) wide. Flowers about  $\frac{1}{2}$  inch long, always 5-parted; lobes of calyx very unequal, the two longer and broader ones exceeding the tube of the corolla; lobes of the corolla acutish or almost obtuse, half as long as the tube. From Druramond's northern specimens in Herb. A. Gr<sup>Q</sup>y, our form is distinguished by the less acute leaves, and especially by the larger calyx. A specimen from Lower Canada in Herb. A. Gray, probably representing Michaux's plant, has very acute leaves, smaller flowers, a more regular 4-parted calyx, and very acute lobes of the corolla. The very nearly allied *G. Amarella* of northern Europe has the corolla much less deeply divided, with quite obtuse lobes." *Engelm.*

309. *Gentiana acuta*, var. *nana*, Engelm. in Transact. St. Louis Acad., 2, t. 9, fig. 6-9. "In the higher alpine regions, together with *G. prostrata*, in masses of *Silene acaulis*." "A diminutive form, 1<sup>^</sup>-2 inches high; flowers few, smaller; lobes of 4-5-parted corolla obtuse; beard consisting of few distinct fibres." *Engelm.* This, from the obtuse lobes of the corolla, would appear to confirm Dr. Hooker's view that *G. acuta* is a form of *G. Amarella*, represented in Lapland by *G. lingulata*, Ag. Some specimens distributed with No. 309 are the ordinary *G. acuta* in a depauperate form, with acute lobes to the corolla.

308. *Swertia perennis*, L.

310. *Frasera speciosa*, Dougl. "A very strict and small-flowered form, with ternate, linear-lanceolate, 7-9-nerved cauline leaves, and linear elongated lobe3 of calyx rather exceeding the corolla. Fendler's New Mexican specimens (No. 686) have large and obtuse radical leaves (12-16 inches long, 4-5 inches wide); even the cauline leaves are broadly oval, only the uppermost being lance-linear; the inflorescence is loose, and the flowers much larger. Dr. Parry's plant resembles more the figure in Hooker's flora. The cup uniting the base of the stamens is ciliate on its edge in this species. *Frasera Carolinensis* has large, obovate-spa,tulate, feather-veined radical leaves." *Engelm.*

311. *Primula Parryi* (sp. nov.): *P. nivalis* formae eximise similis, nisi foliolis involucris subulatis seu linearibus quam pedicelH elongati triplo brevioribus; calyce glanduloso (lobis lato-lanceolatis acutis) tubum corollae rubne adaequante; corollse lobis rotundatis obcordato- bifid is.—Limb of the corolla an inch in diameter. Pedicels one to nearly two inches long. This magnificent Primrose needs to be compared with Ledebour's-

*P. pycnorhiza* (a very rare and little known species from the Caucasus, which, however, seems too like *P. algida* and it doubtless lies between that species and *P. nivalis*: but it can hardly be referred to either although possibly, all these species may be found to merge in one. Dr. Parry remarks that "This fine species is quite constantly met with on the borders of alpine streams near the snow line; its knotted fibrous roots matted together, and constantly bathed in ice-cold water. Its usual height about 12 to 18 inches: flowers of a deep *carmine red* (fading to purple), with a slight primrose odor; leaves glossy on the upper surface, pale green. It flowers in July. It must be quite extensively diffused in its peculiar localities, and it is a wonder it has not been found before. In my sketch map I have named one mountain stream *Primrose Creek*, on account of the abundance of this plant."

312. *Dodecatheon Meadia*, L. A slender, few-flowered variety of this polymorphous species.

313. *Androsace septentrionalis*, L. Both alpine and in the valleys.

314. *Pkacelia Popei*, Torr. & Gray in Pacific R. R. Rep. 2, p. 172, t. 10. "Whole plant of a brownish-green color, often robust, 8 to 15 inches high."

315. *Eriogonum umbellatum*, Ton\*, in Ann. Lye. N. Y., 2, p. 241, & in Sitgreaves, Rep. t. 12. Flowering specimens: flowers bright yellow, as they are in Hayden's and other specimens.

316. The same as 315 in fruit; the perianth changed to pale yellow turning brownish.

318. The same species, apparently, as the two foregoing, but the flowers in the fine and well preserved specimens are obviously white OP cream color. Which form is the original of James's collection, I am unable now to determine. Torrey's figure, in Sitgreaves' Expedition is a good one, but there is nothing answering to it in the letter-press. The rays of the umbel are more numerous, slender, and simple in all these specimens than in Hooker's figure of *E. stellatum*; but a Douglasian specimen appears to belong to this species.

317. *Eriogonum flavum*, Nutt.

319. *Eriogonum alatum*, Torr.

320. *Eriogonum annuum*, Nutt.

321. *Eriogonum effusum*, Nutt. Flowers white: those of *E. microtheca*, Nutt, are yellow.

322. *Polygonum tenue*, Michx. Hillsides, near Central City.

323. *Montelia tamariscina*, Gray? male plant.

324. *Euphorbia marginata*, Pursh.

325. *Croton (Hendecandra) muricatum*, Nutt.

326. *Froelichia Floridana*, Moq.

327. *Cycloloma platyphyllum*, Moq.

328. *Eurotia lanata*, Moq. *Diotis*, Pursh.

329. *Euphorbia hexagona*, Nutt.

330. *Euphorbia petaloidea*, Engelm.

331. *Solanum rostratum*, Dun. *S. heterandrum*, Pursh.

332. *Polygonum viviparum*, L.

333. *Polygonum Bistorta*, L., var. *oblongifolium*, Meisn.

334. *Oxyria digyna*^ R. Br. "Common in the alpine region; the specimens collected are from a lower elevation, and are large."

335. *Asclepias verticillata*, L., dwarf form.  
 336. *Abronia* (*Tripterocalyx*) *cycloptera*, Gray.  
 337. *Abronia fragrans*, Nutt., figured in the second volume of the Pacific Rail Road Reports.  
 338. *Acer glabrum*, Torr., var. *A. triparlitum*, Nutt.  
 339. *Betula alba*, L. var., *glutinosa*, forma *latifolia*, Regel, or nearly.  
 340. *Alnus viridis*, DC.  
 341. *Salix glauca*, L. Masc.  
 342. *Salix cordata*, Muhl. ?  
 343. *Salix reticulata*, L. (*S. sericea*, Pursh.) Alpine.  
 344. *Salix discolor*, Willd.  
 345. *Populus tremuloides*, Michx.  
 346. *Lloydia serotina*, Reich. *Anthericum*, L.  
 347. *Calochortus venustus*, Benth., ex Torr. The species greatly need revision and diagnosis.  
 348. *Streptopus amplexifolius*, DC.  
 349. *Leucocrinum montanum*, Nutt. in Gray, *Melanth.*, p. 110. A rare plant, one of the many which go to demonstrate the futility of an ordinal separation of the *Melanthiacee* from the *Liliacee*. Also collected by Mr. Howard. The specimens in both cases not in good state for examination.  
 350. *Allium cernuum*, Roth.  
 351. *Zygadenus glaucus*, Nutt.  
 352. *Corallorhiza innata*, R. Br.  
 353. *Listera cordata*, R. Br.  
 354. *Calyso borealis*, Salisb. In spruce woods; not uncommon.  
 355. *Platanthera obtusata*, Lindl.  
 356. *Platanthera hyperborea*, Lindl. To this, as I suspected long ago (in *Ann. Lye. N. Y.*, when endeavoring to distinguish this species from the next), belongs the *Habenaria dilatata* of Hooker's *Exot. Fl.*, t. 95. "Flowers greenish."  
 357. *Platanthera dilatata*, Lindl. *Orchis dilatata*, Pursh. *Habenaria dilatata*, Gray, in *Ann. Lye. N. Y.* "In subalpine swamps." Flowers white. Since my observations upon these two species, made almost thirty years ago, I have often, like other botanists, when superficially examining dried specimens, been tempted to re-unite them. This Dr. Hooker has recently done, in his memoir of Arctic Plants. It is quite as easy to err in combining as in unduly separating species. Having recently examined the two alive, in view of their arrangements for fertilization, (which I may elsewhere describe), I would now state that the structure and disposition of their genitalia and the shape of the gorge of the flower is so different, that, while *P. dilatata* (like its congeners in general) can rarely if ever self-fertilize, *P. hyperborea* readily does so, much in the manner of *Ophrys apifera* as recently illustrated by Darwin; the former has almost parallel anther-cells, with a narrow stigmatic surface and a sort of trowel-shaped beak between their bases and below, within the narrow gorge, made by the erect position and connivence of the base of the label lobe and other petals, are the large and elongated, linear-oblong, viscid discs or glands. In *P. hyperborea* the labellum, spreading from the base, leaves an open gorge, the more exposed stigma is broad and transverse (as figured by

Sir Wm. Hooker in Exot. Fl<sub>M</sub> t. 95, under the name of *Habenaria dilatata*), the glands are smaller and orbicular, the beak wanting, the anther-cells more divergent, and, from the curvature of the flower, more overhanging, and the stalks of the pollinia very attenuated and weak. Thus disposed, the pollinia very commonly fall out of the anther-cells while the tip of the labellum is still engaged under the point of the upper sepal and petal, or even in the closed buds; and when the labellum is disengaged and becomes recurved, or even before, the pollinia are apt to topple over and fall upon the broad stigma beneath.\* That our *P. dilatata* is the *Orchis dilaiata* of Pursh I am assured. Our green flowered species should be re-compared with the Iceland *P. hyperborea*, and with this the Iceland *Orchis Kcenigii* (described originally by Retz as with "*labio tripartite*", but referred by Linnaeus to *O. hyperborea*, and annexed by Lindley to a probably quite different species from Unalaschka) should be collated.

358. *Juncus castaneus*, Sm.; an alpine form.

359. *Juncus triglumis*, L. With the last.

360. *Juncus arcticus*, var. *gracilis*, Hook. ? Alpine; too young.

361. *Juncus Menziesii*, R. Br. ex Hook.

362. *Luzula parviflora*, DC.

392. *Luzula spicata*, DC, var., approaching *L. Peruviana*. Alpine.

363. *Poa alpina*, L. "At the, foot of the snow banks; July."

364. *Munroa squarrosa*, Torr. *Crypsis*, Nutt. Deep sand beds, east of Denver.

365. *Calamagrostis sylvatica*, Trin. "Dry bottoms of Clear Creek<sup>1</sup>; July. \*

368. A purple variety of the above (nearly *C. purpurascens*, R. Br.), in an older state. "Alpine; August."

366. *Muhlenbergia gracilis*, Trin. *Calycodm montanum*, Nutt. PL Gamb., ex Thurber.

367. *Aira cespitosa*, var. *arctica*, Trin. *Deschampsia brevifolia*, R. Br. Alpine.

369. *Buchlœe dactyloides*, Engelm.; both sexes of the Buffalo-Grass. "Plains of the Platte."

370. *Boutelona oligostachya*, Torr.

371. *Eriocoma cuspidata*, Nutt. *Stipa membranacea*, Pursh.

372. *Aira caspitosa*, L. "Alpine ridges."

373. *Festuca rubra*, L. Too young; "alpine ridges."

374. *Poa laxa*, Haenke.

375. *Poa nemoralisy* L., or one of the species referable to this. "Alpine ridges."

\* Another North American Orchid, which self-fertilizes, and that without the aid of insects, is *Gymnadenia tridentata*. In this the anther-cells dehisce while the flower-bud is still unopened, and some of the packets of pollen (in this species easily separable from their connections) will be found to have reached stigmatic surfaces, here unusually situated; and I have found an abundance of pollen-tubes to be produced, before the flower had opened. Yet the arrangements for the removal of the pollinia by insects are as perfect as in the species which depend upon insect-aid, and while a portion of the pollen-packets fall away at an early period, the rest remain attached in the usual manner. The plant requires, and will well reward, a critical study.

379. *Poa andina*, Nutt. in herb. Acad. Philad. "Upper Clear Creek."  
376. *Poa arctica*, R. Br. ? (*P. ftexuosa*, Wabl.); a form of *P. laxa*?  
"Alpine ridges."  
377. *Trisetum subspicatum*, Beauv. "Alpine ridges."  
378. *Bromus Ifalmii*, Gray, Man. "S. Clear Creek; July."  
380. *Festuca ovina*, L. "Alpine."  
381. *Triticum cegilopoides*, Turcz. Perhaps a variety of *T. caninum*, as Ledebour has it. "Alpine."  
382. *Phleum alpinum*, L. "Subalpine."  
383. 387, 389. *Carex atrata*, L., var. *nigra*, Boott. (*C. nigra*, All.), except that the perigynia are light-colored. From the var. *ovata*, Boott (6<sup>1</sup>. *ovata*, Rudge), they differ in the sessile and crowded spikes.  
384. *Carex rigida*, L.  
385. *Carex incurva*, Lightf., with a dense, globular head.  
386. *Carex capillaris*, L.  
388. *Carex aurea*, Nutt.  
390. *Carex lanuginosa*, Michx. S. Clear Creek.  
391. *Carex festiva*, Dewey. S. Clear Creek.  
393. *Carex bromoides*, Schk. ? Too young.  
394. *Woodsia obtusa*, Torr. "Subalpine."  
395. *Cystopteris fragilis*, Bernh.  
396. *Allosorus* (*Gymnogramme*) *acrostichoides*; referred by Sir Wm. Hooker to *A. crisp us*. "Alpine."  
397. *NotocJdcena dealbata*, Kunze. Near Idaho.

# SUPPLEMENTS

TO THE

ENUMERATION OF PLANTS OF DR. PARRY'S COLLECTION

IN THE

ROCKY MOUNTAINS.

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SUPPLEMENT I.—*Conifer*®, by Drs. PARRY and ENGELMANN.

DB. PARRY collected too few specimens of the following Coniferae for distribution, but as his notes are replete with interest they are given here (under marks of quotation) together with a few remarks of my own. • G« E.

**ABIES GRANDIS, Lindl.** Not common in this region, resembling much the Eastern *A. balsamea*. Fendler's N. Mex. No. 828 is the same.

**ABIES DOUGLASII, Lindl.** "Abundant through the eastern mountain district, except on the higher elevations. A very slight tree, of the average height of 80 feet, with a graceful oval outline; the spreading branches curving upwards at the extremities. Wood of slow growth, but very indifferent, inclined to warp and crack, turning reddish-brown in drying." This species, as well as the nearly allied *A. Canadensis*, is well distinguished from all our other Pines by the distinctly petioled leaves. Fendler's N. Mex. No. 8H9.

**ABIES MENZIESII, Lindl.** "A finely shaped tree, though of rather stiff outline, of rapid growth; wood very compact, but rather coarse grained and pitchy; the logs taper too rapidly to saw up to advantage." Cones pendulous from the end of the branches. Leaves stouter than in any other allied species, stiff and very acute, almost spinescent.

**ABIES NIGRA, Poir.** Probably the same as the northeastern tree (characterized by the slender and very acute leaves, ovate cones with thin and crenate margin of the scales), a pale leaved form of which is usually named *A. alba*, but which Prof. Gray has demonstrated to belong to *A. nigra*. The true *A. alba* (leaves somewhat stouter and obtusish, cylindrical cones with thickened entire margin of the scales) seems to extend from Canada to the northern Rocky Mountains, where it has been gathered by Bourgeau; but it has not fallen under Dr. Parry's or Dr. Hayden's observation, on the headwaters of the Kettle, Colorado, Missouri

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and Columbia Rivers, where *Abies nigra* seems to be abundant, extending down to Santa Fe (Fendler, N. Mex. No. 833). Dr. Parry found it "composing almost the entire forest growth of the mountain slopes of Middle Park about the head of Grand River: a magnificent tree, 80 to 100 feet high, with an even, columnar trunk, below, 2-2½ feet in diameter, tapering upwards; of rapid growth; bark scaly, smooth and quite thin, of a purplish-brown color, full of tannin, and quite different from the rough brown bark of *A. nigra* of Wisconsin; wood remarkably white and soft, free of knots and scarcely resinous, preferred for inside work." Could this be *Abies rubra* Loud., and specifically distinct from *A. nigra*?

**PINUS AITSA**, Engelm., in St. Louis Transact., vol. 2, tab. 5 and 6. Dr. Parry had the good luck to discover this very peculiar and exclusively alpine species "which does not descend lower than 9000 or 10,000 feet," on the higher mountains of Clear Creek. As a full description and a figure has been given in the Transactions of the St. Louis Academy, I confine myself here to the statement that it is our only representative of Endlicher's section, *Pseudostrobus*, which comprises numerous Mexican, a few Central American, and a single West Indian species; it is characterized by quinate entire leaves and horizontal ovate cones, with thin apophyses on the long-mucronate or aristate scales, and small winged seeds. In sheltered situations it forms a tree 40 or 50 feet high and 1 or 2 feet in diameter, but on the higher bleak mountains it is a stunted bush, often thickly covered with fruit. Its growth, at least in the latter localities, is exceedingly slow, as a stick of scarcely more than one inch in diameter, brought back by Dr. Parry, shows nearly fifty annual rings, some of them  $\frac{1}{2}$  of a line, and none more than  $\frac{1}{4}$  of a line wide.

**PINUS FLEXILIS**, James. This species, discovered in the same regions by Dr. James, has to some extent remained doubtful, as his description in the account of Long's Expedition, and Torrey's diagnosis in the Annals of the New York Lyceum (vol. ii, p. 249) are based on notes only, no specimens having been collected. By later writers it has been ignored, until Mr. Fendler in 1847 collected it on the mountains above Santa Fe, (Coll. N. Mex. Np. 832), when a short notice was published by the writer in the appendix to Wislizenus' Memoir of a Tour to New Mexico, etc., 1848. Endlicher, in his Synopsis Coniferarum, 1847, does not enumerate it, and Carrière in his Traité des Conifères, 1855, credits it to Wislizenus, translating only my short remarks. Nuttall, however, had already (in 1849) given a somewhat extended account of it, with a poor figure, in the continuation of Michaux's Sylva (vol. iii, p. 107, pl. 112), without clearing up the doubts, which Dr. Parry in his present expedition, 1862, is expected finally to settle. My brother, H. Engelmann, collected it on the head waters of the Platte, and Dr. Hayden on the mountains about the head waters of the Yellowstone, Missouri and Columbia rivers. Dr. Parry notes that the cones grow several together, "semipendulous" at the extremity of the horizontal branchlets; while James gave his plant "erect" cones. Near Santa Fe it grows at the elevation of 8000 or 10,000 feet, and in favorable situations becomes 60 or 80 feet high and bears "pendulous" cones, according to Fendler's note. *Pinus flexilis* is certainly intermediate between the sections *Cembra* and *Strobus* of Endlicher, and unites the two, as does *P. cembroides*, Newberry, Pacif.



R Rep., vol. vi, Bot., p. 44, not Zucc.,\* if, indeed, this is not a mere form of *P. flexilis*, approaching by its short cones close to *P. Cembra*. The large seeds of *P. Jiexilis* are, as Dr. James already stated and as Dr. Hayden confirmed, eaten by the Indians. They are distinguished from those of any other of our Pines by a persistent, sharp, keeled margin, representing the wing.

PINUS PONDEROSA, Dougl., is "common through all the lower valleys and less elevated districts of the mountains, associated with *A. Douglasii* and *A. Menziesii*; a most valuable timber tree/" Fendler's N. Mex. No. 831. Male aments cylindrical, several inches long.

PINUS CONTORTA, Dougl., "is quite abundant on the crest and slopes of dry subalpine ridges, forming the principal part of the forest there, and extending to near the snow line; a symmetrical tree of rapid growth, 30 or 40 feet high, with slim and tapering trunk a foot in diameter, a smoothish, grayish-brown bark, detached in thin scales, and tough but coarse wood, which is liable to warp, and rarely cut into boards."

SUPPLEMENT II.—Revision of the (*Enotherecs* of the subsection *Onagra* ;  
of Dr. ENGELM ANX.

[*Prefatory Note*, by A. GRAY.—Nuttall, in his *Genera*, stated that Pursh had confounded two species under *CE. albicaulis*, viz., his own (*E. albicaulis* and *CE. pinnatifida*. In *Plantce Wrightianm* I had come to the conclusion that Pursh was right, not then knowing the seeds of *CE. pinnatifida*, Nutt. Consequently, when good fruit of the latter came to hand, in Wright's second collection, in PI. Wright, 2, p. 56,1 carelessly referred the specimens to (*E. coronopifolia*, on account of their seeds, notwithstanding their longer capsules, overlooking the other characters, and wrongly supposing that Nuttall's description of the seeds of his *CE. pinnatifida* or *Bradburiana* somehow belonged to (*E. coronopifolia*, which, as I had shown in PI. Fendleriana, has such seeds, while those of *CE. albicaulis* are longer and smooth. Dr. Engelmann has recently corrected this oversight, and in the following memorandum has established the three species upon a good foundation. I greatly doubt the distinctions based upon the duration of the root, although *CE. albicaulis* and *CE. coronopifolia* generally, if not always, have the appearance of being perennial, while

\* Zuccarini's plant of that name is one of the curious little group of American Nut-pines, including the following four species: *Pinus monophyllos*, Torrey and Fremont, with single (notconnate, as Endlicher would have it) leaves; *P. edulis*, Engelm., with 2 leaves; *P. cembroides*, Zucc. (including *P. Llaveana*, Schiede. not Torr., and *P. osleosperma*, Engelm.) with 3 leaves; and *P. Parryana*, Engelm. (*P. Llaveana*, Torr. Bot. Mex. Bound., p. 208, t. 63) with 3-5, mostly 4 leaves. Other characters, taken principally from the bracts of the young shoots, strengthen the specific distinctions. This very natural little group is characterized by the small, almost globose cones, the scales bearing large pyramidal apophyses and large edible seeds, the wings of which remain attached to the scale, which, I suspect, is the case in all "wingless" seeds of pinus; in *P. Pinea*, however, the wing is very distinct and detaches itself clearly from the scale and at the same time also from the seed itself, which is likewise the case in the closely allied, though 5-leaved, Californian *P. Torreyana*, Parry, where the wing, besides, is very thick, and of a corky substance. The great variability in the number of leaves in the nut-pines proves that sectional characters taken from them are without value.

*CE.pinnatifida* flowers early from a slender monocarpic root; I should not rely much upon the shape and size of the petals; and the leaves are most polymorphous. But, in brief, >

CE. CORONOPIFOLIA, Torr. and Gray, is well marked by the strong villosity of the throat of the calyx, the short and thick, ovoid-oblong, or at most linear-oblong capsules, and the large, oval or oblong, strongly costate seeds, the ribs tuberculate.

The two following both have the calyx glabrous (rarely with a few hairs) in the throat, much larger petals, and larger pods.

(E. PINNATIFIDA, Nutt., has less elongated and stouter capsules, and small, ovoid, striate-reticulated seeds (with pits between the ribs), apiculate at the hilum.

CE. ALBICAULIS, NUU., in all its forms, has elongated-oblong and perfectly smooth seeds, and its longer, linear, capsules are closely sessile by a broad base, and mostly porrected or divaricate from the axis which bears them, often flexuose.

Dr. Parry's No. 116 is *CE. pinnatifida*; his 117, probably a canescent form of *CE. albicaulis*; neither are in fruit.

The following communication from Dr. Engelmann was received too late for insertion in its proper place in the July No. of the Journal, A. G.]

"A large suite of specimens enables me to clear up some difficulties which have environed the following species of *CEnothera*.

"1. (ENOTUXRA CORONOPIFOLIA, Torr. & Gr. Fl. 1, p. 245; Gray, Pl. Fendl., p. 43. Perennis, saepe multicaulis, humilis, erecta seu erectopatula, puberulo-canescens, strigosa seu hispida; foliis infimis lineari-spathulatis, caeteris pectinato-pinnatifklis; tubocalycis ad faucem dense villosa; petalissuborhiculatis integristamina aequantibus pistillobrevioribus; capsula ovato-seu lineari-oblonga torulosa basi nunc in pedkellem brevissimum attenuata suberecta; seminibus magnis ovatis turgidis subobtusis vanè oblique truncatis tubtrculatis. My specimens were collected by Mr. Fendler (No. 222) near Santa Fe, along waterducts, and by Dr. Hayden on the sandhills of the Loupfork, on "Running Water." Steins £-1 foot high: flower white, turning deep red, about an inch in diameter: capsule in Fendler's specimens about an inch long, in Hayden's only about 4 lines long, thicker than in the allied species: seeds yellowish-brown, about a line long, thick, beset with tubercles arranged in longitudinal rows.

"2. (ENOTHEKA PINNATIFIDA, Nutt., Gen. 1, p. 245; Torr. & Gr. Fl. 1, p. 494. (*E. albicaulis*, Pursh, Fl. 2, p. 733: DC. Prodr. 3, p. 51, non Nutt. *CE. Purshii*, Don. Syst. 2, p. 688. (*E. Purshiana*, Steud. Nom. 2, p. 207: Annuæ seu biennis, humilis, diffusa, (rarissime erecta), puberula, rarius sursuin hirsuta; foliis imis obovato-spatulatis acutis seu obtusis integris, caeteris pinnatifidis saepe ciliatis; tubo calycis ad faucem nudo; petalis late obcordatis seu profunde emarginatis genitalia sperantibus; capsula lanceolato-lineari torulosa sessili suberecta; seminibus ovatis turgidis utrunque apiculatis foveolatis seriatim inter costas dispositis eleganter notatis. Sandy soil on White River, Upper Missouri, Nuttall, Geyer in Nicollet's Expedition, Dr. Hayden; Las Vegas and Santa Fe, New Mexico, Dr. Wislizenus, Mr. Fendler; the latter's specimens, few in number, bearing his private number 239, were distributed with others of the next species under No. 223; Southern New Mexico, Wright (referred to (*E.*

*coronifolia* in Pl. Wright, 1, p. 69.) All the specimens I have seen are either annual (sometimes simple and one-flowered) or, usually, biennial, with rosulate entire radical leaves; branching from the base, diffuse or even decumbent; an erect form was collected by A. Gordon on the Upper Canadian River, No. 29, similar to the last species in habit. Stems usually 4-6 inches high, but, according to Nuttall, the decumbent branches sometimes 2 feet long. Flowers 2½—3 inches in diameter, white, turning pale red: capsule 1-1½ inches long: seeds very regularly and prettily pitted between the longitudinal ribs, 0.6-0.7 of a line long, yellow. Don and Steudel have changed Nuttall's earlier name, but his must stand and Humboldt's plant, described five years later under the same name, may receive the name of *GE. Humboldtii*.

"3. OENOTHERA ALBICAULIS, Nuttall in Fras. Cat., 1813, & Gen. 1, p. 245; Torr. & Gr. Fl. 1, 495; Gray Pl. Wright I, p. 69, & 2, p. 56: Perennis, glabra, puberula seu hirsuta; caulis cortice albida membranaceo nitente; foliis maxime variis; petalis orbiculato-ovatis in unguem plus minus attenuatis integris stamina superantibus pistilium aequantibus; sampla e basi crasso sessili lineari divaricata saepe flexuosa seu deflexa; ceminibus minoribus lineari-lanceolatis laevibus. A common plant on the western plains, extending into Oregon, New Mexico and Chihuahua, as variable in habit, growth and foliage as it is common, but always easily recognized by the unvarying characters of the flower and fruit as above indicated, and also by its white glistening stems and branches, the epidermis of which is apt to peel off in the manner of many Loasaceae. The white flowers, 1½—2 inches in diameter, at last turn pale-red; the very slender capsule, connected by a very thick base with the stem, is usually 1½—1 f inches long, and spreads at right angle, or is curved or twisted in various directions. Seeds smooth, dark-brown, lance-linear and usually very acute at one end, and 0.8 line long; var. *tf*, has smaller (0.6 line) and obtuse seeds. According to foliage and pubescence I arrange the specimens before me under the following varieties:

a. *Foliis basi in petiolum brevem attenuatis.*

Var. a. NUTTALLII: erecta, glabrescens seu puberula, simplex seu ramosa; foliis linearibus seu lanceolatis seu oblongis integris vel plus minus dentatis. Here belongs (*E. pallida*, Dougl., with its variety *leptophylla*, Torr. & Gr., as already indicated by Prof. Gray. Nuttall describes this form as sometimes 3 feet high, and Geyer notes that in the sandy plains of Devil's Lake and at the sources of St. Peter's River it forms shrubby bushes of the size of *Spartium scoparium*, growing even 4 feet high; but it seems more usually between one and two feet high. Leaves 1-2½ inches long and 1-6 lines wide. One of the broadest leaved forms is Fendler's N. Mex. No. 224.

Var. *£*. RUNCINATA: branchiato-ramosa, patula, glabra, puberula seu canescens; foliis lanceolatis grosse seu sinuato-dentatis: This is *GE. pinatifida*. Gray Pl. Fendl., p. 43 (description and most of the specimens No. 223, all those with the private number 243). Fendler gathered it near Santa Fe; Fremont in his 3d Expedition collected a glabrous (No. 222) and a very canescent (No. 178) form, the latter with singularly abortive but apparently fertile capsules, scarcely 3 lines long.

*b. Folds basi lata truncata sessilibus.*

Var. *y.* BREVIFOLIA: tota glaberrima, erecta, ramosissima; foliis late ovatis abbreviatis grosse dentatis. Sandhills south of El Paso, Dr. Wislizenus, No. 99. Leaves dark green, while all the other forms are pale or grayish, 4-6 lines long, acutish, or often rounded at the end.

Var. 8. TRICHOICALYX: erecta, parce ramosa, canescenti-hirsuta; foliis lanceolatis seu lanceolato-oblongis sinuato-dentatis. Las Vegas, New Mexico, Dr. Wislizenus, No. 473.—This is no doubt Nuttall's (*E. trichocalyx*, Torr. & Gr. Fl. 1. c, the specific identity of which with (*E. albi-caulis* Prof. Gray has already indicated. The long hair on the stem, ovary, and especially the calyx, consists of a single cell, remarkably broad at base, tapering to an acute point;—it is however the form of hair I find in all long-haired (*Eiotherce*.  
G. E.

SUPPLEMENT III.—Revision of the genus *Castilleia*; by A. GRAY.

## CASTILLEIA, Linn. f.

The species of this genus are most troublesome and unsatisfactory, not only on account of the difficulty of investigating the dried specimens, but also from the variability of the characters which have been relied upon in arranging them, and especially of the calyx. Although the latter affords good characters on the whole, yet the degree of fission and the form of the lobes are far from being constant in several species; and the same remark applies in a measure to the relative length of the galea and of the lower lip. The structure of the lower lip is likely to afford some good characters; but they are not readily nor very safely to be derived from dried specimens. Bentham's four sections (in DeCandolle's Prodr.) do not prove to be as distinct as they would seem. The second and the third were better combined into one, which will include all our North American species but two. The fourth section is pretty well marked, but not absolutely. Of the first, which would appear to be quite distinct, I have no specimens. Beginning with Bentham's fourth section, since this comprises the original species :—

§ 1. HEMICHROMA or EUCASTILLEIA. Calyx (saepe incurvus) antice profunde fissus, postice leviter bifidus saepe 4-dentatus.

*C. LINARIIFOLIA*, Benth., is one of the best characterized and the most northern species. It is known by its long, narrow and glabrous cauline leaves which are not dilated at the base, the floral ones scarlet-colored, by the subulate teeth of the calyx, and by the long and narrow galea, which is more slender and falcate than in *C. tenuiflora*; the lobes of the lower lip linear-subulate. But the flowers are not always sessile, nor the leaves only one-nerved and entire; these are often 3-cleft or 3-parted, and more or less distinctly 3-nerved at the base. To this species clearly belongs *C. fulgens*, Nutt. in herb. Philad., and *C. candens*, Durand in Pacif. R. B. Rep. 5, p. 12. (But No. 70 of the Californian (Fort Tejon) collection of Xantus, also specimens collected by Dr. Newberry in the Colorado expedition, which I had mistaken for *C. candens*, belong to *C. affinis*). This is No. 583 of Fendler's New Mexican collection, and 246 of Dr. Parry's Rocky Mountain collection.

C. TENUIFLORA, Benth., PL Hartw. No. 191, as Bentham intimates, should probably include *C. longiflora*, Kunze, and *C. canescens*, Benth., (which is Gregg's No. 434, 610, and Coulter's No. 1354), all from Mexico.

C. ORIZABA I have not seen, unless Coulter's No. 1352 and 1353 belong to it.

C. FISSIFOLIA, Linn. f. (No. 835, coll. Venezuel. Fendler). To this Weddell refers all the five other South American species of this section, including even *C. integrifolia*, Linn. f.

C. LAXA, Gray in Bot. Mex. Bound., p. 119, of Arizona (coll. C. Wright, No. 1490), has a broader calyx and corolla than any of its allies, the former very thin-membranaceous, colored, and with obtuse teeth, the galea slightly falcate; the leaves thin and not dilated at the insertion.

§ 2. EUCHROMA (incl. *Callichroma*). Calyx antice et postice fissus, segmentis intogris emarginatis vel bifidis.

I have nothing to say of the six Mexican and South American species in the Prodromus. The proper North American ones I understand as follows:

\* *Radice annua vel bienni.*

H- *Integrifolice.*

C. AFFINIS, Hook. & Arn. Folia lineari seu lanceolato-attenuata, floralia raro trifida: flores pauci. m. pedicellati: calyx usque ad medium bifidus, segmentis angustis saepius bifidis vel emarginatis: galea elongata falcata; labium brevissimum.—The calyx is generally cylindrical, more or less curved, and reddish, and the wholly exerted galea 6 to 8 lines long: but the species, I believe, passes by regular gradations into the

Var. MINOR, Gray in Bot. Mex. Bound., p. 119 (*Euchroma simplex* and *E. lanceolata*, Nutt in herb. Acad. Philad.), which has smaller flowers, less colored floral leaves, a green and herbaceous calyx, the galea of the pale corolla only three or four lines long. Hartweg's No. 1877 is a good intermediate form. The calyx in both forms (as I have elsewhere noted) varies with its segments deeply bifid, moderately bidentate, or entire.

C. INDIVISA, Engelm. Folia caulina lineari-lanceolata, floralia obovato-dilatata rarius sublobata: flores sessiles: calycis segmenta lata saepius emarginata; galea brevis breviter exserta. I have not the means of collating this with *C. lithospermoides*.

-i--\*- *Laciniatifolice.*

C. COCCINEA, Spreng. The only annual, or perhaps biennial, species with laciniately cleft leaves; confined to North America east of the Rocky Mountains, and mostly east of the great plains, ranging from Rupert's Land to Texas.

\* \* *Radice perenni.*

-<- *Foliis floralibus superne paucis dilatatis et coloratis.*

++ *Villoso-pubescentes, vel in/erne glabrescentes, pubes versus apicem caulis, etc. % patente pilosa vel hirsuta saepius viscosa.*

C. PARVIFLORA, Bongard. Fere undique piloso-pubescentes vel hirsuta, vix hispida: folia plerumque trifida vel pinnato-laciniata, floralibus apice saepissime rubro-colorata: calycis segmenta aut emarginato-biloba, aut profunde bifida lobis oblongis seu linearibus: corollae labium brevissimum.

—This is apparently the commonest species and of widest range west of the Rocky Mountains, extending from Russian America to Southern California. The name given by Bongard is much the earliest, but not a good one, being founded upon what, I believe, is only a northern form of *lien*—thanks *C. hispida* (a later and scarcely more appropriate name), with a less developed corolla. The length of the galea appears to be subject to variation in this species, as in *C. pallida*, and the calyx-segments still more so. To the present species may be referred: *C. coccinea*, Lindl. Bot. Reg. t. 1136 (non Spreng.), which, as its calyx-segments are described as being dilated and retuse, Mr. Bentham should rather have referred to his *C. Douglassii*. *Euchroma anfrustifolia* and *E. Bradburii*, Nutt! in Jour. Acad. Philad. 7, p. 44, 47 (1834), both hirsute forms with deeply cleft and narrow calyx-segments. *Caxtilleia hispida*, Benth. in Hook. Fl. Bor. Am. & in DC. Prodr., 10, p. 532. *C. Douglasii* Benth. in DC. 1. c. p. 530; the commoner form, with oblong or more dilated and slightly lobed or cleft calyx-segments. *C. desertorum*, Geyer in Hook. Kew Jour. Bot. 5, p. 258, which is just Nuttall's *E. angustifolia*, but with partly yellow bracts. *E. macrocalyx*, *E. villosa*, *E. laciniata*, and *E. viscosa*, Nutt. in herb. Acad. Philad.

*C. PALLIDA*, Kunth. Inferne saepius glabra vel glabrata, caule versus apicem calycibusque villosis: folia inferiora saepissime integra (e forma lineari ad ovato-lanceolata), floral in vulgo pi. m. incisa vel laciniata et albido-colorata: calycis segmenta bifida seu biloba: galea aut breviuscula aut elongata.—The most northern species, and extending round the world on the borders of the arctic zone. I am well satisfied (especially from White Mountain specimens, clearly all of one species) that the galea varies much in length or degree of development,—the lower lip remaining nearly uniform,—and that, accordingly, *C. Sibirica* and *C. septentrionalis* of Lindley are states of one species, *C. pallida*,—to which belong *C. acuminata*, Spreng. (*Bartsia acuminata*, Pursh), *C. occidentalis* Torr. (a dwarf alpine form), *Euchroma luiescens*, Nutt. in herb. Acad. Philad., and, as a variety:—•

Var. *MINIATA*: viridior, inferne glabra; foliis floralibus pi. m. miniatis; galea elongata magis exserta. *C. miniata*, Dougl., Benth. *Euchroma integrifolia*, Nutt. in herb. Hook. Acad. Philad. This is pretty well marked on the whole; but in Rocky Mountain specimens it runs both into *pallida* and *septentrionalis*. As to *C. pallida* var. *Unalaschensis*, Cham. and Schlecht., from Sitka, my specimens from Bongard consist of narrow-leaved ones with a short galea (true *C. pallida*) and a broader-leaved one with elongated galea, good *C. septentrionalis*, apparently, referred by Bentham to *C. miniata*. C. No. 1, Bourgeau's coll. in Palliser's Exped., is *C. miniata* with the upper cauline and floral leaves unusually cleft.

*C. LATIFOLIA*, Hook. & Arn. Undique viscoso-hirsuta, laxa ramosa: folia brevia, obovata, obtusissima, plerisque integra, floralia apice dilatata, 3-5-lobata, rubro-colorata: calycis segmenta lata emarginato-biloba: corolla parva. A well-marked Californian species. The comparatively short and broad calyx is sometimes equally cleft before and behind, sometimes much deeper posteriorly.

\*-+++ *Tomentosa*\*, *velpube caulic mollis imphxa*. *Folia caulina linearia inleyra, vel trifida*.

a. *Incance*; 'calycis segmentis dilatatis subintegris.

**C. FOLIOLOSA**, Hook. & Arn. Floccoso-tomentosa, tomento e pilis ramosissimis! Caules suffruticosi cum foliis adultis quandoque glabrescentes: galea ultra segmenta calycis spathulato-oblonga ssepius retusa leviter exserta.—The peculiarity of the pubescence is indicated in Bot. Mex. Bound. Survey, p. 118.

**C. LANATA**, Gray in Bot. Mex. Bound., L c. Herbacea, tomento arachnoideo appresso albo-lanata: flores fere *C. foliosce*, sed majores.

b. *Cinereo-puberulce vel subtomentosce; calycis segmentis scepiissime bifidis; galea exserta. Folia supra nunc glabra.*

**C. INTEGRATA**, Gray in Bot. Mex. Bound. 1. c. Caulis laxè tomentosus: folia (saepius tomentulosa) omnia integerrima, vel floralia sublobata, raro trifida: flores sesquipollicares, galea majore et labio breviorè quam *C. purpurea*.—Besides the numbers already cited, this is No. 244 of Parry's Rocky Mountain collection (a dwarf or subalpine form); and my *C. tomentosa*, from Mabibi, Arizona, Thurber, appears to be a more tomentose state of the same species, the flowers in the specimen not well developed. It is closely related to *C. purpurea*, and perhaps runs into it. To that, at least, I now refer the undistributed specimens of Wright's first collection.

**C. PURPUREA**, Don. Caulis tomentosus vel cinereus: folia pubera vel glabrata, superiora vulgo cum floralibus trifida seu laciniata: flores pollicares, labio minus quam in affinibus abbreviato (2-2½ lin. longo). Floral leaves varying from cherry-red to flesh-color, or light yellow. Lower lip of the corolla by no means half the length of the galea in well developed flowers. To this species belongs *C. angustifolia*, Gray in Bot. Mex. Bound. 1. c, excluding the synonymy, and excluding the plant of H. Engelmann from Bridger's Pass, the latter being *C. miniata*. It is, accordingly, Wright's No. 1491 and 1492, and Lindheimer's 488 and 669.

-«- H- *Foliis (plerisque 3-5-fldis lobis linearibus) floralibus apice nee dilatatis nee coloratis. Calyx aut cequaliter aut anlice profundius flssus, segmentis alte bifidis. Corolla? labium magis quam in ceteris trisaccato-carinatum, lobis galea dimidium adaequantibus. Planta humiles, subvillosce vel subcinerece.*

**C. SESSILIFLORA**, Pursh. Calyx et corolla tubo elongato angusto; labio tripartito, lobis lineari-lanceolatis. Corolla evoluta bipollicaris, galea 4-6 lin. longa.

**C. BREVIFLORA**, Gray, Pl. Parry, No. 243. (*Euchroma breviflora*, Nutt. in herb. Philad.) Spithamsea, spica densa, florescente vix pollicari; calyce ovoideo-oblongo, lobis lanceolatis; corollas luteae tubo fere incluso, labio inferiore triplicato-saccato breviter trifido, lobis oblongis obtusis.—Rocky Mountains, Nuttall, Parry, No. 243. A well-marked species of this genus; the lip of the corolla about as long in proportion to the galea as in *C. sessiliflora*, but more trisaccate,—therefore one of the transitions to *Orthocarpus*. The calyx in flowers of the same spike is sometimes about equally cleft behind and before, and sometimes split in front while the posterior cleft is no deeper than that between the lateral lobes.

*Excludendce.* Small indeed are the absolute distinctions between some of the third section of *Orthocarpus* and *Castilleia*.

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*Euchroma albida*, Nutt. in herb. Acad. Philad., is *Orthocarpus attenuates*. Gray in Bot. Whipl. Exped. Pacif. R. R. Rep. 4, p. 121. This is the "O. No. 1," of Dr. Lyall's collection on the Oregon Boundary, from Lopez Island, distributed at Kew Gardens.

*Euchroma pallescens*, Nutt. in herb. Acad. Philad., from the Rocky Mountains, being a near relative of the preceding and of *Orthocarpus densiflorus* Sy and I believe not a described species, would take the name of *O. pallescens*. The lobes of the lower lip of the corolla are so conspicuous that it can hardly be *O. hispidus*, Benth., a species unknown to me. The segments of the deeply two-cleft calyx are merely bifid at their apex. Near to this, if not the same, but more hairy, with deeper-cleft calyx-segments, and yellowish corolla almost an inch long, are specimens of Geyer's Rocky Mountain collection, distributed as No. 291, therefore probably those mentioned in Hook. Kew Jour. Bot. 5, p. 259. Here also the lobes of the lower lip are quite conspicuous, and the incompletely developed specimens might very readily be taken for those of a *Castilleia*.

SUPPLEMENT IV.—Review of the genus *Mertensia*; by A. GRAY.

#### MERTENSIA, Roth.

The species of *Mertensia* which I have been able to examine, although not a little perplexing, may perhaps be best discriminated as follows:—

§ 1. Filamenta gracilia antheris multo longiora: corollae tubo calyce alte 5-fido pluries longiore, limbo levissime lobato, plicis faucialibus nullis. Tota glaberrima.

1. *M. VIRGINICA*, DO.—The disk is annular, but on each side developed into a large lobe or glandular appendage. That of *M. Fendleri* and of some specimens of *M. paniculata* approaches it. Corolla villous inside just above the obscurely 10-glandular base of the tube. •

§ 2. Filamenta antheris plus minus angustiora et longiora: corolla limbo lobato.

2. *M. MARITIMA*, Don. Corolla? tubo limbo breviora calycem sub-5-partitum subaequantem, plicis conspicuis.

3. *M. PALLASSII*, Don. *M. Sibirica*, DC, ~~ex~~ *Pulmonaria Sibirica*, Pall., non Linn. *Lithospermum Pallasi*, Ledeb. Corollae tubo limbo 1<sup>^</sup>-2-plo calyce 3-plo longiore, plicis tenuibus. Siberia.

§ 3. Filamentá magis dilatata, antheris sequilata seu latiora et plus minus breviora: corollae limbo 5-fido.

\* *Calyx haud ultra medium b-fidus.*

4. *M. FENDLERI* (sp. nov.): foliis subtus cauleque laevibus supra cum pedicellis appresse hispidulis, caulinis oblongo-lanceolatis; racemis paucifloris; corollae tubo lobis calycis hirsuti lato-lanceolatis limboque vix longiore intus supra basim annulato-villoso. New Mexico: foot of hills on Santa Fe Creek, Fendler No. 625. Discus pi. m. bilobus.



\* \* Calyx 5-partitus, in *M. oblongifolia* et *M. alpina* quandoque alte 5-fidus.

\*- Corolla tubo quam limbus (i. e. pars dilatata supra faucem) 2-3-plo longiore.

5. *M. DAVURICA*, Don. Gracilis; foliis caulinis linearibus supra cum calyce subincano-hirtis; corolla ima basi annulato-pilosa<sup>1</sup>, cast, glabra. Siberia. The hairy ring (much less conspicuous than that of the foregoing species) is here at the very base of the corolla, occupying the position in which ten obscure glands or slight thickened spots are generally discernable: these are most evident in the following species, and in *M. alpina*.

6. *M. OBLONGIFOLIA*, DC, Hook. Kew Jour. Bot. 3, p. 295. *Pulmonaria oblongifolia*, Nutt.! *Lithospermum marginatum*, Lehra. in Hook. Fl. Bor. Am. Humilis; foliis caulinis oblongis vel spathulato-lanceolatis plerumque obtusis; segraentis calycis lanceolatis seu linearibus acutis corollae tubo intus glaberrimo 2-3-plo brevioribus. Interior of Oregon, Utah, &c. Varies with the sepals very narrow and ciliate with long and rigid bristles, as in Nuttall's original specimens collected by Wyeth; or with these cilite minute or sparse or obsolete, as in most specimens; in Geyer's No. 316, the calyx is hardly 5-parted, and its segments broader; in Spalding's, from Clear Water, the leaves are unusually broad. The leaves resemble those of *Heliotropium Curassavicum*.

£- \*- Corolla tubo quam limbus ad summum sesquolongiore.

\*w- JElatcc, l—Z-pedales: folia caulina ovata seu ovato-lanceolata, acutissime acuminata vel acutata, costato-venosa; corolla semipollicares seu paullo longiores.

7. *M. PANICULATA*, Don. *M. paniculata*, pilosa, pubescens, lanceolata? stylosa? & *Kamtschatica?* DC. Hirsuta, hirtula, vel glabrata; segmentis calycis lanceolatis seu lanceolato-linearibus acutis hirsutis vel hispidociliatis tubo corollae intus sparsim piloso paullo vel dimidio brevioribus.—A specimen of *L. denticulatum*, L<sup>^</sup>pok. & Arn. from Kotzebue's Sound in Beechey's Voyage, p. 128, in herb. Torr., is certainly of this species, which probably occurs in Northeastern Asia also. H. Engelmann's specimens from Medicine-Bow Mountains and Dr. Parry's No. 286 are glabrate and dwarf mountain forms of *M. paniculata*, with barely acute leaves, and are Pursh's *Pulmonaria lanceolata*. Nuttall's *P. marginata* is much the same.

8. *M. SIBIRICA*, Don, non DC. *M. dentkulata* (Don.) & *ciliata*, DC. (*JPulm. Sibirica*, Linn.) Glaucescens, subpubescens, vel glabra; segmentis calycis oblongis seu oblongo-linearibus obtusis ciliolatis tubo corollae intus sparsim piloso vel fere glabro 2-4-plo brevioribus. Rocky Mountains, Eastern Siberia.

+t >>> Pumila: folia caulina obtusa vel acutiuscula, vix venosa: corollae & semipollicares.

9. *M. ALPINA*; Don. *M. Drummondii*, Don. *Pulmonaria alpina*, Torr. *Lithospermum Drummondii*, Lehm., in Hook. Fl. Bor.-Am. Spithamaea ad subpedalem; foliis spathulato-oblongis lanceolatis vel supremis oblongo-ovatis parvulis; segmentis calycis nunc ovato seu oblongo-lanceolatis obtusiusculis nunc lineari-lanceolatis acutis ciliatis corollae tubo limbum

adsequante paullo brevioribus.—Either glabrous or hirsute. Richardson's plant from the arctic coast is a large-flowered form of Torrey's *P. alpina*. Parry has an alpine form (No. 287), and a loose, evolute form with longer and narrower leaves (No. 284); in these the tube of the corolla is usually pilose inside near the middle; but it is not so in Torrey's original specimens of *M. alpina*, nor in Hooker's *M. Drummondii*. In the latter, and in Parry's specimens, as in all of the various other species I have examined, the stamens are inserted in the throat of the corolla. In the flowers of Dr. James' specimens, they are inserted pretty low down on the tube, so that the tips of the anthers barely reach to the level of the faucial plicae or appendages. This is the case in all the various specimens I have examined (of Burke, Fremont, and Stansbury) from the western side of the Rocky Mountains, of what seems to be a narrow-leaved and hirsute variety of this species. Contrary, however, to the dimorphism in other *Borragineae*, *JRubiaceae*, &c., the included stamens are here accompanied by a short style.

§ 4. Filamenta'antheris sublongiora et equilata: corollas limbo lobato: achenia echinata!

10. *M. RIVULARIS*, DC. *M. elliptica*, Ledeb. ex Regel & Tiling, Fl. Ajan. N.E. Siberia and Kamtschatka. Corolla with the tube hairy within towards the base: plicae at the throat conspicuous. I have only a specimen from Tiling's Ajan collection. In this the fruit is conspicuously *echinate* with soft prickles,—a remarkable peculiarity, which is not noticed in RegePs account of this collection.

\*%\* Dr. Hooker, in his Arctic Essay, received long since the above was written, adopting Sir William's suggestion, refers the high arctic *M. Drummondii* (*Lithospermum Drummondii*) to our *M. Virginica*. Although Lehmann describes the corolla "*fauce notata protuberantiis quinque*", I found no appendages in an original specimen in herb. Torrey, just as Dr. Hooker notes. But I also found them obsolete in specimens of *M. alpina* and of other species in which they are sometimes evident. Wherefore I rejected the character from the diagnosis of Section 3.

Professor Peirce also presented the results of the working of the Calculating Machine at the Dudley Observatory, for the Nautical Almanac. The computations had been made with reference to the tables of Mars. He also exhibited the lead plates stamped by the machine, and explained its working.

Dr. If. R. Storer read a paper, tending to show the rapid diminution of the rate of increase in the number of births in Europe and America, especially in Massachusetts. It was remarked, that certain generally admitted facts had hitherto been a problem to political economists. By a comparison of extensive statistical tables Dr. Storer indicated the direct dependence of this decrease, apparently, upon criminal causes. The question would be elsewhere more fully and thoroughly discussed. It was evident from a consideration of the data, that the state of the case as respects Massachusetts was not exceptional, but was merely here brought to light by means of our more careful registration.

Professor Parsons stated that a memorial would be presented to the Legislature of Massachusetts during the coming session, asking for aid in publishing a new edition of the late Dr. Harris's valuable work on Insects\* injurious to Vegetation, and that it is desirable that the Academy should add its influence to that of the Societies with which it originated. On his motion it was voted, that the President be authorized to sign the memorial in behalf of the Academy.

Professor Gray communicated three papers upon the Botany of the United States North Pacific Exploring Expedition under Captain John Rodgers (succeeding Captain Ringgold), by permission of the commander of the Expedition, viz.: —

1. An Account of the new PhEenogamous Plants collected by Charles "Wright, the Botanist of the Expedition; with a notice of the Vegetation of Japan in its relations to that of the Northern Temperate Zone generally. [Published in the Memoirs of the Academy.]

2. *Characters of some New Filices, from Japan and Adjacent Regions, collected by Charles Wright in the North Pacific Exploring Expedition under Captain John Rodgers.* Communicated by permission of the Commander of the Expedition, by DANIEL C. EATON.

1. ADIANTUM MONOCHLAMYS : gracile; stipite rhachique ebeneo nitido; fronde ovato-lanceolata tripinnata; pinnulis chartaceis glaberrimis longe pedicellatis anguste cuneatis obcordatis indivisis siccitate striatis margine revolutis apice acute serratis in sinu monosoriferis; involucro orbiculari submembranaceo.

Hill-sides near Simoda, Japan.

2. ATHYRIUM CYSTOPTEROIDES : caudice repente tenui vix paleacea; frondibus erectis stipiti gracili impositis membranaceis lanceolatis pinnatis; pinnis ovato-lanceolatis acutis pinnatipartitis, segmentis (basilaribus' nunc liberis) ovatis obtusis dentatis crenatisve supra glabris subtus parce glandulosis, venis utrinque pubescentibus pinnatis, venulis simplicibus vel furcatis; indusio hispido margine glandulifero, nunc oblongo lateri adfixo, nunc reniformi-orbiculari venulae insidente.

Var. /?. elatius; pinnis lanceolatis pinnatisectis, segmentis oblongis obtusis integris; venulis simplicibus; indusio minus hispido.

Oiisima, Katbnasima, and Anakerima, Loo Choo Islands.

3. LASTREA LACERA (*Polypodium lacerum*, *Thunb. Fl. Jap.p. 337!*) : frondibus e caudice brevi crasso pluribus stipite breviori valde paleacco insidentibus subcoriaceis glabris subtus albicantibus oblongis acutis bipinnatis; pinnis late-lanceolatis acuminatis pinnatis vel pinnatifidis, intermediis longioribus, superioribus contractis fructiferis; segmentis oblongis vel falcatis acutis serratis, basilaribus nunc utrinque subauriculatis; soris confertis demum confluentibus; indusio orbiculari usque ad medium fisso, sinu clauso lateribus inflexis.

Simoda, Japan.

1. WOODSIA (HYMENOCISTIS) POLYSTICHOIDES : crecspitosum, glabriusculum ; stipite brevi sparsim paleaceo; frondibus erectis elongato-lanceolatis pinnatis; pinnis subcoriaceis confertis lineari-oblongis subfalcatis obtusis auricula majuscula, e basi superiori semi-hastatis fere integerrimis, inferioribus sensim minoribus deflexis; venis pinnatis, venulis furcatis; soris apice venulae superioris impositis prope mar-

ginem seriatis; indusio subgloboso cystiformi 4-6-fido, lobis imbricatis; receptaculo oblongo.

On hill-sides near Hakodadi, Japan.

5. TRICHOMANES LATEMARGINALE : pusillum; caudice repente filiformi tomentoso; frondibus subsessilibus 3-6 lineis longis pellucidis glabris nunc palmato 3-6-partitis nunc pinnatifidis, laciniis lineari-oblongis integerrimis obtusis nervilla intra duplicem seriem cellularum marginalium cinctis; involucro omnino immerso infundibuliformi breviter bilabiate; receptaculo longe exserto; areolatione hexagonali conspicua fragmentis venularum conspersa.

Creeping on rocks in mountain ravines, near Hong Kong, China.

3. *Characters of New Fungi, collected in the North Pacific Exploring Expedition by Charles Wright. (Communicated by request of Captain Rodgers.)* By REV. M. J. BERKELEY, M. A., F. L. S., &c, and REV. M. A. CURTIS, Associate Fellow of the Academy.

1. AGARICUS (LEPIOTA) AUCTUS, Berk. & Curt.: pileo hemisphaerico carnosio albo in squamulas granulosas fuscas rupto, margine e velo appendiculato; stipite elongate aequali; lamellis latiusculis remotis.

On sides of hills, Hong Kong, Aug. 1854.

2. A. (LEPIOTA) DEPRAVATUS, Berk. & Curt.: pileo convexo stipiteque subsequali furfuraceo-verrucosis ex albo brunneis; lamellis ventricosus postice emarginatis adnexus.

In woods among leaves, Bonin Islands. — Has some resemblance to *A. acute-squamosus*, Weinm.

3. A. (LEPIOTA) HEMISOÖDES, Berk. & Curt.: albus, pileo campanulato epidermide continua esquamulosa; stipite basi subbulboso gracili; lamellis angustis remotis postice distinctis.

On decayed wood, Bonin Islands. — Resembles *A. continuus* of Ceylon, but is smaller and with the gills not reticulated behind.

4. A. (ARMILLARIA) TYMPANITICUS, Berk. & Curt.: caespitosus; pileo convexo rufo-brunneo; stipite deorsum attenuate sursum ventricosus albo-brunneo; annulo membranaceo; lamellis concoloribus angustis.

On dead wood, Bonin Islands. — Allied to *A. mucidus*.

5. A. (TRICHOLOMA) PERIPORPHTRUS, Berk. & Curt.: obscure

purpureus, cespitosus, pusillus; pileo e convexo piano glabrato; stipite gracili; lamellis crassis adnatis.

Shady hill-sides, Bonin Islands. — Allied to *A. onychinus*.

6. *A. (COLLYBIA) TALPINUS*, Berk. & Curt.: flavidus; pileo tenui stipiteque basi strigoso-radiato subtiliter velutinis; lamellis angustissimis adnexis. \*

On decayed wood, Bonin Islands. — Allied to *A. velutipes*.

7. *A. (COLLYBIA) PALMICOLA*, Berk. & Curt.: pusillus; pileo convexo glabro aurantiaco margine inflexo; stipite subconcolore glabro \*basi radiato-strigoso; lamellis adnexis crassiusculis pallidioribus.

On dead Palms, &c, Bonin Islands.

8. *A. (COLLYBIA) EFFLORESCENS*, Berk. & Curt.: flavidus; pileo planiusculo stipiteque sursum dilatato subtiliter pulverulento-velutinis; lamellis liberis modice latis venoso-connexis.

On decayed wood, Bonin Islands. — Allied to *A. velutipes*, but far less velvety. We believe it is *Marasmius rufus* of Montagne.

9. *A. (COLLYBIA) POIGENUS*, Berk. & Curt.: fuscus; pileo hemispharico striato glabro; stipite insititio deorsum velutino; lamellis adnexis subdistantibus.

On dead grass, Hong Kong. — Has the habit of *A. stipitarius*.

10. *A. (COLLYBIA) ADIANTICEPS*, Berk. & Curt.: flavidus 5 pileo demum depresso striato, margine crenato appendiculato; stipite cartilagineo aequali; lamellis angustis adnexis. †.

Hill-sides, Hakodadi, Japan. — The pileus of this pretty species looks very much like the frond of an *Adiantum*, from its long striae, and crenate, appendiculate margin.

11. *A. (MYCEXA) CALIFORNIENSIS*, Berk. & Curt.: pileo ex conico breviter campanulato stipiteque gracili rufis; lamellis liberis albis rubro-marginatis. \*

On Oak leaves, Mare Island, California. — Differs from *A. aurantio-marginatus* in the nature of the gills, and is a more graceful species.

12. *A. (MYCENA) ALPHITOPHYLLUS*, Berk. & Curt.: pileo leviter depresso molli succulento viscoso albo; stipite brevi rufescente; lamellis latiusculis distantibus adnexi-decurrentibus pulverulentis; sporis magnis globosis.

On decayed logs, Bonin Islands. — This may perhaps be the type of a distinct genus. The spores are very peculiar, as also the manner in which the gills separate below, reminding one of *PaxiRus*.

13. A. (MYCENA) DICRANOPHYLLUS, Berk. & Curt.: pileo subdepresso hyalino sordide albo; stipite insitio glabro sursum dilatato; lamellis purpurascenti-albis furcatis ramosisque distantibus subtiliter pulverulentis; sporis minoribus globosis.

On dead sticks, Bonin' Islands. — Closely resembles the preceding; but differs in the small spores, as well as in other particulars.

14. A. (MYCENA) LEUCOCONIS, Berk. & Curt.: pileo umbrino leviter depresso viscoso; stipite robustiore deorsum incrassato medio tenuipre albo; lamellis latiusculis distantibus adnatis albis demum secedentibus albo-pulverulentis.

On wood, Bonin Islands. — Distinguished from the\* following by its thicker pileus and white spores.

15. A. (MYCENA) RHODOCONIS, Berk. & Curt.: albus; pileo leviter depresso tenuissimo viscoso; stipite sursum incrassato basi dilatato; lamellis latiusculis distantibus adnatis roseo-pulverulentis.

On decayed wood, Bonin Islands.

16. A. (MYCENA) CLADOPHYLLUS, Berk. & Curt.: pileo hemisphaerico membranaceo delicato striato albo; stipite gracili rufo; lamellis angustis distantibus ramosis.

On dead wood, Hong Kong. — Resembles a *Marasmius*.

17. A. (MYCENA) HEMILEUCUS, Berk. & Curt.: pileo ex conico-campanulato expanso umbrino; stipite stricto lamellis adnexis distantibus albis.

On decayed wood, Bonin Islands.

18. A. (MYCENA) CHJETODES, Berk. & Curt.: pileo hemisphaerico ex albo griseo striato; stipite elongato basi pilis longis strigoso; lamellis paucis subangustis adnexis.

Amongst leaves, &c, under trees, Hong Kong.

19. A. (MYCENA) CHLOROPHOS, Berk. & Curt.: ex albo viriditinctus, lumen viride emittens; pileo depresso striato viscidulo; stipite pulverulento sursum dilatato e basi orbiculari oriundo; lamellis subdistantibus ventricosis leviter decurrentibus.

Dead logs, Bonin Islands. — Highly luminous at night.

20. A. (MYCENA) CYANOPHOS, Berk. & Curt.: albus, lumen caeruleum spargens; pileo hemisphaerico campanulato viscidulo; stipite pulverulento sursum dilatato e basi orbiculari delicata pulverulento-tomentosa oriundo; lamellis liberis.

On decayed wood, Bonin Islands. — Closely allied to the last, but differing in its free gills, &c.

21. A. (MYCENA) PITYRODES, Berk. & Curt.: albus, tenerrimus; pileo campanulato furfuraceo; stipite gracili flocciilento e basi orbiculari estriata oriundo.

On decayed wood, Bonin Islands. — Allied to *A. tenerrimus*, Berk.

22. A. (OMPHALIA) USTA, Berk. & Curt.: rufus; pileo tenui infundibuliformi glabro; stipite recto sursum incrassato basi orbiculari strigosa affixo; lamellis angustis decurrentibus.

On dead twigs, Bonin Islands.—Somewhat resembling *A. pyxidatus*.

23. A. (OMPHALIA) RUFICEPS, Berk. & Curt.: rufus; pileo depresso membranaceo; stipite glabro; lamellis angustis distantibus decurrentibus venoso-connexis.

On dead wood, Bonin Islands.

24. A. (OMPHALIA) EPHIPIUM, Berk. & Curt.: purpureo-fuscus; pileo umbilicato subsquamuloso; stipite sursum dilatato nigro-punctato; lamellis crassiusculis decurrentibus.

On the ground, Bonin Islands. — Allied to *A. timbettiferus*. The helvelloid form of the pileus when dry is peculiar.

25. A. (OMPHALIA) OUSIMIE, Berk. & Curt.: pileo pallide fusco striato depresso glutinoso; stipite gracili; lamellis distantibus decurrentibus tenuibus albis.

In the crevices of bark of trees, Ousima, north of the Loo Choo Islands. — Allied to *A. umbeuiferus* and *stellatus*, but distinguished from the former by its thin gills and gelatinous pileus; and from *A. stettatus* by the latter character and by the base not being stellate.

26. A. (OMPHALIA) BEHRINGENSIS, Berk. & Curt.: pileo depresso cupulaeformi glabro striato luteo-albo; stipite sursum incrassato; lamellis adnato-decurrentibus latiusculis distantibus albis.

Arakamtchetchene Island, Behring's Straits. — Approaches *Cantharellus Behringensis*, but the gills are not forked, &c.

27. A. (OMPHALIA) PORPHYROMIGES, Berk. & Curt.: pallide purpureus; pileo umbilicato tenui; stipite sursum incrassato basi discoidea affixo; lamellis distantibus angustis decurrentibus.

On decayed wood, Bonin Islands.

28. A. (OMPHALIA) PLUMBARIUS, Berk. & Curt.: pileo convexo centre depresso griseo-plumbeo; stipite recto basi floccis brevibus affixo; lamellis distantibus decurrentibus.



On rotten sticks, in the Bonin Islands.

29. A. (PLEUROTUS) CONNATUS, Berk. & Curt.: pallide luteus; pileis excentricis tenuibus nitentibus glabris; stipitibus fibrillosis connatis; lamellis decurrentibus; annulo deflexo.

Arakamtchetchene Island, Behring's Straits; on decayed wood. — This has the habit and colors of *A. pudicus*; but the gills are decurrent, and the spores white.

30. A. (PLEUROTUS) PROMETHEUS, Berk. & Curt.: albus, phosphoreus; pileo tenui flabelliformi minutissime virgato-maculato in stipitem brevissimum postice attenuate; lamellis crebris angustis.

On dead wood, Hong Kong. — The most delicate of the phosphorescent Agarics.

31. A. (PLEUROTUS) ALOPECIUS, Eerk. & Curt.: ex albo subfulvus; pileo excentrico subreniformi vel orbiculari glabro; stipite brevi sursum dihitato; lamellis ventricosis confertis adnexas.

On decayed logs, Bonin Islands. — A delicate and curious species.

32. A. (PLEUROTUS) LEIOPHYLLUS, Berk. & Curt.: albidus; pileo reniformi tenui; stipite brevissimo; lamellis angustis crassiusculis subdistantibus adnatis; interstitiis lsevibus.

On dead sticks, Bonin Islands.

33. A. (PLEUROTUS) HVIDULUS, Berk. & Curt.: resupinatus; pileo reniformi seu flabellato demum lobato purpurascenti-livido pulverulenti-hispidulo glabrescente; stipite nullo; lamellis pileo concoloribus demum albis.

On dead twigs, Bonin Islands. — Allied to *A. spiculiferus*, Berk.

34. A. (PLEUROTUS) SQUAMULA, Berk. & Curt.: resupinatus, villo albo affixus, margine libero; strato superiore gelatinoso; pileo suborbiculari glabrescente lamellisque crassiusculis luteis; stipite nullo.

On decayed wood, Bonin Islands. — Allied to *A. spiculiferus*, Berk.; but the pileus is half attached, the stem wanting, &c.

35. A. (VOLVARIA) MICROSPILUS, Berk. & Curt.: pileo hemisphærico tenuissimo badio sericeo particulis obscurioribus virgato; stipite tenui e volva badia adnata emergente; lamellis latiusculis liberis.

On decayed wood, Bonin Islands. — An exquisite little species.

36. A\* (PLUTEUS) AREFULOSUS, Berk. & Curt.: pileo convexo candido centro diffracto verruculoso margine striato; stipite tenui flexuoso brevi; lamellis ventricosis liberis remotis.

On dead wood, Bonin Islands. — Analogous to *A. cristatus*.

37. *A. (LEPTONIA) VIRESCENS*, Bert. & Curt.: totus pallide cyaneus, siccitate virescens; pileo centra depresso; lamellis latiusculis distantibus adnexus.

On the ground, Bonin Islands.—A very curious species. The gills stain the drying-paper with a yellow-olive tint.

38. *A. (ECCILIA) GLAUCI-BRUNNEUS*, Berk. & Curt.: pileo infundibuliformi tenui striato umbrino; stipite lamellisq̄ue decurrentibus glaucoralbis.

Mountain-sides, Hong Kong.

39. *A. (HEBELOMA) VENIFER*, Berk. & Curt.: pileo tenui striato glabro, margine reflexo albido; stipite aequali brunneolo; lamellis angustis liberis umbrinis; interstitiis eximie venosis.

Damp ground, Arakamtchetchene Island, Behring's Straits. — A beautiful species, allied to *A. rimosus*, but distinguished by its smooth pileus, reticulated interstices, reflected margin, &c.

40. *A. (FLAMMULA) HOLOCIRRHUS*, Berk. & Curt.: minor, fulvus; pileo sub lente floccis squamulisve innatis subtiliter notato quandoque glabro; stipite tenui fibrilloso-striato; lamellis flavo-punctatis decurrentibus; sporis minutissime echinulatis.

On dead wood, Bonin Islands. — Allied to *A. penetrans*, but smaller.

41. *A. (NAUCORIA) STELLULATUS*, Berk. & Curt.: pileo convexo tenui badio, sicco rufescente, verrucis pyramidatis basi sericeo-stellatis, centro aspero, margine squamuloso; lamellis adnexus ferrugineis.

On decayed wood, Japan.—Allied to *A. conspersus*.

42. *A. (NAUCORIA) NICOTIANA*, Berk. & Curt.: pileo convexo diffracto-squamoso fusco; squamis squarrulosis, margine appendiculato; stipite sursum attenuato fibrilloso-squamoso subcaeruleo; lamellis ventricosus arcuato-adnexus.

Damp hill-sides, Behring's Straits. — Allied to *A. conspersus* and *cscharoides*.

43. *A. (GALERA) JAPONICUS*, Berk. & Curt.: magnus; pileo conico-campanulato tenui spadiceo; stipite elato gracili fibrilloso basi incrassato; lamellis adscendentibus peroxydatis.

On dead wood, Hakodadi, Japan. — Allied to *A. Apalus*.

44. *A. (GALERA) LIRATUS*, Berk. & Curt.: pusillus; pileo umbilicato sulcato atomato rufo; stipite brevi; lamellis paucis latis adnatis. •

On the bark of Oak-trees, Mare Island, San Francisco Bay, California. — Resembles a *Marasmius*, with the habit of *A. corticola*. •

45. A. (CREPIDOTUS) FALMULARIS, Berk. & Curt.: pileo renifonni subrufo striato marginem versus transversim ruguloso; lamellis latis subconcoloribus.

On dead wood, Bonin Islands.

46. A. (CREPIDOTUS) UBER, Berk. & Curt.: pileo reniformi tenui ex albo luteo-fusco viscidulo; lamellis confertis ferruginosis e sporis luteis.

In shady woods, Bonin Islands.—Allied to *A. mollis* and *malachus*,

47. A. (CREPIDOTUS) I/EUCOCHHYSOS, Berk. & Curt.: luteus; pileo subflabelliformi vel reniformi subtiliter tomentoso glabrescente; stipite nullo; lamellis distantibus.

On decayed wood, Bonin Islands.

48. A. (CREPIDOTUS) SCTMNODES, Berk. & Curt.: pileo dimidiato tenui ex albo leonino subtiliter villosa; villis innatis liberisque floccis affixis; lamellis confertis.

On dead Palm-leaves, Bonin Islands. — Closely allied to the last.

49. A. (CREPIDOTUS) HAEMATITES, Berk. & Curt.: atro-sanguineus; pileo reniformi postice affixo glabro; lamellis ventricosis latiusculis.

On dead wood, Hong Kong. — Has somewhat the habit of *Panns*.

50. A. (CREPIDOTUS) CACAO, Berk. & Curt.: brunneus; pileo suborbiculari glabro siccitate rugoso margine inflexo; lamellis latiusculis.

On dead wood, Bonin Islands.

51. A. (CREPIDOTUS) FLAVO-LIVENS, Berk. & Curt.: pileo flabelliformi flavido pulverulento; stipite nullo; lamellis angustis purpureo-albis.

On dead wood, Bonin Islands.

52. It (PSALLIOTA) PRIMIPILUS, Berk. & Curt.: pileo amplissimo fortiter umbonato brunneolo squamis minutis sericeis brunneis ornato; stipite subbulboso; lamellis latis argillaceis.

Shady hill-sides, Bonin Islands. — Resembles some variety of *A. procerus*, but has colored spores; also like *A. cretaceus*, but with larger and differently-shaped spores.

53. A. (PSALLIOTA) ASOTUS, Berk. & Curt.: fasciculatus; pileo convexo fusco-purpureo; stipite elato solido concolore; mycelio expanso albo; lamellis latis adnatis. \*

Amongst Rice straw and rubbish, Hong Kong. — Allied to *A. semiglobatus*, but far larger.

54. A. (PSALLIOTA) PORPHOTROPHTLLUS, Berk. & Curt.: pileo albo centro umbonato luteo viscoso nitido; stipite deorsum incrassato albo; lamellis ventricosus adnexis purpureis.

On the ground, Japan. — Closely allied to *A. semigbbatus*.

55. A. (PSATHYRA) PUSCO-NIVEUS, Berk. & Curt.: pileo campanulato tenui pallide fusco areolis minutis veli reliquiis distincto; stipite niveo glabro; lamellis adnexis phseotis.

On hill-sides, Bonin Islands. — Resembles *A. spadiceo-griseus*.

56. HIATULA LUTEOLA, Berk. & Curt.: pallide flava; pileo hemisphasrico striato hjalino; stipite glabro sursum incrassato; lamellis liberis angustis subdistantibus remotis.

On dead wood, Loo Choo Islands.

57. H. NIVOSA, Berk. & Curt.: nivea; pileo breviter campanulato demum expanso tenerrimo; stipite glabro; lamellis postice attenuatis approximate subdistantibus.

Side of mountains, Bonin Islands. — Approaches *Mycena*.

58. H. BONINENSIS, Bark. & Curt.: pileo tenerrimo brunneolo striato; stipite delicato hyalino; lamellis remotis distantibus ventricosus'albis.

Side of logs, Bonin Islands. — Also has the habit of *Mycena*.

59. H. GRACILIS, Berk. & Curt.: albus; pileo hemisphserico striato glabro; stipite gracili hyalino pulverulento-tomentoso; lamellis ventricosus remotis.

Decayed wood, Bonin Islands. — Closely allied to the last.

60. COPRINUS SUBGLOBATUS, Berk. & Curt.: pileo subgloboso pallide fusco indumento crasso subglauco vestito; stipite albo; lamellis latis liberis ex albo obscure purpurascensibus.

On banks, California. — Allied to *O. atrammtarius*.

61. C. MODESTUS, Berk. & Curt.: pileo tenerrimo glabro sulcato-fisso pallide purpureo; stipite gracili; lamellis linearibus Hberis phceotis.

On decayed wood, Bonin Islands. — Eesembles *C. hemerobius*.

62. BOLBITIUS ORTZIE, Berk. & Curt.: pileo campanulato obtuso viscido stipiteque valido albis; lamellis adnexis ex albo gilvo-purpurascensibus.

On decaying Rice chaff, Japan.

63. CORTINARIUS (INOLOMA) WRIGHTII, Berk. & Curt.: pileo convexo umbonato innato tomentoso fusco; stipite subsequali fibrilloso

basi nitente-fulvo; lamellis crassiusculis distantibus postice rotundato-cmarginatis.

Japan.

64. *HYGROPHORUS PICTUS*, Berk. & Curt.: pileo umbilicato depresso striato; stipite sursum incrassato glabro; lamellis distantibus subangustis ventricosis decurrentibus.

On the ground, Hong Kong.

65. *LACTARIUS LIVIDATUS*, Berk. & Curt.: pileo leviter depresso stipiteque sursum incrassato rufis; lamellis angustis subconfertis e sordide helvolis lividis.

On hills, Japan. — Has somewhat the habit of *Z. volemus*.

66. *CANTHARELLUS BEHRINGENSIS*, Berk. & Curt.: pileo piano tomentoso adpresse-squamuloso griseo-albo; stipite sursum incrassato tenui; plicis lamellaeformibus furcatis, adnato-decurrentibus.

Behring's Straits. — Resembles the white var. of *C. aurantiacus*.

67. *C. NIVOSUS*, Berk. & Curt.: candidus; pileo galeaeformi membranaceo subtiliter pulverulento; lamellis angustissimis hic illic anastomosantibus.

On dead stems of grass, Hong Kong. — Belongs to the same section as (*7. retirugis*).

68. *MARASMIUS CREMORICEPS*, Berk. & Curt.: pileo umbilicato candido glabro; stipite cartilagineo sursum rufescente; lamellis decurrentibus cremoricoloribus.

Amongst dead leaves and grass, Japan. — Resembles *Agaricus phyllophylus*.

69. *M. GALEATUS*, Berk. & Curt.: candidus; pileo resupinato e pezizasformi galeato glaberrimo; lamellis e puncto centrali radiantibus.

On dead stalks, Japan. — Pileus looks like kid leather.

70. *M. PETALINUS*, Berk. & Curt.: albus; pileo hemisphaerico expanso membranaceo striato; stipite hygrophano basi striguloso e strato corticioideo oriundo; lamellis paucis veniformibus adnatis.

On dead twigs and bark, Bonin Islands.

71. *M. LUTEOLUS*, Berk. & Curt.: pileo hemisphaerico demum umbilicato luteo; stipite glabro floccis fulvis affixo; lamellis pallido-luteis ramosis distantibus adnatis.

On dead Palm-leaves, Bonin Islands. — Allied to *M. petalinus*.

72. *M. LUTEO-FUSCUS*, Berk. & Curt.: pileo hemisphaerico umbilicato sulcato rugoso helvolo; stipite basi tomentoso sursum glabro hygrophano; lamellis subdistantibus adnatis flavo-albis.

On mountains of the Bonin Islands.

73. *M. PARVULUS*, Berk. & Curt.: pileo convexo striato delicato pulverulento albo; stipite capillari sericeo deorsum purpurascente; lamellis ventricosus liberis.

On the ground, Hong Kong. — Resembles *M. pusio*, B. & C.

74. *M. DICHROUS*, Berk. & Curt.: pusillus; pileo convexo albo glabro; stipite brevi deorsum rufescente capillari; lamellis paucis decurrenti-adnexas; interstitiis laevibus albis.

On dead sticks, Bonin Islands.

75. *M. ALPHITODES*, Berk. & Curt.: pusillus, albus; pileo demum piano stipiteque brevi farinosus; lamellis paucis; interstitiis lrevis.

On dead leaves of some Gingerwort, Bonin Islands.

76. *M. SORDESCENS*, Berk. & Curt.: pileo depresso striato ex albo umbrino; stipite insititio subtiliter velutino fusco; lamellis adnexas pileo concoloribus.

Dead twigs and leaves, Bonin Islands. — Has the habit of *M. perforans*.

77. *M. GLABRESCENS*, Berk. & Curt.: pileo convexulo depresso flavo primum furfuraceo-squamoso demum glabro; stipite pallidiore pulverulento-fibrilloso glabrescente; lamellis distantibus venoso-connexas adnexas flavis.

In shaded ravines, Bonin Islands.

78. *M. UMBONIFER*, Berk. & Curt.: pileo ex campanulato hemisphaerico fortiter umbonato albido centro brurineo; stipite insititio polito glabro purpurascenti-brunneo; lamellis paucis collariatis albidis.

In shady ravines, Bonin Islands. — Allied to *M. rotida* and *Guyanensis*.

79. *M. EXUSTUS*, Berk. & Curt.: pusillus; pileo hemisphaerico umbilicato sulcato brunneo-albo siccitate fusco; stipite brevi capillari insititio atro-fusco; lamellis paucis.

On dead leaves, Bonin Islands. — Nearly allied to the last.

80. *M. ACICULARIS*, Berk. & Curt.: pileo hemisphaerico umbilicato sulcato rufo-luteo; stipite glaberrimo flavo insititio; lamellis paucis flavis adnatis.

On decayed wood, Bonin Islands.

81. *M. ALUTACEUS*, Berk. & Curt.: sordide alutaceus; pileo inflato campanulato, cute demum plicato-rugosa; stipite subtiliter pulverulento; lamellis paucis ventricosus; interstitiis lasvibus.

Hong Kong. — Allied to *M. hcematocephaliis*.

82. *M. ACICOLA\** Berk. & Curt.: pileo e convexo subdepresso glabro striato brunneo; stipite insitio glaberrimo rufo; lamellis angustis breviter adnatis "albis.

On dead Pine leaves, Japan. — Approaches *Collybia*.

83. *M. TENER*, Berk. & Curt.: ex albo siccitate umbrinus; pileo hemj^phserico striato subtiliter pulverulento; stipite demum glabro nitido non insitio basi parvula floccosa affixo; lamellis latiusculis adnatis.

On dead twigs, Bonin Islands. — Allied to *M. androsaceus*.

84. *LENTINUS PYRAMIDATUS*, Berk. & Curt.: pileo umbilicato fibroso; fibris in fasciculos pyramidatos stipatis margine involute cirrhosis; stipite sursum tomentoso deorsum furfuraceo; lamellis incis, omnibus una desinentibus.

On logs, Nicaragua. — Allied to *L. vittosus*.

85. *L. NICARAGUENSIS*, Berk. & Curt.: pileo umbilicato strigoso; strigis cirrhosis subfasciculatis cervinis; stipite farinoso-tomentoso deorsum modo pilei strigoso; lamellis postice anastomosantibus.

On logs, Nicaragua. — Nearly allied to the two last.

86. *PANUS INFUNDIBULIJM*, Berk. & Curt.: albus; pileo duro lobato infundibuliformi, margine tenui stipiteque excentrico sursum dilatato tomentos; lamellis distantibus decurrentibus.

On dead trees, Nicaragua.—The surface of the pileus resembles that of *Lactarius vellereus*.

87. *XEROTUS FULIGINOSUS*, Berk. & Curt.: pileo reniformi tenui sursum e lateritio brunneo rugosiusculo parce striato; lamellis angustis antice ramosis vel anastomosantibus.

On dead twigs, Hong Kong.

88. *X. FRAGILIS*, Berk. & Curt.: pileo reniformi tenui e lateritio luteo-fusco striato; lamellis venoso-connexis, intermediis pluribus.

On decayed wood, Bonin Islands.

89. *X. PUSILLUS*, Berk. & Curt.: minutus; pileo reniformi conchato brunneo sulcato-striato; lamellis paucis alutaceis;- interstitiis Irevibus.

On dead Fern leaves, Hong Kong.

90. *LENZITES JAPONICA*, Berk. & Curt.: pileo dimidiato lobato albido zonato scabroso-hirsuto postice rugoso; lamellis tenuibus dentatis margine poriformibus; contextu niveo.

On dead wood, Japan. — Allied to *L. betulina*.

91. *BOLETUS RHODOMYCES*, Berk. & Curt.: pileo subviscoso brunneo; stipite brevi erythirino e mycelio roseo oriundo; tubulis compositis decurrentibus.

' On shaded hills, Japan.

92. *POLYPORUS (MESOPUS) OCHROTINCTUS*, Berk. & Curt.: pileo e flabelliformi orbiculari ochraceo glaberrimo polito sulcato-zonato; stipite concolori nitente; hymenio albo, poris parvis rotundis.

On decayed wood, Bonin Islands and Japan.

93. *P. POCULA*, Berk. & Curt.: pusillus, poculaeformis; pileo umbrino farinaceo; stipite ut plurimum verticali insititio; hymenio concavo pallido. (*Sphariapocula*, Schwein.!)

On dead sticks, Nicaragua.

94. *P. (Anodermei) NITIDULUS*, Berk. & Curt.: pileis lateraliter connatis sublobatis brevibus demum rufescentibus nitidulis subzonatis, obscure lineatis; hymenio albo; poris minimis angulatis.

On dead wood, Bonin Islands.

95. *P. (Placodermei) MARMORATUS*, Berk. & Curt.: pileo convexo ligneo zonato subtiliter pulverulento laccato contextu hymenioque ferrugineis; poris minutis punctiformibus.

Nicaragua.

96. *P. (Placodermei) LINTEUS*, Berk. & Curt.: durus, ponderosus; pileo dimidiato sulcato radiatim rimoso brunneo villo albicante dealbato, margine tenui; contextu ferrugineo; hymenio cinnamomeo; poris minutis punctiformibus.

On bark, Nicaragua.

97. *P. NICARAGUENSIS*, Berk. & Curt.: ungulatus; pileo ex albido pallide umbrino subtiliter tomentosoveki, contextu umbrino; hymenio irregulari brunneo; poris minutis.

On dead wood, Nicaragua.

98. *HEXAGOXIA THWAITESII*, Berk. Herb.: cervina; pileo tenui glabro zonato unicolori hic illic lineatim rugoso; poris magnis concoloribus.

On dead wood, Bonin Islands. — Allied to *H. affinis*.

99. *H. VARIEGATA*, Berk. Herb.: pileo reniformi tenui zonato rigido variegato velutino glabrescente radiato-rugoso; hymenio umbrino; poris mediis.

On dead wood, Nicaragua.

100. *HYDNUM (MESOPUS) WRIGHTII*, Berk. & Curt.: fuscum;



pileo orbicular! lobato virgato sericeo vel tomentoso; stipite e fibris floccisque nigris oriundo; aculeis acutis elongatis.

Amongst leaves, Japan.

101. H. STALAGMODES, Berk. & Curt.: resupinatum, lophe effusum, luteo-album; aculeis subulatis dependentibus fasciculato-connatis denticulatis ciliatis.

On decayed wood, Bonin Islands. — Somewhat *Ijke H. membranaceum* and *udum*.

102. EADULUM RHABBARINUM, Berk. & Curt.: resupinatum, effusum, irregulare, ferrugineum; tuberculis fasciculatis subcylindricis tenuibus, apicibus obtusis emarginatis.

On decayed wood, Nicaragua.

103. CRATERELLUS AUREUS, Berk. & Curt.: pileo submembranaceo tubaeformi pervio subflocculoso, margine primum deflexo breviter fimbriato aureo; hymenio persistenter laevi glauco-luteo.

On the earth, Hong Kong. — Near *C. odoratus*.

104. THELEPHORA XERANTHA, Berk. & Curt.: pileo flabelliformi subzonato pulverulento-tomentoso lineatim rugoso in petiolum attenuato; hymenio subferrugineo.

On roots of trees, Hong Kong. — Allied to *T. laciniata*.

105. STEREUM NICARAGUENSE, Berk. & Curt.: pileo dimidiato rugoso inaequabili villosa zonato candido, contextu umbrino; hymenio cinereo, margine tenui umbrino.

On logs, Nicaragua.

106. S. SUBCRUENTATUM, Berk. & Curt.: pileo dimidiato conchiformi decurrente albido postice cruentato zonato; hymenio laevi ochroleuco.

On dead wood, Japan.

107. LASCHIA PEZIZIFORMIS, Berk. & Curt.: minuta, alba, resupinata, peziziformis, inagine incurva; poris rotundis.

On dead Palm-leaves, Bonin Islands. — We have the same from Venezuela.

108. CORTICIUM IRRIGATUM, Berk. & Curt.: pileo tenui reflexo leviter zonato rugoso-tomentoso hymenioque laevi cremoricoloribus.

Forming dense patches on rocks, Hong Kong.

109. C. ASCISITUM, Berk. & Curt.: album, resupinatum, effusum, lasve, continuum, subtiliter pubescens, margine demum liberato tomentoso.

On decayed logs, Nicaragua. — Near *C. puberula*.

110. *C. EIMOSISSIMUM*, Berk. & Curt.: effusum, resupinatum, cinnamomeum, a matrice separabile, rimosissimum, contextu rufo-albido.

On dead Cane, Nicaragua.

111. *CTPHELLA EPILEUCA*, Berk. & Curt.: galeaeformis vel conchiformis, tomentosa, e strato corticioideo oriunda; hymenio laevi.

On dead panicles of *Areca*, Bonin Islands.

112. *CLAVARIA DECOLOR*, Berk. & Curt.: ex albo umbrina; stipite cylindrico e fibris ramosis oriundo sursum subdichotomo, ramis brevibus.

On hill-sides, Hong Kong. — Allied to *CL abietina*.

113. *HTMENULA ATROVIRENS*, Berk. & Curt.: linearis, subconvexa, atrovirens, sicca granulate.

On dead Canes, Nicaragua.

114. *BHIZOPOGON PICEJIS*, Berk. & Curt.: imberbis; peridio demum piceo; gleba alutaceo-umbrina; sporis oblongis.

In steep banks, Hong Kong.

115. *GEASTER BIPLICATUS*, Berk. & Curt.: peridio exteriori tenui irregulariter multifido e mycelio floccoso oriundo; peridio interiori subgloboso nigrescente stipitato, basi stipitis e plicis peridii interioris impressa, ore plicato, apice fimbriato.

On the ground, Bonin Islands.

116. *G. PAPTRACEUS*, Berk. & Curt.: gregarius, e mycelio albo membranaceo oriundus; peridio externo extus subsericeo albo intus e rufo fusco 5-6 fido, interiori brunneo sessili; ore depresso sericeo-fibroso.

On decaying vegetable matter, under Pines; Japan. On rotten wood, Bonin Islands. We have it also from Ceylon.

117. *BOVISTA DELICATA*, Berk. & Curt.: pusilla, globosa; peridio exteriori verrucis minimis consperso, tandem rimoso-deglubente; sporis argillaceis subroseis longe pedunculatis.

On the ground, Hong Kong. — Resembles *B. cervina*, Berk.

118. *LTCOPERDON PURPURASCENS*, Berk. & Curt.: pusillum, subglobosum, e purpurascenti brunneum basi subaculeatum sursum innato-squamulosum; strato sterili obsoleto; sporis luteo-olivaceis.

On decayed logs, Bonin Islands. — Allied to *X. pusillum*.

119. *L. HONGKONGENSE*, Berk. & Curt.: pusillus, pyriformis, breviter radicans, apice irregulariter dehiscens; capillitio subrufo; sporis ellipticis, pedunculatis.

On the ground, Hong Kong.

120. *L. PLICATUM*, Berk. & Curt.: parvura, subrotundura, ex albo pallide fuscum, subtus plicatum; epidermide verruculoso sursum fatiscencentevanido; sporis lasvibus brevissime pedunculatis.

On the ground, Japan.

121. *LICEA STIPITATA*, Berk. & Bay.: perithecis cylindricis ex incarnato rubidis stipite communi fusco intus celluloso suffultis.

On<sup>#</sup>decayed logs, Bonin Islands. — Agrees exactly with South Carolina specimens from Mr. Ravenel.

122. *L. RUBIFORMIS*, Berk. & Curt.: conglomerata, coccinea; peridiis urceolatis apiculatis liberis, basi vesiculosa.

On decayed wood, Behring's Straits.

123. *PHOMA ANGUINA*, Berk. & Curt.; maculis parvis nigris hic illic confluentibus; peritheciis depressis; sporis subellipticis.

On dead stems of *Alysicarpus bupleurifolius*, Behring's Straits. [Probably from Hong Kong. *Alysicarpus* is not found so far north. A. G.]

124. *SPHJEROFSIS ARCTICA*, Berk. & Curt.: peritheciis erumpentibus elongato-prominulis papilliformibus vel subcompressis; sporis hyalinis fusiformibus.

On cones of *Pinus Ajanensis*, Kamtschatka.

125. *SEPTORIA ARCTICA*, Berk. & Curt.: peritheciis globosis, immersis, siccis collabentibus; sporis sursum attenuatis, linearibus, 3-7 septatis.

On culms of *Dupontia Fischeri*, Arakamtchetchene Island-

126. *S. BONINEKSIS*, Berk. & Curt.: peritheciis minutis epidermide nigrifacto polito ocellato tectis; sporis rectis mediis filiformibus curvulis.

On petioles of an unknown leaf, Bonin Islands.

127. *S. PHOTINII*, Berk. & Curt.: peritheciis epidermide nigrifacto medio ocellato tectis; sporis rectis brevibus linearibus.

On leaves of *Photinia*, California.

128. *DISCOSIA OSTIOLATA*, Berk. & Curt.: peritheciis elevatis; ostiolo distincto prominulo perforato; sporis 3-septatis.

On dead leaves, Bonin Islands.

129. *TRIPHAGMIUM BINATUM*, Berk. & Curt.: sporis fuscis bicellulosis spinis emarginatis asperis; dissepimento verticali; membrana exteriore deglubente.

On leaves, with *Lecythea pezizaformis*; Nicaragua.

130. PUCCINIA TRIARTICULATA, Berk. & Curt.: soris oblongis epidermide rimoso arete inclusis; sporis elongatis triarticulatis breviter pedicellatis.

On *Elymus mollis*, Behring's Straits.

131. P. DOCHMIA, Berk. & Curt.: soris oblongis; sporis brevibus obtusissimis fuscis; pedunculo hyalino laterali.

On leaves of Grasses, Nicaragua.

132. P. SEPULTA, Berk. & Curt.: maculis orbicularibus, supra bullatis brunneis, subtus concavis; soris congestis in massam uniformem, partim e pilis matricis cektis; sporis obtusis pedunculatis.

On leaves of *Ficus*? J<sup>^</sup>rcaragua.

133. UROMYCES LUPINI, Berk. & Curt.: hypo-epiphylla; soris irregularibus; sporis brunneis papilla crassa terminatis; pedunculo spora longiore.

On leaves of *Lupinus*, with No. 137; California.

134. U. JAPONICA, Berk. & Curt.: maculis orbicularibus; soris solitariis vel circinantibus; sporis ovatis, apiculo terminali hyalino; pedunculo brevi, extema membrana evanescente.

On leaves of an *Orchid* Japan.

135. U. STATICES, Berk. & Curt.: hypo-epiphylla; soris amplis concentricis epidermide cinctis; sporis obtusissimis.

On leaves of *Statice*, California.

136. UREDO ASPERATA, Berk. & Curt.: maculis obsoletis; soris sparsis gregariisque hypophyllis oblongis vel fusiformibus pallidis granulatis.

On leaves of *Xanihoxylum*, Bonin Islands.

137. U. LUPINI, Berk. & Curt.: hypo-epiphylla; maculis nullis; soris sparsis irregularibus epidermide rupto cinctis j sporis brunneolis subglobosis lsevibus.

On leaves of *Lupinus*, California.

138. U. BAU&INLJE, Berk. & Curt.: hypo-epiphylla; maculis nullis; sporis fuscis subglobosis echinulatis, membrana interna saepe polyhedrj-contracta.

On leaves of *Bauhinia*, Nicaragua.

139. U. CONSTELLATA, Berk. & Curt.: maculis pallidis, oppositis nullis; soris minutis tarde ruptis constellatis; sporis argillaceis decolorantibus verrucoso-aculeatis.

On living leaves, Hong Eong.

140. *LECYPTEA PEZIZIFORMIS*, Berk. & Curt.: soris minutis pezizaeformibus extus albis intus fuscis; sporis obovatis echinulatis.

On under side of leaves, Nicaragua.

141. *JECIDIUM CAPENSE*, Berk. & Curt.: maculis nullis; peridiis elongatis cylindricis apice dilatatis dentatis.

On the fruit of an *Asparagus* or some allied plant., Cape of Good Hope.

142. *HELICOMA FASCICULATUM*, Berk. & Curt.: floods fasciculatis hic illic subconnatis parce articulatis; sporis quadriarticulatis.

Under side of dead leaves, Japan.

143. *CLADOSPORIUM PALLIDUM*, Berk. & Curt.: maculis orbicularibus pulveraceis; floccis erectis simplicibus; sporis oblongis sinuatis.

On leaves, Nicaragua.

144. *CAMPSOTRICHUM CIRCINATUM*, Berk. & Curt. mss.: atrum, floccis apice cirrhiformibus.

On dead leaves, Bonin Islands. South Carolina specimens are on leaves of *Magnolia grandiflora*.

145. *HELVELLA PUSILLA*, Berk. & Curt.: pusilla; pileo deflexo libero brunneo subtus griseo; stipite glaberrimo fistuloso cartilagineo.

On sandy flats, Behring's Straits. — Very distinct.

146. *PEZIZA JAPONICA*, Berk. & Curt.: fusco-atra; cupulis congestis subpedicellatis plicato-rugosis, e floccis brunneis in fasciculum unitis oriundis.

On roots, Japan. — Allied to *P. mekena*.

147. *P. BONINENSIS*, Berk. & Curt.: media; cupula plana glabra extus alba intus pallide rufa; sporidiis subcymbiformibus.

On dead leaves, Bonin Islands. — Allied to *P. rutilans*.

148\* *P. INSITITIA*, Berk. & Curt.: cupula alba anguste cyathiformi subcostato setoso, margine squamis setiformibus ciliato; stipite deorsum attenuato sulcato farinoso; hymenio pallide flavo; ascis longissimis; sporidiis maximis cymbiformibus.

On dead wood, Bonin Islands. — Allied to *P. tricholoma*, Mont.

149. *P. LEPIDA*, Berk. & Curt.: media; cupula infundibuliformi e stipite sursum attenuato gradatim oriundo, margine inflexo furfuraceo, disco coccineo.

On burnt earth, Japan. — Allied to *P. coccinea*.

150. *P. VERRUCULOSA*, Berk. & Curt.: atropurpurea, rigescens, sessilis vel breviter pedicellata, Oipulseformis vel explanata, extus verruculis pyramidatis margine pulverulentis aspera.

On stony hills, Behring's Straits. — Somewhat resembling *P. nigrella*.

151. *F. PORPMYRA*, Berk. & Curt.: sessilis; cupula planiuscula, extus fusca velutina, intus atropurpurea; sporidiis globosis; paraphysibus furcatis.

On roadside banks, Japan. — A splendid species.

152. *P. LEUCOPRZBA*, Berk. & Curt.: cupula concava, intus alba, extus floccis brunneis subfasciculatis aspera; sporidiis longis filiformibus.

On dead sticks, Japan.

153. *F. INCONSPICUA*, Berk. & Curt.: subsessilis; cupula hemispherica, margine incurvo, extus albo pruinoso, intus luteolo.

On dead wood, Bonin Islands.

154. *P. HONGKONGENSIS*, Berk. & Curt.: breviter stipitata; cupula hemispherica subtus lutea, margine incurvo; hymenio convexulo vel piano aurantiaco.

On dead twigs, Hong Kong. — This pretty species belongs to the claviform section of *Mollida*.

155. *HYPOCREA ARMENIACA*, Berk. & Curt.: armeniaca, omnino superficial, convexa, basi orbiculari affixa; ostiolis fuscis.

On living leaves of *Apocynae*, Bonin Islands.

156. *DIATRYPE CATERVARIA*, Berk. & Curt.: stromatibus parvis in maculas aggregatis papilla centrali notatis, quandoque confluentibus; ascis brevibus; sporidiis globosis. — *Sph. catervaria*, Berk. Herb.

On leaves of *Ficus*, Hong Kong. — Also in Ceylon.

157. *SPJLERIA* (Connatae) *PARDALIOS*, Berk. & Curt.: subiculo ex albo citrino subceraceo; peritheciis mediis e brunneolo nigris; ostiolo papillaeformi.

On dead wood, Bonin Islands. — Allied to *S. confluens*.

158. §. *CULCITELLA*, Berk. & Rav. Fung. Carol.: subcult aterrimo; fibris repetitèr dichotomis, apicibus furcatis; peritheciis minutis subglobosis glabris.

On dead wood, Nicaragua.

159. *S.* (Denudatae) *DEPOLITA*, Berk. & Curt.: peritheciis subglobosis basi applanatis politis nigerrimis; ostiolo minuto papillaeformi.

On Palm leaves, Bonin Islands.

160. *RHYTISMA ERTTHROSPORUM*, Berk. & Curt.: stromate tenui piceo hic illic in papillas elevato; \*ascis amplis; sporidiis salmonicoloribus magnis rectis vel curvulis utrinque apiculatis.

Both sides of leaves of *Quercus virens* *\agrifoliaT\*^ California. Remarkable for the size and color of the sporidia.

161. DOTHIDEA PERMEANS, Berk. & Curt.: maculis irregularibus substellato-orbiculatis nigris totam matricem permeantibus elevato-subrugosis; ostiolis indistinctis.

On leaves, Nicaragua.

162. D. TENUIS, Berk. & Curt: picea; stromate subpenetrante tenui supra e cellulis prominulis minute granuloso; sporidiis hyalinis oblongo-clavati9.

On leaves of *Bauhinia*, Nicaragua. — Allied to the preceding.

163. D. PLATTPLACA, Berk. & Curt.: stromate tenui nigro totam matricem penetrante supra nitido subtus fertili opaco; cellulis superficialibus.

With *D. permeans*.—In some respects resembling *S. demersa*, Corda.

164. D. INCLUSA, Berk. & Curt.: stromate punctiformi margine e matrice formato incluso; cellulis subsolitariis; sporidiis fusiformibus ellipticis.

On leaves of *Jacquinia*, Nicaragua.

165. ASTERINA VELUTINA, Berk. & Curt.: maculis velutinis orbicularibus fibris erectis subulatis obsitis; peritheciis minutissimis frequentibus; ascis oblongis; sporidiis oblongis uniseptatis.

On leaves, Loo Choo Islands.

166. A. OSTIOLATA, Berk. & Curt.: punctiformis, niger; subiculo nullo nisi peritheciali; ostiolo distincto papill&formi.

Upper surface of leaves, with *Cephaleuros virens*; Nicaragua.

167. A. SEPULTA, Berk\* & Curt.: subiculo repente epidermide diu tecto; peritheciis minutis; ascis oblongis; sporidiis uniseptatis.

On leaves of some *Laurinea*, Japan.

168. A. MEGALOSPORA, Berk. & Curt.: subiculo parcissimo fimbriante; peritheciis magnis hiantibus; sporidiis mazimis uniseptatis.

On living leaves, Bonin Islands. — Resembles *A. Azarrts*, Lev.

169. A. CONGREGATA, Berk. & Curt: peritheciis minimis nitidis congregatis; subiculo parcissimo; ore rotundo; ascis helvolis; sporidiis angustis.

On dead leaves, Nicaragua. — Has the habit of *Sph. macvlceformis*.

170. A. BULLATA, Berk. & Curt.: maculis orbicularibus e matrice elevata enatis, fills in stratum compactum tenue hie illic celluloseum intertextis; peritheciis prominulis.

On dead leaves, Nicaragua. — Has the habit of *Strigula*.

171. MELIOLA DICHOTOMA, Berk. & Curt.: subiculo velutino; peritheciis magnis, appendiculis uni - bifurcatis, ramulis elongatis.

On leaves of some climbing plant, Japan.

#### CYSTOTHECA, Berk. & Curt.

*Ferithecium globosa*, e floccis rigidis brunneis oriunda. Ascus unicus, sacco hexagono-celluloso circumdatus. — Genus pulcherrimum *Myxothecio*, *Pisomyxa*, &c. affine, foliis innascens.

172. CYSTOTHECA WBIGHTII, Berk. & Curt. Forming thin chocolate-colored patches on the under surface of leaves. *Ferithecium* globose,  $\frac{1}{10}$  inch in diameter, containing a single hyaline, globose, beautifully reticulate sac, within which is an ascus of the same form. Sporidia in our specimens imperfect.

173. ASCOMYCES DEFORMANS, Berk. Mss. (Vide Gard. Chron. 1856, p. 470): candidissimum, compactum<sup>^</sup>matricem deformans.

On *Trientalis*, Fetropaulowski, Kamtschatka.

174. SPHERIA CULLUMIJB, Berk. & Curt.: primum epidermide tecta, subpustulata, demum nuda, subglobosa, obtusa, ore minutissimo perforata; ascis brevibus curvis; sporidiis biseriatis clavato-lanceolatis demum uni - triseptatis.

On leaves of *OuUumia squarrosa*. Cape of Good Hope. — Sporidia at first simple, then binucleate, at length uniseptate, or very rarely triseptate, brown,  $\frac{1}{2}$  long, lanceolate, but broader at the upper end. — On the same leaves there is a minute *Leptostroma*, but without fruit.

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Four hundred and fifty-eighth meeting.

January 11, 1859. — MONTHLY MEETING.

The PRESIDENT in the chair.

The Corresponding Secretary read letters from the War Department, accompanying Vols. II. - VIII. of the Pacific Railroad Surveys; from the Minister of the Interior of the Netherlands, presenting folio 14 of the Geological Maps of Holland; and from Dr. I. I. Hayes of Philadelphia, acknowledging the receipt of a copy of the resolutions of the Academy upon the subject of his proposed Arctic expedition.



Professor Gray gave a series of illustrations of the Botany of Japan in its relations to that of Central and Northern Asia, Europe, and North America, — the communication being a portion of one of the papers presented by him at the last preceding meeting.

He showed that the relations of the Flora of Japan with that of the United States east of the Mississippi were peculiarly intimate, as evinced by the great number of congeneric, of closely representative, and of identical species in the two floras, noting especially that most of the more striking points of similarity were presented in species or in types which are absent from the flora of Europe. Also, that although there is a considerable number of species common to the western side of the American continent and to Japan, yet that the likeness was less strong between their floras than between those of Eastern North America and of Japan, although the latter are geographically separated by about one hundred and forty degrees of longitude. Also, that far more Eastern American species or types are represented in Eastern Asia, than of Western American in Europe, or even in Asia; — thus pointing to a remarkable interchange between the floras of Eastern North America and Eastern Asia; or to a former homogeneousness of the temperate American and East-Asian floras, to a degree equal, perhaps, to that of the Arctic or the sub-Arctic flora at the present time.

Comparisons formerly instituted by Professor Gray between the flora of the Northern United States and that of other parts of the northern temperate zone had already suggested to others, as well as to himself, the inference that the interchange between these floras had taken place mainly *via* Asia, and not *via* Europe; and it would be seen that our now largely increased knowledge of the botany of the Japanese and of the Himalayan regions strengthened this inference.

In presenting the subject, Professor Gray could hardly avoid using the words "interchange" and "dispersion of species." He had used them only in drawing his conclusions from the

facts, and wished to do so without prejudging the question involved. But he was free to say that the present investigation had confirmed his impression that such terms were properly employed. For although some of these facts would at first seem most readily explicable upon the supposition of the double origin of those species whose present geographical areas are widely dissevered, yet, in his opinion, they would be found, on considering the whole case, far more conformable to the hypothesis of a single local origin for each species at an early time. And in his opinion the actual question now is, — whether each species originated in one local area, whence it has spread, as circumstances permitted, over more or less broad tracts, in some cases becoming discontinuous in area through changes in climate or other physical conditions operating during a long period of time; or, whether each species originated where it now occurs, probably in as great a number of individuals occupying as large an area, and generally the same area, or even the same discontinuous areas, as at the present time. The latter is understood to be the view of Professor Agassiz.

To this view Professor Gray objected: — 1. That it offers no *scientific* explanation of the present distribution of species over the globe; but simply supersedes explanation, by affirming, that as things now are, so they were at the beginning; whereas the facts of the case — often very peculiar — appear to demand from science something more than a direct reference of the phenomena as they are to the Divine will.

2. That the idea of the descent of all similar or conspecific individuals from a common stock is so natural, and so inevitably suggested by common observation, that it must needs be first tried upon the problem; and if the trial be satisfactory, its adoption would follow as a matter of course.

3. That, since it is conceded that the present era of the world is of extremely long duration, and since it is most probable, not to say certain, that the existing species of plants of the regions in question, or a part of them, are of

high antiquity, dating back to the post-tertiary, or even to the later tertiary epoch, — and therefore must have been" subject to great climatic changes, accompanied or caused by no inconsiderable changes in the relative extent and configuration of the land, — the objections formerly raised against such wide dispersion of species lose most of their force. And the explanation of such anomalies in the actual distribution of species is to be sought in the vicissitudes to which the species must have been subject in their earlier days.

Professor Gray proceeded briefly to intimate, that, if the present flora of the northern hemisphere preceded the glacial period, or even immediately succeeded it, the actual distribution of species, and the interchange between this continent and Eastern Asia under similar parallels of latitude, could be readily accounted for on the ordinary view; or at least would offer no greater difficulty than the Arctic flora now does,—the general homogeneousness of which round the world has never been thought difficult of explanation. He proposed to illustrate his views upon this part of the subject at a future meeting.

Professor Agassiz remarked, that the animal kingdom presented a resemblance between its representatives of Eastern North America and Eastern Asia similar to that mentioned by Dr. Gray in the flora, and that he has especially pointed out this correspondence in detail in the order of Testudinata, in his Contributions to the Natural History of North America. He acknowledged the correctness of the views ascribed to him by Dr. Gray, and would defend them on the ground that, connecting the present state of things with that\* which prevailed in earlier geological periods, it could be shown that the present distribution of animals was linked with that of earlier periods in a manner which excluded the assumption of extensive migrations, or of a shifting of the florae and faunae from one area to another.

He viewed the similarity between the fauna of Northeastern America and that of Northeastern Asia, not as the result of climatic changes over an area primitively" more

homogeneous in its organic productions and modified by climatic changes, but as a primitive adaptation of organic types to similar corresponding physical features, which have remained respectively unchanged since the first introduction upon earth of these organisms. Admitting with Dr. Gray the immensely long duration of even the present period, he did not think that the regular order and organic connection which everywhere exist between the different types of animals and plants upon the whole surface of our globe, could have been established by physical changes, or even essentially modified by them. With reference to the single origin of conspecific individuals, he thought that the warfare which so many species wage upon others was in itself an insuperable objection to the assumption that any one species could have originated in a single pair.

The President remarked, that the appearance of the same species on different or opposite parts of the globe admitted of explanation by supposing that originally a zone, or isothermal belt, which existed in each climate, contained all the species capable of flourishing in that climate so long as the climate remained stationary; and that in the lapse of ages a great portion of these plants had disappeared or died out, under the casualties to which plants are liable, some having disappeared altogether, and others remaining only in localities, defined by longitudes, in different parts of the same zone; so that at the present day, while the general character of the vegetation is different in different hemispheres and countries, still a sufficient number of species might be extant in, and common to, both hemispheres, to represent a part of the original growth. This explanation appeared to him more probable than the supposition that these plants had more recently migrated from any one country to its antipodes, passing over the intermediate regions.

Professor Gray rejoined, that his views would in a good degree harmonize with those of the President, with the important exception that he regarded any former more homo-

geneous state of the temperate flora as itself a resulting, not an original condition. Still less, therefore, could he coincide with Professor Agassiz, in regarding the actually present distribution, with all its dislocations, as a primitive state. Whether a much larger number of species than now were ever common to Japan and to New England, and whether these at any one time inhabited the whole intermediate ground, appeared to him uncertain, and was unnecessary to suppose; but he had no idea that *recent* migration had anything to do in accounting for the present existence of the same species in such widely separated stations.

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Four hundred and fifty-ninth meeting.

January 26, 1859. — STATED MEETING.

The PRESIDENT in the chair.

The Corresponding Secretary read letters from the Royal Belgian Academy, Brussels, acknowledging the reception of publications from the American Academy, and presenting its own recent Memoirs. Also, a letter from the President of the Royal Bavarian Academy of Sciences, Munich, announcing the intended celebration of the centennial anniversary of the foundation of that society on the 28th of March ensuing, and inviting the participation of the American Academy.

On motion of Mr. Winthrop, seconded by Professor Felton, Dr. Charles Beck, being now in Europe, was appointed to represent this Academy upon that occasion.

Professor John Lindley was elected a Foreign Honorary Member, in Class II. Section 2 (Botany), to fill the vacancy made by the decease of the late Robert Brown.

Sir William E. Logan, Director of the Geological Survey of Canada, was elected an Associate Fellow, in Class II. Section 1 (Geology, &c).

William Watson Goodwin, Ph. D., of Cambridge, was chosen a Resident Fellow, in Class III. Section 2 (Philology, &c.).

On motion of Mr. Henck, a special appropriation of two hundred dollars was made, for the purchase by the **Library** Committee of additional works upon mathematics, technology, and engineering.

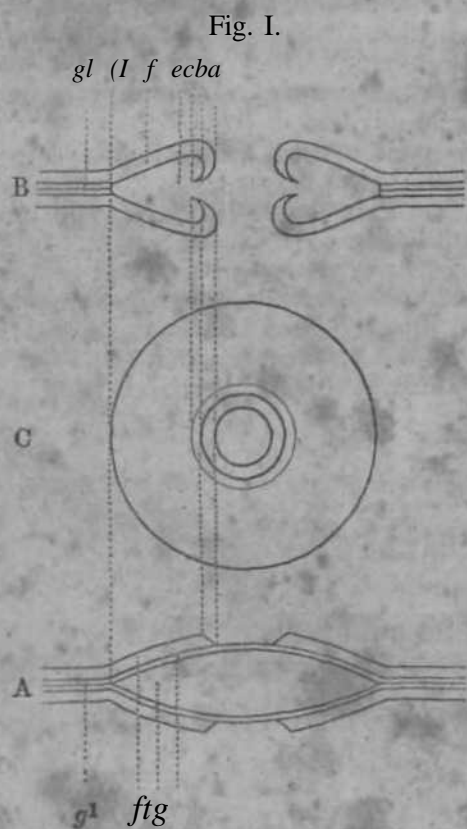
On motion of Professor Agassiz, special meetings for scientific discussion were voted to be held, at the hall of the Academy, on **the** fourth Tuesday of February, March, and April ensuing.

Professor Peirce made a further communication upon **the** tail of Comets, especially of Donati's Comet.

Mr. H. J. Clark read the following paper upon the use of the microscope, as recently improved, in the investigation of the minute organization of living bodies: —

"I was incited to bring together my thoughts and experiences upon this subject, by discovering, three or four months ago, a novel feature in the so-called glandular dots of the wood of our common AWhite Pine (*Pinus Strobus*, Linn.).

"A dot of this kind is usually represented by a circle (Fig. 1, C, *d*),



in the centre of which is a single or double ring (*a, h*), which has about one third the diameter of the **first** (*d*). The outer circle (*d*) is described as the boundary of a lenticular space (*A, c*) between two *contiguous cells*, and the inner double circle (*C, a, b*) as the outskirts of a perforation (*A, a b*) in the deposit layer (*l'*) of the cell. The double circle arises, as is said, from the fact that the perforation has the shape of an extremely short truncate cone, which, when viewed endwise, presents to the eye its two circular ends concentrically; the broader end, which is always next the interior of the cell, corresponding to the outer (*b*), and the narrower end to the

figures and diagnoses of the various authors who have treated of this bird -has shown that there are assigned to *JEgiothus HolbøllU*, as distinctive characters, exactly those differences from the *linarius* which exist in the specimens under consideration,—viz.: larger size, larger, more elongated and bright yellow bill, and larger gular spot. I think there can be no reasonable doubt that these specimens represent in North America the form long recognized in Europe under the name of *Atgiothwt HolbøllU*.

• If this be the case, next comes the question, what rank are we to accord to this form. Is it to be looked upon as an accidental variation from the type,—as a well marked variety,—or as a distinct species? Brehm was the first to proclaim it as distinct, and give it a name. Temminck, Schlegel, Bonaparte, and other authors,—who are rather more orthodox in their ideas of a species than is Brehm,—have always inclined, more or less decidedly, to the opinion that it is rather a race or subspecies of *A. linarius*. The fact of there being a complete gradation towards the *linarius*, has not escaped attention, and has been a powerful argument against according to it full specific rank. For my own part, though unable to demonstrate the point incontrovertibly, I am inclined to reiterate still more strongly the doubts expressed in my Monograph, as to the propriety of separating it from the *linarius*.

Pursuing this question of the variations which *A. linarius* presents, we find another species,—*A. rufescens*,—which has never been able to fully vindicate its claims to specific distinction. First introduced by Vieillot, its existence was strenuously denied by Temminck, doubtfully regarded by Bonaparte and Schlegel, and admitted by Cabanis and others. I have always entertained strong doubts as to its validity. The characters assigned are slight enough; and that they exhibit a gradation towards *A. linarius*, is admitted even by those who contend for its separation from that species. In examining two hundred or more specimens, I find many individuals, fully as small, in fact, and with as much of a reddish tinge, as specimens from Europe labelled "*m-fp.scens*" by good authority.

The existence, then, in North America of these two races, or species, whichever they may be, the one larger and the other smaller than the typical *Unariua*, may be considered as exceedingly probable, if the fact be not actually demonstrable. As a sort of negative argument, I may remark, that one might naturally look for their occurrence in this country, as the typical *linarius* from Europe is absolutely identical with our own.

*Algiothus nt/escens* and *A. Holbo'lli*, compared with *A. exilipes*, afford a good illustration of the limits between which a species may vary from its normal type; while another species, looking at first glance more like this type than do either of its extremes, is permanently distinct.

I have no reason to change any of the views expressed with regard to three new species I have introduced. Additional specimens confirm the position assumed, especially regarding *A. exilipes*. I may here, however, correct a typographical error, which gives the date of the first introduction of *A. fuseescensls* « Aug., 1860," instead of " Aug., 1861."

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March 3d.

MR. JOS. JEANES in the Chair.

Twenty members present.

The following paper was presented for publication :

Enumeration of the plants collected by Dr. Parry, and Messrs. Hall and Harbour, in Colorado Territory. By Asa Gray.

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*March 10th.*

Vice-President VAUX in the Chair.

Twenty members present.

The following paper was presented for publication :

On Trachycephalus, Scaphiopus, &c. By E. D. Cope.

Mr. Cope mentioned that a fish obtained by Jesse Burke, in the cedar swamps of New Jersey, he had determined to be a new species, for which he proposed the name of *Hololepis simus*.

*March VIth.*

Vice-President BRIDGES, in the Chair.

Twenty-five members present.

The Publication Committee laid on the table Part 3 of Volume V. of the Journal, just published.

*March 2±th.*

The President, MR. LEA, in the Chair.

Twenty-five members present.

The following papers were presented for publication :

Catalogue of the Fishes of California, Part 4. By Theodore Gill.

Descriptions of new species of *Pediculati*, &c. By Theodore Gill.

Additions to the Catalogue of Stars which have changed their colors.

By Jacob Ennis.

*Tetraolagophus*, White Grouse, &c. By James A. Grant, M. I).

Dr. Leidy directed attention to some portions of the aorta of ft horse, containing parasitic worms, presented this evening by Dr. R. Jennings, veterinary surgeon. The worms belong to the species *Sclerostomum armatum*. A letter from\*the donor, giving an account of the case, observes :

"The horse appeared generally in good condition, and was a yearling colt. It wa3 taken with symptoms of prostration, and slightly hurried respiration, and died four hour3 after the attack was noticed. Patches of inflammation were observed ia various parts of the intestines, aud several of the mesenteric glands were of a dark bloody appearance, -and contained clusters of small worms. Parasites of the same character were noticed in the liver, and on the exterior of the kidneys. A clot of blood, the size of a goose *cgg*, was found between the coats of the left iliac vein, and contained a large number of the -worms. They appeared to have perforated the internal coat of the vein, and thus caused the extravasation of blood. The worms were also observed in small clusters contained ia the coats of the, thoracic aorta."

Dr. Leidy also exhibited a specimen of sheep wool, striped alternately black and white, which was presented this evening by Mr. Joseph P. Hazard. In a note the donor observes, that his brother, Mr. Rowland G. Hazard, of Peace Dale, R. I., who gave him the specimen, stated that-in an experience of forty *years'* connection with the manufacture of the article, he had never before seen anything of the kind.

Mr. Vaux exhibited an Indian axe, of native copper, from a mound near Ham\*ilton, Ohio.

The Committee on Proceedings, laid on the table the published number for January and February.

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· *March 31st.*

The President, MR. LEA, in the Chair.

Twenty members present.

On report of the respective Committees, the following papers were ordered to be published in the Proceedings:

On TBACHYCEPHALUS, SCAPHIOPTIS and other American BATBACHIA.

BY E. D. COPE.

TBACHYCEPHALUS, Tsch.

In the most recent enumeration of the species of this genus (by Dr. Günther, 1358,) four are recognized: one,—*T. geographicus*,—from Brazil, and three from the Antilles. I am enabled to add four to the latter, which have been sent from those regions by Messrs. Wright and Weinland, and Professors Poey and Adams, all well known as most efficient laborers in advancing our knowledge of zoology in that field.

It does not appear to have been stated that the males of certain species of this genus,—*T. marmoratus*, *insulsus*, *ovatus*,—possess, during the breeding season, a corneous sheath upon the tuberiferous metacarpus of the inner anterior digit, as occurs in *Discogloasus* and *Scaphiopus*. Specimens of males in which the generative organs are not enlarged, are destitute of this pellicle; it is, however, readily lost after saturation in fluid. Its object here, as elsewhere, is to assist the powers of prehension of the male.

The following table contrasts the peculiarities of the West Indian species:

- A. Posterior margin of area of cephalic derinoössification continuous with the skin of the nape;
  - o. Without distinct cordiform outline.
    - /? Its length from end of muzzle equal to breadth of jaws opposite middle of orbits.
- Muzzle acuminate; tongue entire; fingers scarcely webbed *insulsus*.
- Muzzle rounded; tongue cordate; fingers well webbed. . . . . *ovatus*.
- PP. Length of casque from end of muzzle less than breadth of jaws opposite middle of orbits.'
  - S<sup>in</sup> tuberculous; heel scarcely reaching muzzle; casque concave in posterior outline. . . . . *marmoratus*.
  - Skin nearly smooth; heel reaching beyond muzzle; casque straight in posterior putline. . . . . *wrightii*.
  - at\*. Casque with posterior cordate outline complete from orbits; Canthus rostralis nearly straight. . . . . *scutigerus*.
- AA. Posterior margin of casque elevated, crest-like.
  - Length from muzzle to border of casque much less than breadth of jaws at middle of orbit. . . . . *lichenatus*.
  - Length from muzzle to border of casque equal or greater than breadth of jaws at middle of orbit. . . . . *auochlorus*.

*T. insulsus* Cope, sp. nov.

Head elongate, outlines converging toward end of muzzle. Length from that point to posterior border of casque equal to distance across mouth at orbits. Top of cranium plano-concave, end of muzzle prominent, rounded in profile. Posterior outline of casque straight or slightly emarginate, extending nearly to tympanum. Canthus rostralis strongly marked, with a slight point or ridge one-third distant from orbit. Loreal region coacave. Eyes very prominent, twice extent of tympanum. Vomerine teeth in transverse series. Internal nares equal ostia pbaryngea. Tongue nDt emarginate. Skin of upper surfaces

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sparsely tuberculous. Three external digits one-fourth webbed. Heel reaching a little beyond orbit. When the markings of the upper surfaces are not obsolete, there is a brown band converging from the supercilium towards one upon the other side, then diverging, and becoming broken up on the iliac region. Lateral and posterior femoral regions marbled; extremities banded.

Length from muzzle to posterior margin of casque 16'';\* least breadth between orbits 8''. From casque to vent 4" 5''; anterior extremity 3" 5''; posterior extremity 8" 8<sup>7</sup>/<sub>16</sub>.

*Habitat.*—Cuba.. From Prof. Poey. Mus. Smithsonian, Nos.6265-6. Academy Natural Sciences.

*T. o v a t u s* Cope, pp. nov.

Length from extremity of muzzle to posterior border of casque equal to breadth from one os maxillare to the other at orbits. Head depressed, especially anteriorly; maxillary outlines much rounded, not acuminate. Muzzle rounded in profile. Canthus rostralis strong, but little concave, far within maxillary border; loreal region grooved. Posterior border of casque extending nearly from tympanum to tympanum, slightly doubly-convex. Eyes very prominent, more than twice the extent of the tympanum. Internal nares larger than ostia pharyngea. Tongue emarginate. Vomerine teeth between nares, in two postero-externally divergent series. Digits of anterior extremity nearly half-webbed. Heel reaching nearly to end of muzzle. Skin of upper surfaces nearly smooth.

Length from end of muzzle to posterior border of casque 1" 7''. Least width between orbits 7''. Length from casque to vent 4" 5<sup>11</sup>/<sub>16</sub>; of anterior extremities 3" C"; of posterior extremities 8" 5''.

Above deep brown, beneath immaculate; upper faces of extremities indistinctly barred; lateral and posterior femoral regions spotted, and marbled with brown.

*Habitat.*—Hayti, near Jeremie. Dr. Weinland's Collection in Mus. Comparative Zoology, Cambridge.

Perhaps this is the *T. domhricenim* Gthr., which does not appear to be the species so named by Dumcrlil and Bibron.

*T. m a r m o r a t u s* Dum., Bibr.

Hjad short; maxillary outline broadly oval. Length from end of muzzle to posterior border of casque less than from one alveolar margin to the other at orbit. Frontal region concave, especially in old individuals. End of muzzle nearly vertical in profile. Casque extending from tympanum to tympanum in fully developed individuals; the posterior outline openly emarginate or concave. Canthus rostralis convergent, concave, but little elevated, with a more or less obsolete furcation br process, one-third of its length anterior to the orbit. Loreal region, very oblique, concave. Orbits twice the extent of tympanum. Series of vomerine teeth either transverse, arcuate or oblique converging anteriorly. Posterior nares moderate. Tongue not or scarcely emarginate. Skin of upper surfaces coarsely, usually closely, tuberculous. Two external digits of anterior extremity very slightly palmate. Heel of extended extremity reaching from anterior to the orbit to near end of muzzle.

Length from end of muzzle to middle of posterior margin of casque (in 9 from New Providence) 22''. Breadth between orbits 12<sup>7</sup>/<sub>16</sub>; length from casque to vent 5" C"; of posterior extremity 11" V''. Length of head and body in § (from New Providence) 4" 6<sup>11</sup>/<sub>16</sub>.

Specimens of this species in alcohol are either rufous brown, varied with dark brown, blackish brown, ashy<sub>T</sub> with confluent brown spots, or olivaceous, with close brown or black reticulations.

*Habitat.*—Cuba, De La Sagra, Poey. New Providence, Wood, Bryant. Hayti, Weinland, Cuminp, ?Ricord. Jamaica, Gosse, Adams. Mus. Academy Nat.

\* The centimetre and millimetre are used in this paper.

Sciences, Philada.; Boston Nat Hist. Soc.; Compar. Zoology, Cambridge; Smithsonian, Washington.

The palmation of the fingers in this species varies between bare existence and an extent equal to one-fourth the length of the digits. The series of vomerine teeth are either arched or straight. As the peculiarities of *the Ilyptiboas dominiceruis* of Tschudi, as defined by Duméril and Bibron, are exhibited within this range, I am induced to believe that it is but a nominal species. The *domim'censis* of Günther, possessing a more extensive palmation of the anterior digits, is so far similar to the *ovatus* from the same island. I agree with that author in assigning the same name to the Jamaican animal, which is, according to him, the frog called *Hyla brunnea* by Mr. Gosse. The specimens labelled erroneously in Mus. Paris as having been brought from Cape North, in Norway, under the name *Hyla septentrionalis*, belong to the present species according to the "Erpétologie Générale." It is the oldest name, but, being but a museum label, must be passed over.

Specimens from New Providence are of large size and with golden and olivaceous shades.

*T. wrightii* Cope, sp. nov.

Head short, broadly rounded; length from end of muzzle to posterior border of casque less than breadth of mouth opposite middle of orbits. This posterior border extends from tympanum to tympanum, and is not emarginate. Frontal region very broad, concave; muzzle oblique in profile. Ganthus rostralis much within maxillary border, well marked, slightly concave, angle of convergence nearly right, with a weak descending ridge nearer orbit than nares. Eyes not very prominent, twice extent of tympanum, which equals discs of anterior digits. Loreal region concave. Vomerine series not short, transverse; inner nares not much larger than ostia pharyngea. Tongue very broad, slightly emarginate. Anterior digits scarcely palmate. Heel reaching beyond end of muzzle; tibia measures a little more than twice from nostril to posterior border of casque. Skin of upper surfaces very sparsely tuberculous.

Length in a ♂, from end of muzzle to posterior border of casque,  $V'' 5'''$ . Least breadth of frontal region  $1'' 2'''$ . Length from posterior border of casque to vent  $5'' 7'''$ ; of anterior extremity  $5'' 5'''$ ; of posterior extremity  $13'' 8'''$ .

Above purplish brown, beneath yellowish; gular region brown-shaded; sides and interior faces of femur and tibia marbled, and external faces of limbs banded with brown.

*Habitat*.—District of Guantanamo, Southeastern Cuba. Discovered by Chas. Wright, to whom it is dedicated. Mas. Smithsonian, (No. 5174.)

*T. scutigera* Cope, sp. nov.

Head more elongate; maxillary outline regularly rounded or slightly truncate. Length from end of muzzle to posterior border of casque less than distance across the mouth opposite middle of orbits. Profile from occiput to muzzle gently arched, the latter not depressed, vertical (truncate) in profile. Ganthus rostralis elevated, straight or convex just interior to orbit, converging at an acute angle, without branch-ridge. Loreal region nearly vertical, with a delicate groove between two patches of ossification. Cephalic dermo-ossification with a distinctly-defined cordate outline posteriorly; separable more or less distinctly into two parietals, a pentagonal frontal and two elongate convergent nasal plates; where the latter are in contact with the parietals (on the superciliary margin) there is often an emargination. Eyes not prominent vertically, twice the extent of tympanum. Internal nares very large. Vomerine teeth in two short, widely-separated, straight or slightly curved series, which converge anteriorly between the posterior margin of nares. Tongue scarcely emarginate. Anterior digits one-fourth to one-third webbed. Heel scarcely reaching beyond orbit. Skin very sparsely tuberculous or smooth.

1863.]

*Dimensions of a female.*—From end of muzzle to posterior border of casque 2" 4''; least width of frontal region 1" 5''; greatest width of casque posteriorly 2"; from casque to vent 5" 8''; anterior extremity 4" 6''; posterior extremity 10" 8''. Length of head and body of a ♂ 5" 6''.

In spirits, brown; a blackish band or spot behind tympanum, one across casque behind interorbital space, one on anterior dorsal, and some transverse blackish lines on scapular region. Extremity bands with pale borders; sides brown-spotted; a large brown, pale-bordered anal spot.

*Habitat.*—Jamaica, Prof. G. B. Adams. Mus. Smithsonian, (6268.) Academy Nat. Sciences.

#### *T. lichenatus* Gosse.

Head short, broadly rounded in outline; length from end of muzzle to most distant point of posterior margin of casque much less than breadth of mouth at middle of orbits; about equal to distance from one supratympanic ridge to the other. Frontal region very concave; profile of muzzle nearly vertical. Canthus rostralis short, very concave, forming a sharp elevated ridge posteriorly, with » short descending branch nearer the orbit; almost obsolete near the external nares; shorter than interorbital breadth. Casque with an elevated, crenulate, doubly-convex posterior margin; rugose, especially upon the superciliary region. Eyes very large and prominent, three times the extent of the tympanum; the latter is obliquely elliptic, contracted antero-superiorly, and bounded above by a crenulate arched ridge. Tongue broad, not emarginate. Vomerine teeth in two short, curved, well-separated series, between the posterior parts of the very large internal nares. Ostia pharyngea relatively small. Exterior anterior digits one-third palmate; palettes as large as tympanum. Heel reaching anterior border of orbit. Skin of upper surfaces roughly, medially sparsely, tuberculous; some prominent elevations near vent, two on the heel, and several on the tarsus and antebrachium.

*Dimensions of ♂.*—Length from end of muzzle to posterior border of casque 3"; from latter point to vent 7" 4''; breadth of interorbital space 1" 7''; length of anterior extremity 6" 2''; of posterior, 14" 4''.

Color in spirits yellowish brown, with deep brown variations, most distinctly on the occipital, interscapular and the superior lateral regions; sides and gular region coarsely brown-spotted. Extremities, including tarsus and foot, cross-banded. Under surfaces yellowish.

*Habitat.*—Jamaica, Gosse, Adams. Mus. Smithsonian; Amherst, Mass.

Mr. Gosse has given an interesting account of this very singular tree-frog in his "Naturalist's Sojourn in Jamaica,"—a work which is ever recurred to with pleasure. He has also described the colors as they appear during life, which are brilliant: they scarcely assist the student in separating the species when rendered unnatural by preservation in alcohol.

#### *T. anochlorus* Gosse.

Head elongate, maxillary outlines more acuminate than in the preceding species. Length from end of muzzle to most distant point of posterior margin of casque equal to or greater than distance from alveolar ridge to ridge at middle of orbits, greater than distance from one supratympanic ridge to the other. Frontal region very concave; profile of muzzle vertical. Canthus rostralis as long as interorbital breadth; it forms an acute elevated ridge, which has its median portion nearly transverse, and making nearly right angles with the anterior and posterior portions. Posterior outline of casque much elevated, cordiform, with radiating ridges. A supratympanic serrate ridge. Eyes 3 prominent, twice the extent of the oval tympanum. Internal nares very large; vomerine teeth in short convex series between them. Tongue a little broader than long, entire. External anterior digits nearly half-webbed. Heel extending to anterior margin of orbit. Skin of upper surfaces sparsely tuberculous, promi-

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ment tubercles on antebrachium, heel and tarsus. Abdominal areolations rigid, prominent

*Dimensions of a <sup>^</sup>.*—From end of muzzle to convexity of posterior border of casque 2" 9". Breadth of frontal region 1" 4". Length from casque to vent 6" 5"; of anterior extremity 5"; of posterior do. 12" 7".

Color in spirits, above uniform olivaceous; lateral and internal femoral regions marbled; extremities above banded with brown; mandibular region delicately brown-marbled. A dark anal spot.

*Habitat*.—Jamaica. Drs. Gosse, Betton, Adams. Mus. Academy Natural Sciences; Amherst College, Mass.

It *U* altogether probable that this is the species described by Mr. Gosse, in his work previously mentioned, under the name adopted. His description, relating principally to coloration, is not conclusive towards any identification.

Its affinities are altogether with the *lichenatus*, both being peculiar in the elevation of the posterior margin of the casque into a transverse crest. It differs in the greater elevation of this crest, the more elongate proportions of the cranium, the angulation of the canthus rostralis and less prominence of eyes, besides minor points.

#### HYLA Laur.

*Hyla miotypanum* Cope, sp. nov.

Skin of superior surfaces smooth; gular region areolate; a gular and antepectoral fold, also one across the axilla; another running from inferior anterior face of thigh obliquely upwards to the iliac region. A fold across extremity of forearm, above carpus. Outer fingers one-fourth, toes extensively, webbed; palettes larger than tympanum; posterior extremities slender; the heel reaches the end of the muzzle. Muzzle broadly rounded; canthus rostralis short, loreal region oblique. Nostrils vertical. Eyes very prominent, six times the extent of the small tympanum. Tongue slightly emarginate. Vomerine teeth in two elongate fasciculi between internal nares, presenting an obtuse angle posteriorly.

Length from muzzle to upper border of tympanum *V'*; breadth of jaws opposite middle of orbit 1". Length from tympanum to vent 2" 3"; of anterior extremity 1" 9"; of posterior extremity 5" 1".

In spirits, above purplish ash, (probably green in life,) with or without a few lighter specks, and indistinct darker reticulations. Extremities paler, not barred; a light border from heel to digits, another bounding superiorly a subanal spot. Under surfaces yellowish; superior labial border and lateral stripe bright yellow, the latter sometimes not well separated from the abdominal shade.

*JTalitaU*—Near Jalapa, Mexico. Obtained by Sr. R. Montes de Oca. Mus. Smithsonian, (No. 6311,) Mirador, Dr. Sartorius.

A species to be compared with *rhodopepla Gthr.*, *rubicundula R.* and *L. luteola Bwrm*<sup>^</sup> *molitor Sehn*<sub>n</sub>, but differing from all in the minuteness of its tympanum. In *viridis* the tympanum is larger, the head is more elongate and the hands less palmate, besides the presence of a yellow band on the tibia.

*Hyla p a 11 i a t a* Cope, sp. nov.

All the digits of posterior extremity palmate to penultimate phalanx; of the anterior the three external are one-third webbed. Metacarpus of inner digit with a large tubercle. Tympanic disc one-sixth the size of the eye. Vomerine teeth in a short uninterrupted series behind posterior margin of internal nares. Tongue oval, nicked. Muzzle prominent, truncate; loreal region not concave. From nostril to orbit equal diameter of orbit, and is less than the width of the interorbital space. One vocal sac. Skin smooth above, not granulated on the gular region. The end of the tibia reaches middle of orbit when the limb is extended.

1863.]

Length of head and body 19''; of anterior extremities 10''; of posterior 25''.

Extremities, lower surfaces, loreal and labial regions grayish-brown; upper surface of head and body pale ochreous, abruptly separated from the other color all round.

*Habitat*.—Paraguay. From Gapt. Page's Expedition. Mus. Smithsonian, (Xo. 6225;) Academy Natural Sciences.

*Hyla baudinii* Dum. Bibr., Erp. Gén., viii. 564, 1841.

The names *Hyla vanvlkii*, published in these "Proceedings" for 1854, p. 61, and *H. murkolor*, 1862, 359, apply to forms of this species. It is found in Texas, Eastern Mexico and Honduras. Mus. Academy, Phila.; Smithsonian.

*Hyla* (*Hypsiboas*) *oxyrhina* Rhdt. et Liitk., Videnskab. Meddelelser, etc. Kjobenhavn, 1862, p. 189.

This species is identical with that described in these "Proceedings" 1862, p. 353, as *Hypsiboas raniceps*. The name of the distinguished Danish zoologist must be retained, as the memoir in which it appeared was issued some months prior to our own. The former has just come into our hands.

#### HYLODES Fitz.

*Hylodes planirostris* Cope, Pr. A. N. S. Philada., 1862, p. 153.

This species, hitherto known as a native of the Bahama Islands, has been sent to the Mus. Smithsonian (No. 6310) from Southern Florida by Dr. Cooper. It is the only species of the genus found in the United States, though Holbrook and Agassiz have described frogs under this name from our country. These belong to the genera *Acris*, *Hyla* and *Pseudacris*. Other reptiles common to the Bahamas and Florida are *Anolis principalia* and *Sphaerodactylus notatus*.

The following species of *Hylodes* form a little group which I have called *Craugastor*,—Proc. A. N. S., 1862, p. 153. They can be distinguished as follows:

*H. pulchrigulus*, 1. c, 1862, 357.

Tympanum one-fourth extent of orbit; the latter equal distance from its anterior border to end of muzzle. Carpus reaching anterior border of orbit. Muzzle truncate. Tongue emarginate. Loreal region concave. End of tibia reaching the end of the muzzle.

*H. griseus*.

*HyUgrma*, Hallow., Pr. A. N. S. Phila., 1860, p. 485.

Tympanum obliquely elliptic, one-third the extent of the orbit; diameter of the latter less than the length of the rather elongate and rounded muzzle. Carpus and end of tibia reaching the end of the muzzle. Loreal region concave; canthus rostralis strong. Tongue emarginate; external metatarsal tubercle not developed.

*EL hallowelli* Cope, 1. c, 1862, 153.

Tympanum horizontally elliptic, equal one-third extent of orbit; latter equal in diameter to length of muzzle, which is much rounded; loreal region nearly plane; canthus rosiralis weak. Carpus reaches end of muzzle, the tarsus only the orbit. Two well developed metatarsal tubercles. Tongue entire; mandibulum rounded.

Herr Schmidt has not given the minuter peculiarities of his *H. (Craug.) fitzingerii* so as to enable us to distinguish it from the above. It is most like the *pulchrigulus*.

#### PHYLLOBATRS Bibr.

*Phyllobates latinasus* Cope, sp. nov.

Head elongate; front plane transversely, gently arched longitudinally, a little wider than from orbit to end of muzzle. The latter is prominent, broad and concavely truncate; external nares lateral. Loreal regions plane. Internal

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nares widely separated. Tympanum round, equal one-fourth extent of orbit, whose diameter equals length of muzzle from orbit. A slight web between outer fingers, of which the second is shorter than the inner or first; one large (ferpa) tubercle, one on metacarpus of thumb. A dermal fold on the tarsus. Two metatarsal tubercles. The carpus reaches the end of the muzzle, and the heel the anterior border of the orbit. Length of head and body 3".

Above brown; a black band across end of muzzle and loreal region, through eye to groin; pale-bordered above on the muzzle, and interrupted by an oblique white line from the femur. Femur dark posteriorly, tibia cross-banded; (color of limbs not well preserved.) Beneath pale, immaculate.

*Habitat.*—Truando region, New Granada. Obtained by Arthur Schott, Esq., of the U. S. Expedition under Lieut. Michler.

#### HYLAPLESIA Boie.

##### *Hylaplesia truncata.*

*Phyllobates truncatus* Cope, Pr. A. N. S. Philada., 1860, p. 372.

A certain serrulation of the alveolar ridge of the maxillary bone, in this and the following species, greatly resembles dentition, and has caused their erroneous reference to *Phyllobates*, instead of *Hylaplesia*.

This animal is most like the *H. obscurus* e *Dum.*, *Bibr.* but has much shorter posterior extremities. In both the anterior extremities equal the head and body; in the former they are more than half the length of the posterior, in the latter, considerably less than half. In the *truncatus* the first and second fingers are equal; their expansions are one-fourth the size of the tympanum. The neural spines are very much dilated and thickened, especially that of the axis. There is a transverse bony ridge on the occiput.

##### *Hylaplesia aurata.*

*Phyllobates auratus* Girard, U. S. Astronomical Expedition, ii. p. 209.

In this species the muzzle is rounded, and the first finger shorter than the second, as in the *H. tinctoria*. It has no occipital ridge, and the neural spines are only slightly thickened. Dilatations of posterior extremities one-fourth extent of tympanum; of anterior, one-half the same. The ground color is black or brown. Grown and muzzle surrounded by a golden band; two postscapular transverse annuli on each side, in contact on the median line; a yellow annulus on each inguinal region; smaller rings on humerus and tibia. On pale specimens these markings are represented by refulgent bands which are readily destroyed or passed over; hence the imperfections of Girard's description.

#### BUFONIDÆ.

*Rhaebo haematiticus* Cope, Pr. A. N. S., 1862, p. 357.

The genus *Rhaebo* is to be distinguished from *Bufo* by the presence of the manubrium sterni, in addition to the characters given, 1. c, p. 358. I have had opportunity of observing it in the present species and the *R. leschenaultii*. This character has been denied to all *Bufones* in Stannius' "Handbuch der Zootomie." I find it also in "*Bufo simus* *Schm.*" 1. c, p. 357, which can hardly be placed in *Rhaebo*. I cannot assign it to a new genus until the value of its peculiarities is better known.

The genus of *Bufonidæ* for which I have adopted, in the above quoted article, Fitzinger's name *Chilophryne*, is not alone characterized by the presence of a parietal branch or continuation of the supraorbital ridge, as there indicated; but rather by the straightness of the latter, its not describing the usual arc of the orbit, and its angle with the postorbital ridge, when the latter is present. The parietal ridge sometimes exists in a rudimentary or fully developed condition in *Phrynoidis*. *P. sternosignatus*\* *Gthr.*, illustrates the first case, and *P. d'orbigny* the last. As the latter species is the type of *Chilophryne* 1863.]

Fitz., this name must become a synonyme of *Phrynoïdis*, and the genus to which I first applied it be called *Incilius*. The species which truly belong to it are *I. ientiginosus*, *cognatus*, *woodhousei*, *americanus*, *nebulifer*, *veraguensis*, *coniferus*, *dialophus*, and probably *biporcatus*. The species *d'orbignyi*, *celebensis* and *occellata* formerly referred to it, must be placed in *Phrynoïdis Fitz.*

*fiufo diptychus Cope*, l. c, 353, is the species described by Dr. Girard, as *B. poeppigii Tsch.*, in *Herpetology of U. S. Exploring Expedition*. It is distinct from Tschudi's toad.

#### CERATOPHRYDID<sup>^</sup>!

This family has been recognised in an indefinite way by Dr. Tschudi,\* who gives as its distinguishing features "kopf sehr gross, eckig, schief nach vorn verliingert; Hautverlängerungen am obern Augenliede." He includes in it the genera *Ceratophrys*, *Phrynocerus*, *Megalophrys* and *Asterophrys*. The unnatural nature of this union has been demonstrated by Dr. Günther, who places *Asterophrys* and *Megalophrys* in separate families, and assigns *Ceratophrys* with *Phrynocerus* to the *Ranidae*. The *Ranidae* of Günther is, however, a heterogeneous group; and I would separate under Tschudi's name those genera of toad-like animals in which the manubrium sterni is wanting. These are *Ceratophrys*, *Phrynocerus* and *Pyxicephalus*; probably *Galyptocephalus* will enter the same series; but these I have not seen. Tschudi's inapplicable characters may be replaced by the following. *Form stout, bufonine; head broad, elevated. OS maxillare toothed. Extremities short; digits without terminal discs; the posterior more or less webbed. Ear perfectly developed. Diapophysis of sacral vertebra cylindrical. Manubrium sterni wanting. Paratoids present or absent.*<sup>^</sup> I am not now acquainted with other peculiarities, though they doubtless exist.

The System of *Opisthogloss Anura* proposed by Günther, like the system of *Ophidia* of the *Erpétologie Générale*, is a valuable index of the subject, but not an exposition of the scheme of nature. I have already]; ventured the opinion that a primary division into forms with, and forms without dilatations upon the extremities of the digits cannot be maintained: this character must be subordinated, as that of the presence or absence of teeth on the maxillary bones as employed by Duméril and Bibron, has been by Günther himself. He attaches greater value to the former because it "is connected with a strongly-marked distinction in the mode of life." This appeal to adaptations is not uncommon; but we now know enough of the system, to believe that the relations of its parts are to be determined by homological and embryological considerations combined, which coincide also with chronological and geographical. Have we not creatures of similar habits and adaptations in the most diverse groups? It is enough to mention to a herpetologist the arboreal *Viperidae* and *Crotalidae*; the corresponding types of *Pleodonta* and *Coelodonta*, of *Acrodonta* and *Pleurodonta*; the gill-bearing *Siredonand Siren*, and a host of other such; the parallelisms of the *Implacental* and *Placental Mammalia*, etc. Also the supposed *Neotropical Shrikes* and *Urthiidae* are *Glamatores*, and the supposed *Salmonidse* are *Gharacins*. In comparing many of these cases, we observe, too, how by approximation in time, analogy becomes affinity.

In pursuance of this view, the probability of a distinction between the *Hylodida* and *Cystignathidse* of Günther has appeared to the author to vanish in great measure. The discovery of the genus *Tarsopterus* of Reinhardt and Liitken, in connection with that of *Plectromantis*, by Wagner, has confirmed this opinion. The two genera are incontestably nearly allied, as urged by Reinhardt,|| though the

\* *Clasif. der Batrachier*, 26.

f Stannius' statement, "Zootomie der Amphibian," p. 17, that *Pyxicephalus* possesses thomanubrium, relates properly to the species now called *Tomopterna*, which were formerly included under that genus.

† *Proc. Acad. Philarta.*, 1862, p. 351.

j *Videnskab. Meddeleter KjobenhaTD*, 1862, p. 240.



latter only has paratoid glands. Their margined toes are but a step beyond those of certain Gystignathi; their digital dilatations are as distinct as those of many Hylodidæ. The family of Cystignatidæ, thus composed, would contain the types *Platyplectrum Gthr.*, *Limnodynastes Fitz.*, *Cystignathus Wagl.*, *Pleurodema Tsch.*, *Gomphobates R. and Z.*, *Ischnocnema R. and Z.*, *Liuperusi* and *2?*, *Tarsopterus R. & L.*, *Plectromantis Peter\**, *Grossodactylus Dum.*, *2fcV.*, *Phyllobates Bibron*, *Hylodes-KVz.*, (or the genera into which the last may be divided.) In this association the paratoids of *Plectromantis* have but little weight, as in *Pyxicephalus* in our *Ceratophrydidae*; and it is probable that it will again be found that their presence or absence is immaterial in the definition of certain families in the Anura, although others may be well characterized by them, as in *Gunther's* method. The genera *Pelodryas Gthr.*, and *Scytopsis Cope*, with *Urge* paratoids will probably be referred to the *Hylidae*, which has been defined as destitute of them.

*Pyxicephalus cultripes.*

*Odonophrynus cultripes* Rhdt. and Liitk., *Videnskab. Meddelelser, etc.*, Kjobenhavn, 1862, p. 159.

If we introduce the presumed genus *Odonophrynus* into *Duméril and Bibron's* table of genera of *Rana* forma, the only character which seems to separate it from *Pyxicephalus* is the concealed tympanum of the former, as distinguished from its visibility in the latter. This character is sometimes of very little value, the tympanic disc being more or less distinct in different individuals of the same species of many Anura, in proportion to the tenuity of the epidermis. This is especially seen in species of *Bufo*. The text relating to *Pyxicephalus americanus*, however, settles all doubts, as it says, "Tympan imperceptible au travers de la peau." In their Latin diagnosis, *Reinhardt and Lütken* say "dentes\*\* non in palato;" but in the text, "To langagtige i midten ikke sammenstødende Tandgrupper ere stillede paa Ganen mellem de indre Nsesbor," etc. As the figure represents palatine teeth, they are doubtless present. The species cannot, therefore, be separated from *Pyxicephalus*. It is very nearly allied to, if not identical with, the frog called *Pyxicephalus? n. sp.*, in the recently-published Catalogue of the collection brought home by the United States Paraguay Expedition.\*

ALYTID-E.

SCAPHIOPCS.

The species of this genus are seven in number; they are found throughout the temperate regions of North America, and as far southward as the City of Mexico. They represent the single *Alytes obstetricans* of Europe, which differs in its want of manubrium sterni, its slightly-webbed toes, and its cuneiform bone forming but a tubercle; and the *Helioporus albipunctatus* of Australia, where there is a spur upon the thumb, and trihedral diapophysis of sacral vertebra. They may be at once separated by means of the following synopsis:

- I. A gland in the upper integument of tibia.
- Head short; tympanum concealed..... **multiplicatus.**
- II. No gland in upper integument of tibia.
- A. No pectoral glands.
- 0. Length of tibia three times frontal breadth.
- Muzzle depressed, prominent.
- Tympanum concealed..... **couchii.**
- Muzzle elevated, truncate in profile.
- Front plane;
- Loreal region convex, oblique..... **varius.**

\* Proc. A. N. S., Phil., 1862, 352.

Loreal region straight, nearly vertical.....*rectifrenis*.  
 Front swollen.....*bombifrons*.  
 Length of tibia four times frontal breadth.  
 Muzzle truncate in profile.....*hammondii*.  
 Aet. A gland on each side of thorax, near axilla.  
 Tympanum one-half the extent of the eye.....*holbrookii*.  
*S. multiplicatus* Cope, sp. nov.

Form broad, squat. Head very short; profile rapidly descending; maxillary outlines acuminate, oval; muzzle thick, rounded. Eyes very prominent. From these a strong fold passes posterior to the angle of the mouth and across the gular region; tympanum covered by a portion of the paratoid gland anterior to this. Paratoid proper very large, extending beyond scapula, bent upon the side; bounded inferiorly by a strong fold, which extends from the one above mentioned to the groin. Below this, on the side?, are two or more others. Skin of upper surfaces coarsely tuberculous, that of the crown thick, of the extremities nearly smooth. A large gland occupies most of length of tibia. Abdomen minutely, pubic region coarsely, rugose. Cuneiform process rather short, very prominent. Vomerine teeth in fasciculi opposite posterior margins of choanae; the latter smaller than ostia pharyngea. Tongue entire, with a narrow, free anterior border; on third free posteriorly.

*Dimensions of a ♀*.—From end of muzzle to vent 5" 1"; muzzle to behind tympanum 16" j length of anterior extremity 2" 6"; of posterior extremity 5" 4".

Color in spirits: above ashy-brown, below yellowish-ash.

*Habitat*.—Valley of Mexico. Sent by Mr. Jno. Potts to the Mus. Smithsonian, (No. 3694.)

This species is very bufonine in aspect, and might be regarded as representing a different genus from the type of *holbrookii* were it not for the existence of *conchii* and *bombifrons*.

*S. couchii* Baird, Proc. A. N. S., Phila., 1854, p. 62. Rept. U. S. and Mex. Bound. Surv., Reptiles, p. 28, pi. XXXV. figs. 1-6.

Form stout; head more elongate, acuminate oval; width of frontal region greater than from lip to nares, one-third the length of the tibia. Profile gradually descending; front plane, muzzle projecting, rounded. Anterior border of tympanum scarcely distinguishable. Eyes very prominent. Vomerine teeth opposite middle of choanae, which equal ostia pharyngea. Tongue slightly emarginate. Paratoid gland flat, descending on the side. Skin tuberculous, especially on the sides; sometimes a slight cryptiferous thickening of integument of tibia; none on the sides of the pectoral region. A posttympanic and an antepectoral fold. Abdomen slightly rugose; gular region smooth. Cuneiform process elongate. Toes fully palmate.

*Dimensions of a ♂*.—From end of muzzle to vent 5" 5"; from same to behind tympanum 2". Anterior extremity 3" 5"; posterior extremity 5" 6".

Color above yellowish, with irregular brown bands, which converge between and behind the orbits; others diverge on the flanks, beginning at the orbits; one from same point to lip, and one on canthus rostralis. There is a confluence of dorsal bands near the sacrum. A light band on outer face of tarsus and toe; hand yellowish.

*Habitat*.—Tamaulipas. Mus. Smithsonian, (3713.) Lieut. Couob.

*S. varius* Cope, sp. nov.

Outline of muzzle acuminate-oval; the end little depressed, nearly vertical in profile, distance from lip to nostril less than frontal breadth; the latter one-third tibia. Canthus rostralis obsolete, approximate; loreal region convex, very oblique in transverse section. Eyes prominent. Tympanum concealed or distinct, one-third extent of eye. Vomerine teeth opposite posterior border

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of choanse. Skin rather smooth, especially on the head. No posttympanic or antepectoral fold. No thoracic aggregation of cryptae; paratoids flat, small. Palmation of posterior digits extensive; cuneiform process prolonged longitudinally.

*Dimensions*.—Total length 5" 3"; from end of muzzle to behind tympanum 19"; of anterior extremity 3"; of posterior 5" 9".

Above yellowish olive, with numerous defined brown bands and spots, which have a general longitudinal direction, and cover more surface than the ground color. A spot across each eyelid, one beneath the eye, one on the end of the muzzle. Extremities marbled; beneath olivaceous yellow.

*Habitat*.—Cape St. Lucas, Lower California. Mus. Smithsonian, (No. 5893;) Philada. Academy. From John Xantus, E?q.

*S. rectificrenis* -Cope, sp. nov.

Outline of maxilla; acuminate-oval; muzzle prominent, truncate in profile, superior face decurved. Canthus rostralis strong; loreal region plane, nearly vertical. Frontal region plane, its width one-third the length of the tibia. Tympanum concealed. Vomerine fasciculi closely approximate, posterior to hinder margin of choanse. Skin of head and body sparsely tuberculous. A weak antepectoral fold. Paratoids rather lateral; no thoracic crypts.

*Dimensions*.—From muzzle to vent 2" 8"; from muzzle to brachium 14"; length of anterior extremity 15"; of posterior-3".

*Coloration*.—Above brown, or brownish-gray, the tubercles tipped with brown. A brown line extends from each eye to sacrum, converging posteriorly. Sides brown marbled posteriorly; a short brown band from tympanum. Below light yellow or brownish.

*Habitat*.—Tamaulipas, (Smithsonian, No. 3715.) Coahuila, (3714.)

*S. bombifrans* Cope, sp. nov.

Outline of maxillae acuminate-oral; muzzle truncate, elevated, thickened transversely; profile of vertex arched, of front concave; canthus rostralis replaced by a concavity. Tympanum concealed or scarcely visible; paratoid flat, small. No gland on tibia or pectus. Tongue entire. Vomerine teeth in oblique fasciculi or short series between choane; these equal ostia pharyngea. Skin nearly smooth, roughest on the sides. Cuneiform process produced. Palmation of toes deeply repand.

*Dimensions of a J\**.—From end of muzzle to vent 4" 2"; same to behind tympanum 1" 5"; length of anterior extremity 19"; of posterior 4" 6".

Color in spirits: pale ashen or brown, with numerous plumbeous vermiculations, which are aggregated into a blotch on the scapular region, which has a pale space below it. Limbs vermiculated; outer border of tarsus ajid foot light. A dark spot on canthus rostralis.

*Habitat*.—Fort Union, on Missouri River, lat. 48° N., from Mr. E. J. Denis, (Smithsonian, No. 3704.) On Platte River, 20 miles west of Fort Kearney, from W. S. Wood, of Lieut. Bryan's Expedition, (Smithsonian, No. 3520.) Llano Estacado Texas, Capt. Pope's Exped. Coll., (Smithsonian, No. 3703.)

This species has the most northern range of those found west of the Mississippi.

*S. hammondii* Baird, Report Surv. for Pac. R. R., v. x. Lieut. Abbot's Rep., pt. iv., p. 12, pi. XXVIII. f. 2.

Maxillary outline acuminate-oval; muzzle somewhat truncate, perpendicular in profile. Region of canthus rostralis concave; front plane or a little concave, with a weak ridge on each side, which is most distinct posteriorly; the width one-fourth length of tibia, and less than from nostril to lip. Eyes prominent; tympanum distinct, one-fourth the extent of the former. A fold behind angle of mouth. Paratoids flat, small; no gland on tibia or pectus. Tongue very large, entire. Choanrelarge; vomerine teeth in transverse series between them. Skin roughly tuberculous, especially on the sides; thick on the occiput; below nearly smooth. Cuneiform process produced.

1868.]

*Dimensions of (J.*—Length from end of muzzle to vent 4" 9''; from muzzle to behind tympanum V 8''; of anterior extremity 2" 9''; of posterior 6" 1''.

Color above stone brown in alcohol, with traces of two paler dorsal bands. Tubercles fulvous-tipped; extremities shaded with the same. Below whitish, immaculate.

*Habitat.*—California. Mus. Smithsonian, 3995. From Fort Reading, lat. 40° 20'.

*S. holbrookii* Baird, Rept. Surv. Pac. R. R. v. x. Lieut. Abbot's Rep., pt. iv., p. 12, pi. XXVIII. f. 1.

*Rana holbrookii* Harl., Med. and Phys. Res., 1835, p. 105.

*Scaphiopus solitarius* Holb., N. Am. Herp., 1836, vol. i., p. 85. pi. XII. Ibid (edit, alt.) 1842, iv. 109, pi. XXVII. Tschudi, Mém. Neuchatel, i., 1838, p. 83. Dum., Bibr., Erp. Gén., 1841, viii., 473. Le Conte, Pr. A. N. S. Phil., 1855, 429. Günth., Catal. Batr. Sal. Brit. Mus., 1858, p. 38.

Head large, maxillary outline rounded. Profile of front a rather steep descent from the swollen occiput, where the skin is thin, closely adherent and penetrated by osseous granules. Eyes prominent; tympanum distinct, half its extent vertically elliptic. Tongue large, elongate, emarginate. Choanae equal or larger than ostia pharyngea; vomerine teeth in two fasciculi between and opposite their posterior borders. Paratoids small, rounded, prominent; no gland on the tibia; one on each side of the thorax near the axilla. Skin of back minutely tuberculous; of sides more coarsely; below nearly smooth. Cuneiform process longer than in any other species of the genus, but not more prominent.

*Dimensions of (J.*—5'' &''' from end of muzzle to vent; from same to posterior border of tympanum 2" 2''; length of anterior extremity 3" 3''; of posterior 12" 5''.

Color above, in spirits, either earth-brown, fulvous-brown or ashy-brown, with a pale ashy band from each orbit; these converge on the interscapular region, then diverge, and converge again on the coccyx. These bands are rarely unbroken, and are sometimes exceedingly indistinct; they sometimes inclose a pale area. Sides sometimes marbled with pale ash, sometimes uniform. Sometimes a pale interorbital crossband, sometimes two longitudinal bands on muzzle. A vertical light line on end of muzzle.

*Habitat.*—From Massachusetts into Florida and Mississippi.

Specimens in Mus. Smithsonian from Cambridge, Mass., are nearly unicolor, while Floridan forms are lightest and most variegated; the head seems to be a little broader and more obtuse. These forms graduate into the intermediate and most common type.

#### AMBLYSTOMIDÆ.

*Spelerpes chiropterus* Cope, sp. nov.

Head elongate oval; muzzle prominent, truncate, as broad as length of antebrachium. Series of palatine teeth arched, commencing behind the choanae. Anterior limb extended forward, reaches orbit. A prominent wing-like rudiment only of the inner digit on both pairs of extremities. Thirteen lateral folds between axilla and groin; the extended posterior limb reaches the sixth, counting from the groin. Soles broad, smooth. Tail cylindrical, rapidly tapering, one-fifth longer than head and body.

Length from muzzle to vent 3" 1''; from muzzle to axilla 12''; length of tail 4''.

Color, brown above, paler medially; dirty white below.

*Habitat.*—Mirador, near Vera Cruz, Mexico. Sent by Dr. Sartorius to the Smithsonian Institution.

This is the third species of Salamander known to inhabit Mexico. In its characters it approaches the genus *Batrachoseps* Bonap. One of Dr. Sartorius' most interesting discoveries.

[Mar.

Enumeration of the Species of PLANTS collected by Dr. C. C. Parry, and Messrs. Elihu Hall and J. P. Harbour, during the Summer and Autumn of 1862, on and near the Rocky Mountains, in Colorado Territory, lat. 39°—41°.

BY ASA GRAY.

An interesting account by Dr. Parry of his first explorations of the Rocky Mountains in Colorado Territory, made in the summer of 1861, was published in the American Journal of Science and Arts, vol. 33, 1862. This was followed by an enumeration of the plants in the choice botanical collection which he made, as determined by myself, Dr. Eugelmann and others. The importance of this pioneer exploration, both in a physico-geographical and a botanical point of view, decided Dr. Parry to repeat and extend it the following year, to undertake more full and exact observations upon the configuration of the district, and the altitude of the loftier peaks, and to secure a larger botanical collection. In the latter view, Dr. Parry was joined by two zealous and enterprising botanical companions, Messrs. Hall and Harbour, of Illinois, who devoted their entire energies to the collection of plants. The botanical collection, accordingly, through these conjoint labors and explorations, is full, excellent, and of great interest. Along with a fair proportion of species new to science or new to the region, it brings to light and makes accessible to botanists generally, many of the late Mr. Nuttall's discoveries made almost thirty years ago, and even some of those of his first journey up the Missouri, almost half a century ago, authentic specimens of which hardly exist, except in the herbarium of the Academy, in that of Mr. Durand, at Philadelphia, and in the Hookerian herbarium at Kew.

It is in this regard, namely, on account of the intimate association of the name and scientific career of Nuttall with Philadelphia, and especially with the Academy of Natural Sciences,—the publisher of many of his botanical writings, and the proprietor of his principal botanical collections,—that I have deemed it peculiarly proper to offer the following enumeration for publication in the Academy's Proceedings.

This enumeration is but a *reconnaissance* of the collection in hand. It might have been much extended by descriptions, remarks, and references; and some of the determinations may probably have to be reconsidered. But I deem it best for our science to publish it at once, as it is, that it may be early in the hands of botanists along with the distributed sets of specimens, thus enhancing the usefulness of the collection, and affording the widest opportunity for the prompt correction of oversights, omissions, or mistakes on my part, of which there may be not a few.

It should be remarked that the general collection, although made by the three associates conjointly, is distributed under the tickets of Messrs. Hall and Harbour,—upon whom indeed the labor of the collection more immediately devolved,—and is numbered quite independently of Dr. Parry's collection of 1861, thus avoiding all danger of confusion between the two. But a small separate collection made by Dr. Parry late in the summer, at stations visited by himself alone, which supplements or helps out the general collection, bears Dr. Parry's numbers of the former year, (which, being already published, are here mentioned only when there is some occasion for it,) or, when of plants not in that collection, the numbers are in continuation of it,—viz.: 398, 399, and so on. Reference to these additional numbers is chiefly made in foot-notes, to which also the characters of new species, &c, are consigned.

The plants were numbered and distributed into sets by Messrs. Hall and Harbour before they were seen by me, and a full set was supplied to me for examination, which serves as a basis for the following list. This accounts for a few misplacements, and also for the occasional mixture of two species 1863.]

under the same number ; which, under the circumstances, it was not easy altogether to avoid. The collectors appear to have been somewhat too fearful of distributing the same species under two or more numbers; but the opposite course, in case of doubt, is preferable. Even well-marked varieties had better be kept separate in distributed collections.

## ENUMERATION.

### RANUNCULACEJE.

1. ATBAOENE ALPINA, L. 2. CLEMATIS DOUGLASII, Hook. 3. C. LIGUSTICIFOLIA, Nutt. 4. PULSATILLA NUTTALLIANA, Gray, which I am now convinced is properly referred to *P. patens*, and especially by Regel to his var. *Wolfgangiana*. Some of the specimens are *Very* large and fine. 6. ANEMONE MULTIFIDA, DC, both red and white-flowered. 6. A. CABOLINIANA, Walt.; on the plains. 7. A. KABCISSIFLORA, L., from the alpine region; not before known this side of Russian America; fine specimens, with the flowers only three, two, or one to the involucre. 8. THALICTRUM FENDLERI, Engelm.; the diagnosis noted in the Enum. PL. Parry, p. 12, and now the species itself is obtained, "on low mountains." 9. T. SPABSIFLORUM, Turcz.,\* in fruit,<sup>4</sup> the whole plant with a very heavy narcotic odor," according to Dr. Parry. 10. T. ALPINCUM, L., large specimens. 11. RANUNCULUS CYMBALARIA, Pursh. 12. R. HYPERBOBEUS, Rottb. var. *natans*, C. A. Mey. "In water or in swamps, at middle elevations in the mountains, or subalpine;" from the station and from the size of the plants so much approaching the small and emersed form of *R. Purshii* var. *repens*, Hook., (*R. Gmelinii* DC, of which a few specimens were also collected,) that it might belong to that species except for the want of a style; mature fruit not collected. 13. R. (CYBTOBBHYNCHA) NUTTALLII, the very rare *Cyrtorrhyncha ranunculina*. Nutt. in Torr. and Gray Fl.; which is rightly determined by Bentham and Hooker to have the ovule erect, and therefore to be a *Ranunculus*, notwithstanding the nervose achenia. 14. R. EBCHSCHOLTZII, Schlecht., Hook.; same as the broader-leaved specimens of Parry's No. 80; has glabrous peduncles, smaller flowers, and shorter styles than *R. nivalis*, but Greenland specimens of Vahl's collection approach it. 15. R. AFFINIS, R. Br. var. *leiocarpus*, Trautv.: the same as narrow-leaved specimens mixed last year with Dr. Parry's No. 80 (vide Sill. Jour., 33, p. 404); may be a form of *R. auricomus* that ever has glabrous achenia, but they compose a rather oblong or cylindrical head. 16. R. AFFINIS, var. *cardiophyllus*. (*R. cardiophyllus*, Hook.) The flowering specimens, with their cordate-rotund radical leaves, villous pubescence and large flowers (the corolla a full inch in diameter) perfectly accord with Hooker's figure, except that the stature is dwarf, and the young carpels show a rather long style, as figured; but accompanying fruiting specimens wholly accord with *R. affinis*. 17. R. ADONECS, n. sp., No. 81, of last year's collection of Dr. Parry, who has now supplied the fruit; and the species proves to be a new and peculiar, handsome and strictly alpine one. § IS. R. FLAMMULA, L.,

\* Dr. Rebel's note under this species, in his elaborate revision of *Thalictrum*, is founded on a misreading of my foot-note in PL. Wright, 2, p. 8, where to *T. spaffflorum* is referred *T. cforturn*, Hook., non DC. The Candolleian species is wholly different, and \* native only of the mountains of Carolina.

t RAJIOHCCCLUS (CYRTORRHYNCHA: petala supra baam callosa: stylus ineuryus, Bitgmaapirfnlatuni: achema turgidamultiirvosa) NUTTALLII: glaber, semipediifl; rtidicefnsciculata; foliisradicalibus hiternatucctis, segmentu 3-5-partitis, lobis ohlongis linearibus fivencunc2-3-tidis; rainis^folioporTOSubteiwispaiH'iinima; petalia Mpathulatis sepala iutiora etiam flava paullo Nupemntibus; stylo lon fro gracili; acheniifl mjusenli\* aibpnuCH in capitulum globosum coltctiH. Kanten eldi> of the Kocky Moutaiua; Independence flock on the iSweet Water of the Platted uttall.

± Mixed in sonic sets, I fear, with a little of *It. EwhnlzU* or of the real *H. nivtlu*.

JKAJIUNCULVS ADOSEUS (top. nor.,: huiiuliis villoparcodeciduoglabratustjraiiiice Asciculato-fibrosa; caulibus basi ramentaceis Rup>me 1-0-foliatia mine erectis simplicidnlms uuifloris nuns annflntoMHlecutnbentibafi 2-3-floris; foliis bipedatopnrtitia segmentis anguste linoaribus, petiolb basi scarioso-dilatatis; pedunculo bi-evi; corolla aurea eximia (plerumque ultra polhem diametro); petalb flabellifoimibuB scpalis oyalibus subvilloaia duplo luugioribus, gquamula b\*

var. *reptans*. 19. B. An ambiguous little plant from the alpine region, which might be mistaken for a smaller form of Parry's 79.\* 20. MYOSURUS MINIMUS, L., from South Park, with somewhat more of a beak to the achenia than in Eastern or European specimens. 21. CALTHA LEPTOSEPALA, DC. 22. TROLLIUS LAXUS, Salisb. var. *albiflorus*, Gray, in Sill. Jour. 33; well-developed specimens. Divisions of the leaves less deeply incised than in the Eastern U. S. plant. 23. AQUILEOIA VUL& VRIS, var. *brevistylis*. 24. A. CCSRULEA, Torr., equally beautiful with the specimens of last year. 25. DELPHINIUM ELATUM, L., var., Parry's No. 84. 26. D. SCOPULORUM, Gray. 27. A high alpine form of the last. 28. D. MENZIESII, DC.; but if collected east of the Mississippi might be taken for *D. tricornis*. 29. ACONITUM KASUTUM, Fisch.; white and blue, as in Parry's 86.

## BERBERIDACEA

30. BERBERIS (1&AHOXIA) AQUIFOLIUM, Pursh, var. *Tepens*.

## FUMARIACEAE

31. CORYDALIS AUREA, Willd., var. *curvisiliqua* (C. *curvisiliqua*, Engelm.), the same as Wright's No. 1309.

## CRUCIFERAE

32. NASTURTIUM OBTUSUM, Nutt. 33. CARDAMINE HIRSUTA, L. 34. C. CORDIFOLIA, Gray. 35. STREPTASTHUS ANGUSTIFOLIUS, Nutt.; probably a form of *S. SAGITTATUS*, Nutt. 36. TURRITIS PATULA, Graham. 37. SISYMBRIUM VIROATUM, Nutt., but from the silique rather an *Erysimum*. 38. ERSIMUM CHEIRASTHOIDES, L. 39. E. PUMILUM, Nutt., (which I suppose is also *E. lanceolatum*, R. Br., of the Old World,) as to the fruiting alpine specimens, along with forms of *E. ASPERUM*, DC, with large flowers (*E. Arkansanum*). The collectors think these are all forms of one species. 40. SYSYMBRIUM SOPHIA, L. (including *S. canescens*, Nutt.), both as a prostrate form, with short pedicels and short pods, (*S. brachycarpum*, Richards.), and also with slender pods, and the whole herbage viscid with glandular pubescence,—one of the forms of *S. incisum*, Engelm. 41. DHABA CKASSIFOLIA, Graham; which, in Parry's former collection, No. 93, I named *Draba Johannis*, but it proves to have yellow flowers. With it is mixed a very little *D. stellata*, var. *hebecarpa*, as the species are

silari parva adnata; acheniis; in capitulum ovale digestis levibus turgidis, rostro longuaculo en-  
Biformi jKrinque acarioso-alato! In the high alpine region, close to the snow. Br. Parry's speci-  
meus of 22, collected later in the season,—with some mature fruit, and with some of the stems  
becoming procumbent or runner-like, and producing a flowering shoot from the axils of the cau-  
liine leaves,—enable me to characterize this remarkable species. In the early state it bears some  
resemblance to *Adonis vernalis*. The spurious wings of the style are sometime\* incurved on the  
acheniis, which, again, often has a delicate hyaline wing round the base. Notwithstanding the  
yellow flower s, the affinity of the species is probably with *Jt. glacialis*, the carpel and style of  
which is ramose wing-margined. The corolla is equally large and full.

\*This form is collected this year, confirms Mr. Illack's opinion that it is a dwarf  
*R. alisnifolius*; but the uppermost leaf is often three parted, and the achenia have a small  
short beak, and are puberulent; the three-parted leaf, the puberulent achenia and too large flower  
characterize it from *Jt. F. Uimmilla* var. *reptans*; and the mostly entire and narrow leaves, the globular  
head of carpels and the depauperate size (2 or 3 inches) from *Jt. afibiti*, of which it has the  
achenia. I have here only a single specimen.

† PAPAVER ALPINUM, L., was again collected by Dr. Parry, No. 147.

‡ This species—which holds its characters well—when described, was compared with our *C. rhom-  
boidea* and *rotundifolia* on the one hand, and on the other, with the European *C. asarifolia*, which,  
so far as recorded, inhabits only central Europe. But I have just received from Kew a specimen  
collected by Dr. Lyall on the banks of the Ashtnoffa Kijer, in the Cascade Mountains of N. Ameri-  
ca, at about lat. 49°, which, so far as my means of comparison extend, appears to belong to  
*C. asarifolia*. The interesting bearing upon questions of geographical distribution is obvious,—  
viz. : as to the probable affiliation of *C. asarifolia*, *angulata*, *cordifolia*, *rhomboides* and *rotundi-  
folia*.

§ Specimens of this were sent by me to Dr. Hooker, to ask his opinion. He replies: "It is *Draba  
Johannis* of Europe, according to Mr. Ball, except that the flower is yellow. It is certainly also  
*Jt. crasifolia*, Graham, from Ko-ky Mountains, Drummond, and evidently the same as *D. Flad-  
nitensis* Walp., and *D. Littca*. Adams, *D-pygmeta*, Turcz., and a host of others."

regarded by Regel, i. e., *J>- mtincella*, Vahl., with pubescent silicles, and a smooth form of *Z>. nemoralis*. 42. D. XEHOBALIS, L., two pubescent forms. 44. D. AUKEA, Vahl. 45. D. STKEPTOCARPA, Gray, Euum. Pl. Parry, p. 13, 2<(o. yC, witheome reduced, high alpine forms, in which the silicle does not always twist. 43. SMELOWBKIA CALYCIXA, C. A. Meyer, (*Hutchimia*, Dtsiv.) High alpine. 46. TULASPI COCULEAIUFORME, DC. Common at all heights. 47- PHYSAHIA DIDT-HOCAKPA, Gray, var. *i* The same as Parry's 101, but more hoary, and with a longer slender style. Mature fruit and seeds being still wanting, it yet remains as doubtful as before whether this is a form of Hooker's species. 48. VESICAKIA LODOVICIANA, DC. 49. VESICARIA MOSTANA, n, sp., \* from the middle mountains; also collected last year at Eureka by Mr. Howard, but without fruit. 60. STAXLEYA IKTEGBIFOLIA, James. 51. THELYFODIUM (PACUYPODICM, Nntt.) ISTEGEFOLIUM, TOIT. and-Gray.

## CAPPARIDACEAE.

52. CIEOMB mTEGEIPOLIA, Torr, k Gray. 53. CLEOMELLA TESPIFOLIA, Torr.

## YIOLACEAE.

54. VIOLA urFXOiu, L. 55. V. NUTTALLII, Purah. 56. V. MFHLENBERGII, Tar. *puhescens*, same as 108 of Parry. 57. IOXIDIUM UNBARE, Torr.

## PARNASSIEJE.

575. PAHWASSIA PARVIFLORA, DC, Hook. Two forms of the species, into which *P. Kotzebupii*, Cham., probably passes. It is No. 427 of Dr. Parry. 578. *P. FIMBBIATA*, Banks; a small form of the species; the flowers only half the size of those of the ordinary state. It is No. 428 of Parry's separate collection.

## HYPERICACEJE.

58. HYFEBICUM SCOCLEBI, Hook., which apparently is also *H. formosum*, HBK.

## ELATINACEÆ.

59. ELATIKB AMERICASA, Arn. On the Flatte Iliver. (60, See Piimulaoea.)

## CARYOPIYLLACE-S!

61. SILEIE ScorLBBi, Hook: 62. S. DBOXWRTTW^ Hook. 63. Ltcnria APETALA, L. vars., same as 132 and 133 of Parry. 64. SILESB MESZIKSII, Hook. 65. AILENE ACAILIS, L.

66. PABOWTCHIA PDLVWATAJ n. ?p, f the same as Parry's 297, of which he also has collected very fine specimens this year. 67. *P. JASIESK*, Torr. and Gray. 68. SAGIKA LISK/EI, Presl. 69. ARESTAEIA (ALSISE) ROSSII, B. Be, the taller stems 3-5-flowered, pretty clearly a mere arctic-alpine form of 1.

\**VistCAMA MONTANA* (sp. nov.): ttraonrio.iti.-aDa; cnulibiis e rmiico perenni *AiOaia follosis*; foliis upathulatin, mdiraHbua HnboTatiB petiol\*fa mine 1-2-dentntla; racenw irni'liTuro cloogato; dlteolt ov&li HD ellipstuirJea cnno-puboiKentit ntylo gracili longiore pudkello pitontc nursiim our-TStopuullo brevior. Hubituf *V. Ludovieiowt.QTyura*, ftjiJ *argmUo.*; w<ll-nuikad by the OVRJ or oblong atlide (irliieh i8,in'omeppecini(Hj.». Z linen in length, bin »T scarcolj li;0t tlmt breadth, wbOa in othfln It U stioirtor *nv<* broader, bartt.v <ival in outline,) honry. with n, fina \*t«11uUr >ubMceDrjo, one-tlHrd lonRei- ;lioti thu style, comuvuly ocie-tlim! or ont-lmlf lon^or than the pedicel, nearly U>ret<; the vakee iif thie wmo rottiai linn u'xuiiri' us thoiv of *V.Ludoneidna*, more convex ihdD thwie of *V. alpitta*, t^wls four or su in uich cirll, wingl\*.\*. Petal.\* Bpatulaie, light ytOlow. 1.1 mil'tite filiform.

fpAitoifToiirA i-ri.viNATA fsp, noT.); depri!«>n.«. onurUce li'Knescente pulvjnato-ciuffipitosa, fere (1a-brft; stlpilU crftoatea i.TiUis integrip muticis folm oMung\* ohtWi iiar;juu> rli'<<ii<li><trabrasitb-luqnan til HIS titm V/n nuooM brerei usqim n'l Borem ter Jiiiiitli'iii wasUem Avn\*,\* Tmtientibua; uulycip f^gmciitifi orallbos Ute scariosis sub apic.BUOOHJUO arbtitlad\*, aiiitula ewculim vlx auperooto. In the hiizh ilpitw Mrrria, q«iti" cmiinin. Fornfnc AvBte, wwfaiou-lilH turt>, apjai-cutly like tbork otStlmt ti:aulis,inter than those if P, truitifera, N'uL. Stipu!«B 2 IBM fonft iiTinully owve and obuse, or the iijipi-niKwi soineewliit t>pcr-pointed or ncute, hut nmtieoits. LoaTM ty r> 3 lines long, about a linn »(\*) , bright gmn, flnt, thick, vert uktan anii ntuloout. nervi'ips-. Flowt'i- snlimry nud linnorist-rl among the tcMws. Ptunii\*uliufi, situilar to tu< fortlle filatneats. Ovary g Ubrous, taper Jg ii o the mtb^r thvrt stjrlt.

[Mar.



*uliginosa*, Schleich, (*Alsine stricta*, Wahl.) 77. A. ARCTICA, Steud., the same form as Parry's 141; and with it specimens of *A. biflora*, Walil., var. *camilosa*, Fenzl., with flaccid procumbent stems, and longer, las, falcate leaves. If forms of the same, then *A. arctica* and *biflora* are properly united by Dr. Hooker. 79. A. FENDLERT, Gray.

70. STELLARIA UMBELLATA, Turcz. ? An ambiguous form, of the alpine region, with the capsules, seeds, and scarious bracts of *S. longifolia*, but with oblong, flaccid leaves, and petals wanting.\* 73. From middle elevations, is a form of the same, without fruit. *S. alpestris*, var. *paniculata*, Fries, Herb. Norm., is perhaps the same, or a form connecting it with *S. longifolia*, but his *S. alpestris* var. *cdiflora* is *S. borealis*. 71 and 76. S. LOXGIPES, Goldie. 72. S. BOREALIS, Bigel., except the depauperate young specimens intermixed which are the same as 70. 78. S. JAMESII, Torr. 74. MOJHRINGIA LATERIFLORA, Fenzl. 75. CERASTIUM ARVENSE, L., mixed with *G. vulgatum* t var. *Behringianum* f or *alpinum*, just as was Parry's No. 138 last year. (80. See under Scrophulariaceae.)

## PORTULACACEJE.

81. TALINUM PARVIFLORUM, Nutt., or perhaps *teretifolium*, as the specimens are only in fruit. 82. CLAYTONIA VIRGINICA, L., from the alpine region. 83. C. ARCTICA? var. *megarrhiza*, Gray, Enum. PL Parry (*C. megarrhiza*, Parry); specimens smaller than last year. 84. CLAYTONIA CHAMISSONIS, Each. (*C. aquatica*, Nutt.); more luxuriant than the plant of (Jnalaschka, but otherwise similar: petals rose-color. (Dr. Parry again collected TALINUM PTGM^UV, Gray, his No. 143.)

## MALVACEAE.

85. SIDALCEA CANDIDA, Gray. Gold springs, &c, on Blue River. f 86. MALVASTRUM COCCICEUM, Gray.

## LINACEAE.

87^ LINUM PESENNE, L.

## GERANIACEJE.

88. GERANIUM RICHARDSONII, F. & M., the same as 112 of Parry. 89. G. FREMONTII, Torr., var. *Parryi*, Engelm., the same as Parry's 113, the fruiting pedicels divaricate I

## RHAMNAGEJE.

90. GEANOTHUS FENDLEBI, Gray. 91. C. OVATUS, Desf.

## CELASTRACE.E.

92. PACHYSTIMA MYRSIKITES, Raf.

## SAPINDAGEJE (ACERACE^S.)

93. ACER GLABRUM, Torr., the ordinary form of the species.

## LEGUMINOSJE.

94. LUPINUS PUSILLUS, Parsh. 95. L. ORXATUS, Dougl.: "abundant at low and middle elevations." Very ornamental. 96. L. C-ESPITOSDS, Nutt., probably a form of *L. aridas*, Dougl. The keel is slightly ciliate. It was found "on Blue River, west of the range." 97. TRIFOLIUM DASYPHYLLUM, Torr. and Gr. Still finer and larger specimens than last year. 98. T. PARRYI, Gray, Enum. PL Parry. J 99. T. NANUM, Torr. 100. DALEA LAXIPLOEA, Pursh.

\* Dr. Parry also separately collected it, in fine fruiting specimens, in subalpine woods, on Mad Creek, Ac, No. 431.

t This rare species was separately collected in Middle Park, by Dr. Parry. It is his No. 429. SIDALCEA MILVAFLORA, Gray, (& *Keo-Mixicaru* Ly Gray,) Parry's 430, was collected with the last JTRIPOLIUM L05QP6S, tftt. £?iirhlfly collected by Dr. Parry in Middle Park, and distributed as his No. 444.

101. PSORALEA LANCEOLATA, Pursh. 102. P. FLORIBUNDA, Nutt. 103. P. AR60-PHTLLA, Pursh. 104. DALEA ALOPECUROIDES, Willd. 105. PETALOSTEMON MACROSTACHYUS, Torr. 106. ASTRAGALUS KENTROPHYTA (*Kentroph/ta montana*, Nutt.) 107. THERMOFSIS RHOMBIFOLIA, Nutt. (the smaller plant and the fruit), and apparently T. FABACEA, var. *montana*, Gray (T. *montana*, Nutt.): the latter should be known by its taller stems, larger leaflets, and narrow, linear, pubescent, erect legumes. 108. HOSACKIA PWSHIANA, Benth. 100. LATHYRUSOKNATUS, Nutt., and a pubescent variety. 110. L. LHJEARIS, Nutt. 111. L. POLYMORPHUS, Nutt. U2. L. PALUSTRIS, var. *myrtifolius?* a small portion, and mainly VICIA AMERICANA, Muhl. 113. ASIRAGALUS RACEMOSUS, Pursh. 114. A. (PHACA, Hook.) BISULCATUS, Gray; in fruit. 130. Same in flower. 115. A. (PHACA, Hook.) KIGRESCEXS, Gray. 116. A. (PHACA, Hook.) GLABRIUSCULUS, var. *major*, foliolis anguste oblongis. Very likely, as Hooker conjectured, a form of A. *ahoriginum*. A narrow, membranous, rudimentary false septum is borne on the dorsal suture, in the manner of A. *Robbinsii* and A. *alpinus*, to which, indeed, the species is related. It was collected in the mountains, "at middle elevation; not common." 117. A. OROBOIDES, Hornem. (*Phaca elegans*, Hook.) "Along the bank of streams, at middle elevations, and subalpine." Very fine specimens, both in flower and in fruit; the former with linear leaflets, like the original P. *elegans*; the latter with broader anrt glabrate leaflets, just like Bourgeau's specimens from the Saskatchewan. 118. A. PLEXUOSUS, Dougl. (*Phaca flexuosa*&nd P. *elongata*, Hook.) Legumes straight or slightly curved. "Low mountains and plains; common." 119. A. GRACILIS, Nutt. With the last. 121. A. near *Phaca debilis*, Nutt., but larger in all its parts. To be determined hereafter in a general revision of the species.\* 122. A. MOLLISSIMUS, Torr., of which the stipules were wrongly described, a form with silvery instead of yellowish pubescence. Fine specimens, same as Parry's 184, doubtfully compared with A. *fflareosus*, still without fruit. "On the plains; scarce." 123. A. PARRYI, Gray; now collected with ripe legumes, which are so obcompressed and sulcate both sides that the sutures mjeet. "Common both on the low mountains and subalpine." 124. A. DRUMMONDII, Hook. 125. A. ALPINUS, L. "From middle elevations to truly alpine." 126. A. CYANEUS, Gray, Pl. Fendl. Specimens more luxuriant than Fendler's; the leaflets oval, half to two-thirds of an inch long, and young pods nearly two inches long. This is likely to be A. *JShortianus*, Nutt., of which I have seen no specimens; but the flowers are deep blue. "Low mountains, and rarely subalpine; a fine species." 127. A. MISSOURIENSIS, Nutt. 128. A. SPARSIFLORUS, n. sp., to be elsewhere characterized in a revision of the North American species. "On low mountains; rare." 129. Perhaps a variety of the last, with more numerous flowers and larger legumes. 141. A. (PHACA) PAUCIFLORCS, Hook. ? A glabrate, slender form, the same as *Phaca pauciflora*, Nutt. "South Park, common, apparently a good forage plant." (Fendler's, No. 144 is the same.) 130. A. (PHACA) BISULCATUS, Gray, in flower. 131. A. (PHACA) LOTIFLORUS, Hook., very fine specimens in flower and fruit. 132. (fruit) & 133. (fl.) A. CARYOCARPUS, Ker. 134. A. (PHACA, Hook.,) PECTINATUS, Gray. 136. A. STRIATUS, Nutt. I 137. A. (PHACA, L.) FRIGIDUS, with perfectly glabrous legumes, as in other American specimens. "Subalpine, in wet pine-woods." 138. A. (PHACA) FILIFOLIUS, Gray, in Pacif. R. It. Exped. *Phaca longifolia*, Nutt. 139. A. HYPOGLOTTIS, L. 145. A. (OROPHACA) SERICOLEUCUS, Gray (*Phaca sericea*, Nutt.); charming specimens of an interesting plant. 142. HOMALOBUS DECUMBENS, Nutt. Also 435 of Parry, very sparingly collected. Its name as an *Astragalus* can be settled only upon a revision of the species. 120. (and 433 of Parry,) OXYTROPIS DEFLEXA, DC. 135. O. SPLENDENS, Dougl.; worthy of the name. 140. O. LAMBERTI, Pursh, with purple or blue, and with white

\* The name *Astragalus debih's* could properly be retain\*! for *Phaca debilis* of Nuttall. For there is no A. *debili\** of Douglas; that to given in Wulp. Kej.trt. 1, p. 710, being an accidental error for A. *miter*, Dougl.

flowers; "very ornamental and very variable." 143. *O. AHCTICA*, R. Br. "High alpine." 144. *O. MCLTICEPS*, Nutt. in Torr. and Gray, Fl. (*Ph>/SQ~calyx midiiceps* Sf Nutt. in herb. Acad.) "Subalpine and lower\*" This is Dr. Parry's No. 191, which I wrongly referred to *O. nana*, Nutt. The plant is more dwarf and the leaflets much, smaller than in Nuttall's specimens, which are in fruit only, while ours, last year in blossom only, now show the young fruit in the bladderly calyx. It is a very pretty plant. 146. *SARUOEA SERICEA*, Pursh. 147. *GLYCTIIBJUZA LEPIDOTA*, Nutt.

## ROSACEAE.

148. *PKUNCUS (CERASUS) PflHirarLTAKKA.*, L. 149. *SPIBJEA DUMOSA*, Nutt. 150. *S. OFDLIFOLIA*, L., var. *parvifolia*, 151. *SIBBALDIA PBOCUHBEXS*, L. 152. *GIBCIM (SIKVEHSIA) TKiFLOKpSt*, Pursh. 156. *G. (SIEVEESIA) ROSSII*, Ser. 153. *DBYAS OCTOPETALA*, L. 154. *PoTBXTILLA FISSA*, Nutt. 155. *P. FBUTICOSA*, L. 157. *P. COXCIUTA*, R. Br. 158. *P. PEXSSYLVASICA*, L., var. *Hijtpiana*, Torr. and Gray. 159. *P. FASTKJATA*, Nutt. of which specimens of Parry's, in 1861, (with 217) ally to large states of *P. nivea*. (A glabrate specimen intermixed, is the same as Parry's 218, *P. Drummondii*, &c, Lehm.) *ICO. P. NIVEA*, L., a form with the leaflets more deeply incised than in 215 of Parry. 161. *P. PLATTENSIS*, Nutt. ? the leaves more dissected, so as to be almost bipinnately parted; the same as a plant of Bourgeau's collection, from the Saskatchewan. "Common in wet ground; spreading." 162. *P. PESSTSTLVAXICA*, L., var. *strigosa*, Pursh, with some of the coarser No. 158, perhaps accidentally mixed. 163. *RCBDS DELICIOSCS*, James; the same as Parry's 210, with large white petals. This will be very ornamental in cultivation. 164. *IlaBUS TBIFLOEDS*, Richards., in fruit. 165. *CEBCOCAEPUS PABVIFOLIUS*, Nutt.\* 166. *CnAMJEIuxoDos ERECTA*, Bange.

## ONAGRACEAE.

166. *EPIMBITTM pALrsTRB*, L. 167. *E. ALrrxuir*, L. 168. *E. PAHCDtATrw*, Nutt. 169. *E. LATiFOLtpu*, L. 170. *E. AXGUSTIFOMITII*, L. 171. *GATOPHTTIJI IUCSMOSUH*, Torr. and Gray, with a specimen of *IGS* intermixed in my set. 172. *G. KAMOSISSMUSI*, Torr. and Gray; the var. *deJlexum*, Hook., in "Lond. Jour. Bot., 6, p. 224, where the names of the two varieties are transposed. 173. *(EXOTUEBA) WAEGIHATA*, Nutt. 174. *(E. MISSOUHIENSIS)*, SiniB. 175. *CE. TBIWBA*, Nutt. 176. *CE. NCTTALLII*, Torr. and Gray, (*Taraxia longiflora* and *breviflora*, Nutt. ? the specimens belonging to the latter form), South Park. 177. *CE. riNXATiFiDA*, Nutt. (see Parry, *Eium.*, p. 40 (333), the hirsute specimen, which is just Parry's 116, and a canescently puberulent specimen, which, from its obcordate petals, should also be of this species, but not in fruit. 178. *CE. COBOKOPIFOLIA*, Torr. and Gray, exactly No. 222 of Fendler's collection. 179. *CE. SEUKIJATA*, Nutt. 180. (and 43 (i of Parry). *GAUBA PAEVIFLOKA*, Dougl. 181. *GADKA COCCIXEA*, Nutt. 182. *Hirpcms VULGABIS*, L.

## LOASACEAE.

569. *MEXTZELIA (BAKTOXIA) NUDA*, Torr. & Gray. 670. *M. (BARTOXIA) MULTIFLORA*, Nutt.; the form with cylindrical capsules. 571. *M. ALBKACLIS*, Dougl., (Parry's *VZG.*) and some *M. oLituwiKJiMA*, Nutt.

## CACTACEAE.

183. *OrrxriA MISSOTTKIESSIS*, DC, with a red flower also in my set, probably of *O. IU-TILA*, Nutt.

## GROSSULAIACEAE.

184. *R. LAcRSTEE*, Poir, var. (*iJ. setosum*, Dougl.) 185. *R. LEPTANTHUM*, Gray, PI. FendL 186. *R. CEBECIT*, Dougl. 187. *R. UIBTELUJI*, Michx. 188. *R. ALKEUM*, Pursh.

\* *PURSHIA TRIDENTATA*, DC., is No. 432 of Dr. Parry's separate collection, from Middle Park.

## CRASSULACEÆ.

189. *SEDUM JHODASIHUM*, Gray, Enum. PL Parry. In fruit; the inflorescence a dense spike-like thyrsus, oblong. 190. *S. STENOPETALUM*, Pursh. 191. *S. RHODIOLA*, L. (192. See *Borraginaceae*.)

## SAXIFRAGACEÆ.

193. *SAXIP^AGA NIVALIS*, var. ? An undeveloped specimen of this, in Parry's collection of 1851, was referred to *£. hieracifolia?* But the well-developed specimens appear to pass into the large state of the next. The limits between *S. nivalis*, *Virginensis* and *Integrifolia* are not obvious. 194. *S. MIVALIS*, L., one form the same as Parry's 169; the other has a scape nine inches high, bearing several peduncled erect flower-clusters in a racemose manner, just as in 193, from which it differs in its shorter and smaller, more-toothed leaves. 195. *S. CERHUA*, L. 196. *S. CONTROVERSA*, Sternb., referred by several authors to *S. ads c end ens*, L. Alpine region; before found in America only by Bourgean, in the Rocky Mountains further north; known in Northern Asia. 197. *S. BROKCHIALIS*, L. 198. *S. DEBILIS*, Engelm. n. sp.\* "Alpine." 199. *S. SERPILLIFOLIA*, Pursh; but probably only a high alpine, very dwarf and tufted variety of *S. Hirculus*, L., this being the view taken of it in the Enumeration of Parry's collection of 1861, No. 164. The characters hold out in the present collection. 201. *B. HIRCULUS*, L., in the ordinary form, as different from 199 as possible. "South Park, in wet or swampy places." 200. *S. FLAGELLARIS*, Willd. (202. See under *Primulaceæ*.) 203. *S. JAMESII*, Torr., from the original stations. A most rare and peculiar species. 207. *S. PUKCTATA*, L. (51 (*rstivalis*, FisoH.) 204. *HEUCHERA PARVIFOLIA*, Nutt., the large form,—viz.: Parry's 174,—with some specimens passing to Parry's 173, the small form. 205. *HEUCHERA BRACTEATA*! Seringe (*Tiarella? bracteata*, Torr.) the same as Parry's 172, mixed with a large-flowered, apparently new species, *H. HALLII* Rocks, on mountains of medium elevation. 206. *LITHOPHRAGMA PARVIFOLIA*, Nutt. 208. *MITELLA PENTANDEA*, Hook.; in fruit. 576. *CHRYSOSPLENIUM ALTERNIFOLIUM*, L. 5£8. *JAMESIA AMERICANA*, Torr. & Gray. (209. See *Eupiiorbiacere*.)

## UMBELLIFERA

210. *CYMOPTEBIIS GLOMERATUS*, DC. A plant rarely collected, but said to be very common on the plains, along with the next. 211. Cf *MONTANUS*, Nutt. 213. *C. ALPINUS*, Gray, Enum. PL Parry, p. 19 (408,) No. 158; with good fruit as well as flowers. 212. *PEUCEDANUM NUDICAULE*, Nutt. ? at least the plant so named in Hayden's collection on the *Mauvaises Terres* of Nebraska; but the plant is minutely pruinose-pubescent, not glabrous, nor is the fruit truly that of a *Peucedanum*, the marginal wings being double, nor from the description can it be the original *Smyrniium nudicaule* of Pursh. It must re-

\* This was mixed with No. 167 (*S. OERNUA*, L.) of Dr. Parry's collection in 1861, but very sparingly distributed. It has a granulate root, so called, and the foliage much as in *S. Sibirica*, but is perfectly glabrous throughout, and with the obconical tube of the calyx wholly adnate to the ovary. As it is manifestly related to *£ rivularis* (though quite distinct), I suppose it may be the *£ S. Cymbalaria*, vel. n. sp., or the species compared with *Sibirica*, of Chamisso in *Linnaea*, 6, p. 655, which in the *Flora Rossica* are doubtfully referred to *S. rivularis*. In which case I know of no name to take precedence of this proposed by Dr. Engelmann.

† *HEUCHERA BRACTEATA* (Seringe): glabella, minutissime pruinoso-glandulosa; thyrsus denso spiriformi multifloro; bracteistaepe flores flavido-virescentes subiequantibus; calyceoblongofere ad medium 5-fido, lobis spatulato-oblongis; petalis attonuatis acutis filamentis vix latioribus; Btaininibus stylisquo dein exsertis. Scapo from a span to nearly a foot in height, often folio&e-bracteate. Thyrsus commonly more or less secund. flowers barely tw> lines in length. Teeth of the leaves usually setaceous mucronate.

§ *HEUCHERA HALUI* (sp. nov.): hirsutula; thyrsus raconu'formi sublaxo 16-30-floro; bracteigpedi-Cfilosrix suporantilms: floribus albidis (mine roseo tinctis?); calyce lato-cainpanulato 5-lobo, lobis lato-ovatis; petalis spatululartobtusis exsertis; staminibus styli^que inclusis. Scapes uraolly a span high flowers about three lines long, but the calyx twice the breadth of that of *If. bractwt a*, and Tory different in shape. Pedicels, when fully developed, sometimes nearly as long as the flower. Leaves as in the preceding species, considerably variable,

main uncertain until the order is revised. A solitary fruiting specimen in Dr. Parry's collection of 1861 was very carelessly named *LeptoUenia dissecta*, which is quite a different plant. 214. MUSENIUM TRACHYSPERMUM, Nutt.; near *M. divaricatum*, but the young fruit much shorter as well as more scabrous. 215. THASPIUM TRACHYPLEURUM, n. sp.,\* in fruit, the same as 159 of Parry in 1861, of which the fruit was too young. It proves to be quite different from that of *T? montanum*, var. *tenuifolium*. The genus is uncertain; but it can hardly be well separated from *Thaspium*, 217. T. XOXTAVUV, Gray, PL Fendl., in flower and in fruit, the latter with the three dorsal wings sometimes barely salient, sometimes as much developed as the marginal ones. 216. CONIOSEMNUM FISCHERI, Wimm.; "alpine and subalpine." 218. C. CANADENSE, Torr. and Gray, probably a larger and coarser form of 216; ".on low mountains." 219. ARCHAXGELICA GMELINI, DC. 220. ARCHEMORA FEXDLERI, Gray, PI. Fendl.; fine, large specimens with good fruit,<sup>14</sup> in subalpine woods." It is 155 of Parry's 1861 collection, which I carelessly named *Bfirula angustifolia*. 221. An acaulescent Umbellifer, undeterminable for the want of fruit. 222. CYMPTERUS? AXISATUS, n. sp.,<sup>f</sup> called "*C. tcrebinthinus*, var. *fceiiculaceus*" in Parry's 1861 collection (No. 157); but it can hardly be either of Nuttall's species under those names, on account of the very long and subulate leaflets of the involucre as well as calyx-teeth, yet apparently related to them; the foliage, &c, very similar. Mature fruit not collected; some of the present collection pretty well formed has the wings abortive, while in younger fruits of 1861 these are obvious and somewhat undulate. This dubious plant inhabits "dry hills in the middle mountains, and is a very aromatic herb." The foliage of the dried specimens and the fruit have a pleasant anisate flavor,—characters unknown in the polymorphous genus *Cymopterus*, and rendering the genus of this plant yet more doubtful.

## ARALIACEE.

223. ADOXAMOSCHATELLINA, L. "Subalpine; common."

## CORNACEJE.

COBNUS CANADENSIS, L. In the mountains Dr. Parry gathered one or two specimens of the ordinary form of this species; and in the alpine region also a depauperate form of it, some specimens of which, having a pair of leaves lower down on the stem, and those from the upper axils small, might readily be mistaken for *C. Suecica*. They are distributed as No. 437 of Parry.

## CAPRIFOLIACEE.

224. LIGNA BOREALIS, Gronov. 225. SYMPHORICARPUS MONTANE, HBK. 227. S. OCCIDENTALS, R. Br. 226. LONICERA INVOLUCRATA, Banks. 228. VIBURNUM PAUCIFLORUM, Pylaie.

## RUBIACEJE.

229. GALIUM BOBEALE, L. 230. G. TRIFIDUM, L., the reduced, northern form, near *G. palustre*.

## VALERIANACEE.

231. VALERIANA DIOICA, L., var. *V. sylvatica*, Richards.

\* THASPIUM TRACHYPLEURUM (ftp. nov.): glabrum; caule (pedali) striato 1-3-foliato 2-3 longiusculo pedunculate gerente; foliis ternato-decompositis, segmentis filiformibus mucronulatis, petiolis basi dilatatis haud scario-marginatis: involucre et involucrellis e foliis 1-3 subulatis parvis; floribus flavis; fructu didymo-otato lateraliter compresso, mericarpiis sectione transversali fero orbiculatis, jugis alveis 5 cernforibus crassa suberosis obtusis scabra cum uno commissurae a carpophoro demum libero, valliculis omnibus grosse univittatis. On the mountains, at middle and lower elevations. Leaves more decomposed than in the *T. montanum* var. *tenuifolium*, with which I had confounded it, the segments shorter and more rigid; the fruit shorter, U to 2 lines long, the mericarps not at all flattened dorsally, in shape and scent like those of *Thaspium*, and the short wings remarkably thick and corky, scabrous-roughened. A similar corky mass at the commissure in the section simulates another wing or rib, except that it is partly divided by a groove, which received the carpophore.

## COMPOSITE.

232. ERIGERON ACRE, L. 233. DIPLOPAPPUS ERTCOIDES, Torr. and Gray. 234. ERIGEROX COMPOSITUM, Pursh. 235. E., a species wholly doubtful to me, with deep purple or blue rays,—except in this respect the same as the white-rayed specimens of Parry's No. 3, which I had confounded with those of *E. uniflorum*, with which it was mixed. I dare not now venture to describe it as a new species. 236. E. GLABELLUM, var. *pubescens*, Hook. Bourgeau collected the same form in the Rocky Mountains. 237. E. DIVERGENT, Torr. and Gr. 233. E. GRANDIFLORUM, Hook., var. *elatius*, Gray, Enum. Pl. Parry, No. 1: a still more luxuriant plant; stems more than a foot high, leafy to the summit, bearing two to four heads, with the same very woolly involucre. 243. E. UNIFLORUM, L., both the same as Parry's No. 8, and large and tall forms 6 to 9 inches high, with light-colored long wool to the involucre, as in the foregoing. "Common in the high alpine region."<sup>11</sup> 239. E. GLABELLUM, Nutt. ? var. *molle*. This is recorded as a common species at all heights. But I have never before seen such a form, except one of Bourgeau's, the largest specimens distributed under "*E. canetensis*," and that has white rays. From the shape of the leaves, and their size and abundance up to the summit of the stem, this should rather be referred to *E. macranthum*; but the pubescence is strange for that species. 240. E. GLABELLUM, Nutt. Parry's No. 4 (collected again) is a dwarfer form of the same, and belongs rather to *glabellum* than to *E. macranthum*. (241, 242. See below, under Aster. 243. See above.) 244. E. CJESPIOSUM, Nutt.; a strict form, near the var. *grandiflorum*,—of which *E. canum*, Gray, Pl. Fendl., is evidently a form. "Common on low mountains." 245. E. PUMILCUM, Nutt. 246. E. BELLIDIASTRUM, Nutt.
247. SOLIDAGO LANCEOLATA, L. 248. S. NEMORALIS, L.; a dwarf, subalpine form, passing to *S. nana*, Nutt. 249. S. MISSOURIENSIS, Nutt.; a dwarf form. 250. S. VIRGA-AUREA, L.; two forms. 251. S. VIRGA-AUREA, var. *multiradiata*, Torr. and Gray. Dr. Parry collected one specimen of *S. humilis* on Clear Creek.
241. ASIER SALSUGIXOSUS, Richards. "Subalpine." This is also 403 of Dr. Parry's separate collection. 242. A. GLACIALIS, Nutt. "In the high alpine region." 252. A. ADSCEXDEXS, Lindl., var. *ciliatifolius*, Torr. and Gray, (which is also 419 of Parry,\*) and the var. *Fremontii*, Torr. & Gray, Fl. Suppl. 253. Various forms of the last, "alpine and subalpine, in low grounds," the larger ones (same as Parry's 417) passing towards *A. integrifolius*, Nutt., but the involucre not manifestly glandular. All the peculiar Asters of the Rocky Mountains and westward require complete re-elaboration. 254. (also 418 of Parry,) A., near the smooth form of ERICOIDES, L., and probably a variety of it, but with laxer and narrower scales to the involucre. The rays are pinkish, as they sometimes are in the eastern plant. "In the mountains, at middle elevations." \*
255. APLOPAPPUS IKULOIDES, Torr. and Gray. Subalpine, in the South Park. 256. A. (STEXOTUS) FUGMTCUS, Gray, Enum., Pl. Parry, mixed with specimens of an equally dwarf new species, which Dr. Lyall collected, in 1860, on the summits of the eastern side of the Cascade Mountains, at 7500 hundred feet above the sea. It should therefore be named A. LYALLI Both high alpine.

\* ASTER (ORTHOMERIS) OLAUCUS, Torr. and Gray, not in the general collection, is again in Parry's Eoparute collection (No. 13) in the finest state.

A. FENDLEKI, Gray, Pl. Fendl. (perhaps a hispid form of *A. XuttaUii*.) was sparingly collected on sand hills, on the plains, but not distributed.

f APLOPAPPUS LYALLI (sp. nov.): nsiuus, undiquo pniinoso-glandulosus; caulibus 2-3-pollicaribus foliobis inuMocphillis; foliisintegerrimis aubmembranaceis silepius mucrunutio, railicalibusinferioribus que uMingo spulilatis seu oblongulatis. basi: attenuatis, sinjnis lanceolatis; involucri Bquamis luxu imbricatis subtriseriatis lauceolatis suba-quilongt glanduloso-puberis; ligulis 16-20 liuearibus longiusculis; acheniis lincaribus iere glabeinniis; pappi ulbi soris ri^idulis corollam disci tequantibus. F<riua a. (LYALLI); involuuri squamis omnibus lanceolafu sensim acuminatis,

257. A. (PYRROCOMA) CROCEUS, n. sp.\* Subalpine, in the Middle Park, &c, west of the Rocky Mountain range. 258. A. (PYRROCOMA) FREMONTII. *Pyrrcoma fulio*\*a, Gray in Jour. Bost. Nat. Hist. Soc, 5, 1843. Low mountains, lat. 39°. There is a Chilian *A. foliosus*; wherefore, in suppressing *Pyrrcoma* as a genus, the name of this most rare and well-marked species may very properly commemorate the discoverer. 259. A. (PYRROCOMA) PARRYI, Gray, Enum. Pl. Parry. 260. CHRYSOPSIS VILLOSA, Nutt., with the dwarf variety, *C hispida*.

261. IVA AXILLARIG, Pursh; a "broad-leaved form. 262. I. CILIATA, Willd. 263. EUPHROSYSIE (CYCLACHJEXA) XANTHIFOLIA, Gray. 264. FRAXSERIA TOMENTOSA, Gray, Pl. Fendl. 265. F. HOOKERIANA, Nutt.

266. LEPACHYS COLUMNARIS, Torr. & Gr. 267. GAILLARDIA ARISTATA, Pursh. 268. HELIANTHELLA UNIFLORA, Torr. and Gr. Fine specimens. The achenia are ciliate with very long hairs; the awns are long, slender and persistent. 269. HELIANTHUS PUMILUS, Nutt.? Parry's No. 50. 270. H. PETIOLARIS, Nutt. 271. (& 420 of Parry.) HELIOMERIS MULTIFLORA, Nutt.; the broader-leaved form. 272. HELENIUM HOOPESEI, n. sp., a most striking species, seeds of which were collected near Pike's Peak in the autumn of 1859, by Mr. Thomas Hoopes, from which plants were raised by Mr. Halliday Jackson, of Westchester, Pa. 273. ACTINELLA GRANDIFLORA, Torr. and Gr.; equally fine specimens as those of last year. 274. ACTINELLA RICHARDSONII, Torr. and Gr. 275. A. SCAPOSA, Nutt. var. (*A. glabra*, Nutt.) 276, 277. A. ACAULIS, Nutt., in different forms. 278. BAIHA OPPOSITIFOLIA, Torr. and Gr. 279. THELESERMA (COSMIDIUM) GRACILE, Gray. 280. T. FILIFOLIUM, Gray. 281. VILLANOVA CHRYSANTHEMOIDES, Gray. 282. HYMEXOPAPPUS TENUIFOLIDS, Pursh, 283. CH-EXACTIS ACHILLE-FOLIA, Hook. Arn.; a low form from the alpine region. 284. C. ACHILLE-FOLIA, var.

exterioribus paulo brevioribus; foliis parvulis, caulinis superioribus gradatim minoribus (6-3 lin. longis) acutioribus. O. H. m.: involucri squamis plerisque latioribus, extimis oblongo-linearibus; discum adaequantibus; foliis etiam caulinis magis spatulatis, summis pullicaribus capitulum adaequantibus, radicalibus bipollicaribus. Head half an inch long and wide. Ligules exported, 3 or 4 lines long. Appendages of the style in the disk-flowers oblong-lanceolate. Ovaries in Hall and Harbour\* plant sparsely beset with a few Mender hairs; in Dr. Lyall's glabrous.

\* APLOPAPPUS (PymcoMA) CROCEUS (sp. nov.): caulo ultrapedali parce foliato m. n. cophalo primum lanoso; loliis coriaceis glabris integerrimis haud eximie reticulatis, radicalibus oblongo-unceolatis (cum petiolo pedalis), caulinis lanceolatis oblongisve basi semi-amplexicaulibus; capitulo nudo maximo; involucri hemisphaerici squamis ovalibus obtusissimis muticis, interioribus marginesubscarioso-eropsis; ligulis 50 et ultra longe exsertis supra croceis; ovariiis breviusculis glaberrimis; pappo albidu orollam disci adaequante. Allied to *Pyrrcoma radiata*, Nutt., which, however, is probably not distinct from *Ajlopappus* (*Pynwoma*, Houk.) *carttiamoides*. But the leaves are less coriaceous and reticulated; the head naked, peduncled, and I believe nodding; involucre an inch in diameter; the long exserted rays nearly an inch in length; the ovaries far shorter, and the pappus white. But I have this only in flower, and *P. radiata* in fruit.

† The following, apparently quite distinct, new species of this genus, was sparingly collected by Dr. Parry in Middle Park, near the foot of Pike's Peak. I have also received a specimen from Mr. Hall. It is distinguished by its small leaves and heads, thin and scarious chaff, and the awnless achenia crowned with hyaline squamiellae, which are resolved into a villous fringe that equals the proper tube of the corolla in length.

UELIANTIUKLIA PARRYI (sp. nov.): pedalis, hirsuta; foliis triplinerviis lanceolatis vel radicalibus spatulatis, caulinis superioribus sublinearibus 1-2-pullicaribus; enpitis 2-3 parvulis brevissime pedunculatis; receptaculi paleis tenuis-seariosis apice truncato barbularis; ovariiis oblongis (exterioribus ssepius prunis, interioribus superne parce villosis-ciliatis) exaristatis; paleis pappi circ. 4 latis tenuissime linearibus in villum tubum proprium corollae adaequantem solutis. Involucre only half an inch long; disk half an inch in breadth; ligules 7 to 9 lines long.

§ HCLBXIUM HOOPESEI (sp. nov.): caule valido tomentuloso sesqui-bipedali oligocophalo; foliis glauco-pullicaribus crassiusculis punctatis mox glabris subnervatis integerrimis, radicalibus lanceolato-spathulatis in petiolum brevem alatum angustatis, caulinis oblongis lanceolatis spini-implexicaulibus; pedunculis sursum incrassatis; capitulis pro genere maximis; involucri squamis lanceolatis seu linearibus; receptaculo subgloboso; ligulis 20-25 linearibus cuneatis (pollicaribus) cum disco aurantiacis; pappi paleis lanceolato-subulatis nervis corolla disci paulo brevioribus achenium sursum villosu epauctibus. "South Park and west of Pike's Peak." Radical leaves 6 to 11 inches long, tapering into a petiole-like base or flat and winged petiole; the cauline leaves successively shorter and more dilated at the base, the uppermost 1½ to 2 inches long. Disk in the wild specimens an inch in diameter, and the numerous orange-yellow rays an inch long. Palea of the pappus tapering to a sharp point, but not awned. This species is one of those which go to fill the interval between *Utunium* and *Acinella*, but in clearly of the former genus.

*Douglasii*, (*C. Douglasii*, Hook, and Am.) 352. PALAFOXU HOOKEBIANA, Torr. and Gray, with smaller heads.

285. MACH&RANTHERA TANACETIFOLIA, Nees, (*Dieteria cortnopifolia*, Nutt.)

286. GRINDELIA SQUARROSA, Danal, with larger and with smaller heads. 287. (and 425 of Parry,) APLOPAPFUS RUBIGINOSUS, Torr. and Gr. 288. A. SPIKULOSUS, DC. 289. TOWNSENDIA GRANDIFLORA, Nutt. 290. T. SERICEA, Hook.

291. ASTER (OXTTRIPOLIUM) ANGUSTUS, Torr. and Gr. (*Tripolium angustum* smd. *T. frondosum*, Nutt.) 292. LINOSYRIS (CHRYSOTHAIOUS) GRAVEOLENS, Torr. and Gr.; the form with small heads, and acute and viscid scales of the involucre. It occurs, much better developed, in Parry's separate collection, No. 415.\* 293 (and 413 of Parry,) L. (CHRYSOTHAMNUS) PARRYI, n. sp. f A very distinct species, which is said to abound in the Middle Park, South Park, and all that district; the wonder is that it has not been detected before. The spiciform or racemose and leafy inflorescence, and the large heads with lax and taper-pointed scales, are characteristic. 295. L. (CHRYSOTHAMNUS) VISCIDIFLORA, Torr. and Gr.; the variety with broadish and hispidulous-ciliate leaves (*L. serrulata*, Torr.) ; again collected also by Dr. Parry, under his number 49. 294 (and 426 of Parry,) GUTTIEREZIA EUTHAMIE, Torr. & Gr. 296. MACRONEMA DISCOIDEA, Nutt. "Blue River, west of the Rocky Mountain range." An interesting rediscovery of a very rare plant.

297. PECTIS (PECTIDOPSIS, DC.) AHGUSTIFOUA, Torr. Gravelly banks of streams.

298. ARTEMISIA ARCTIC A, Less. (*A. Norvegica*, Fries); a more hairy form, —the same as Parry's 42, which I wrongly considered as a variety of *A. Richardsoniana*. "Strictly alpine." 299. A. SCOPDLORUM, n. sp., t a "strictly alpine" species, allied to *A. lanata*, and to be compared with *A. hcterophylla*, Bess., which, however, is placed in the section *Abrotanum*, while this plant has the woolly hairs of the receptacle as long as the flowers themselves, in which respect it also differs from the very similar *A. Richardsoniana*. 300. A. CANADENSIS, Michx. 301. A glabrous form of the last, with small heads, too near *A. caudata* and some forms of the next. 302. A. DRACUNCULOIDES, Pursh, var. *brevi/olia*, and specimens with trifid leaves passing into 301. 303, 305, (also 411 and 412 of Parry). A. LUDOVICIANA, a form with small leaves, and also the var. *gnaphalioides*, 304. A. FRIGIDA, Willd. 306. A. TRIDESTATA, Nutt. § "On the Blue River, west of the Rocky Mountain range."<sup>1</sup> 307. A. FILIFOLIA, Torr. (308. See *Chenopodiaceae*.)

\* No. 414 of Parry's separate collection is a glabrate form of the same common species, of which only traces of the close and white down remain, and the leaves and heads are larger.

t LINOSYRIS (CHBYSOTHAMNUS) IPARRYI (sp. nov.): fiuticora; ramist<sup>^</sup>irgatis lanoso-dealbatis; foliia linearibus fere glabris subviscosis, floralibus contormibus capitula in thyrsium angustum cougesta longe superantibus; involucre 10-15-floro cylindraceo pauciseriali, ggomifil sublaxe imbricatis albidis lanceolatis, omnibus (exterioribus saepius folioso- interioribus scarioso-) attenuato-acuminatis ; corolla tubo hirsutulo; achenis linearibus cano-pubeicentibus. Leaves 2 to 3 inches long, 3-nerved, acute, plane, the larger ones 2 lines wide and tapering to the base. Thyrsus narrow, ult<sup>ii</sup> almost simply racemose or spiciform, sometimes more compound and branchy. Heads about two-thirds of an inch long, foliose-bracteate; the bracts passing into the exterior and leafy-tipped scales of the involucre. Receptacle, styles, viscosity, aroma, Ac, as in *Chrifsothamnus* generally.

t Also No. 41 of Dr. Parry's separate collection of 1862 (not of 1861, which is *A. bqrealis*, a very different species.)

ARTEMISIA (ABSINTHIUM) SCOPULORUH (sp. nov.): csespitosa; rhizomate repente; caullbus simplicissimis spithamseis; foliis albido-scriceis pleritque pinnati-<sup>^</sup>5-sectis. segment is prtesertim radicali'um tripartitis, lobis cum foliis summis linearibus angustis; capitulis pluril.us yel panels simpliciter racemoso-spicatis breviter pedicellatis erectis (lin. 2-3 latis), involucre hemisphoerico, squamis ovalibus extun dorso villosis margine lato scarioso atro-fusco cinctis; lana receptacull copiosa coiollas superno longe pilosas adscquante. Yar. MONOCBPHALA ; caule 2-3-pollicnri csipitulo solitario majori terminate; foliis etiam radicalibus ilmpliciter tripartitis vol partini 5-partitis partim integrcrimis linoai'ibus. Stems scrimum-pubescent, sometimes glabrate below. Floral leaves or bracts filiform, linear, entire, the lower surpassing the head. Pedicels a line or a line and a half long, strictly erect. Flowers 30 or more, tipped with purplish.

g This is 410 of Parry's separate collection, from Middle Park; and his 409, associated with the above, is *A. CA*\*A, Purbh; these two being the *Wild Sage* of Lewis and Clarke.



309. ANTENNARIA GARPATUICA, var. *puUhemma*, Hook. A remarkable and leafy-stemmed form.\* 310. A. DIOICA, Gaertn., and A. ALPINA (female, 1-3-cephalous), mixed. Good specimens of *A. alpina* were separately collected on Mount Flora by Dr. Parry, No. 422. 311. GKVAPHALIUM STRICTUM, Gray in Bot. Whipl., Exped. Pacif. R. It. Surv. 4, p. (54) 110; a less strict and many-stemmed form. "Wet places in the mountains." 312. G. DECURRENS, Ives. "Subalpine; rare."

313 (and 423 of Parry). BRICKELLIA GRANDIPILOBA, Nutt., rar. *minor*: foliis profundius oordatis capitnlisqne minoribus; inrolncri squamis acutioribus. 314. NARDOSMIA SAGITTATA, Hook., var. with very obtuse leaves, connecting With *N. frigida*. "Near Pike's Peak." 315. LIATRIS PUXCTATA, Hook.

316. SENECEO LUGESS, Richards., a typical form, and others belonging to *S. fastigiatus* and *S. exaltatus*, Nutt., but dwarf. "Acommon and variable species, at all heights and in all situations, flowering from June to September."

326. A dwarf form of the same, nearly Parry's 21, and just Fendler\*s 477. 325. S. LUGEKS, the downy state, same as Parry's 23, one of the forms of *S. exaltatus*, Nutt. 317. S. AMPLECTENS, Gray, Knum. PL Parry, p. 11, No. 56, a species which, considering the various forms under which it now occurs, was not very well named. A new specific character is appended, f It is a sub-alpine and alpine species.

313. S. INTEGERRIMUS, Nutt. A low form; "alpine." 319. S. SOLDANELLA, n. sp.J "High alpine, among rocks; heads generally single." They are solitary in all the specimens I have seen. § 320. S. CERXUXS, Gray, Enum. PL Parry, No. 52. "A common species at middle and subalpine elevations." 321. S. BIGELOWII, var. *Hallii*. W "Subalpine; heads very drooping, rayless." 322. S. FREMONTII, Torr. and Gr. "Alpine;" a well-marked species. Recently collected by Dr. Lyall on the summit of the Rocky Mountains, in lat. 49°. IT 323. S. TRIANGULABIS, Hook., with shorter and finer teeth to the leaves, (he

\* AXTENSAMA MARGARITATA, R. Br., rar. *subalpina*: caule splthamso ad subpedalem simplicissimo, corymbo coDgesto fare capitata. A singular, Dearly alpine form, collected only by Dr. Parry, No. 421.

f SENECEO AMPLECTENS (Gray, L c.): lana floccosa mox decidua glabratus; caule semi-sesquipedali eradicte pereuni apicenuadol-3-cephalo; foliis mombranaceis oblongis lingulatiBve aut repando aut argutissime dentatis numo sublaciniatis, imis basi angustatis vel inpetiolum alatum attenuatis, Buperioribus sessilibus basi (nunc lata) semi-amplexiciaulibuB; capitulis in pedunculo gracili nutantibus; involucre calyculato laxo; ligulis linearibus oblongatis (1-2-pollcaribus) aureis; acheniisB glaberrimisB.

Var. TARAXACOIDEA (*S. Fremontii*, var. f Gray, PL Parry, p. 9, No. 28): rere alpinus, 4-5-poll-Caria, monocephalus; capitulu minori minus nutanto (ligulis semi-subpoUcaribuB); foliis omnibus basi attenuatis pi. m. laciniatis. In the high and bare alpine region. This, judging from intermediate forma in Hall and Harbour's collection, must be regarded as a depauperate, alpine variety of *S. amplectent*. Dr. Parry gathered only two or three specimens, like those of the former year.

† SENECEO SOLDANELLA (up. nor.): Bubcaulescens, nanus, glaberrimus, subglauca, fere semper monocephalus; radice fasciculato-fibrosa; foliis crasBissubtus purpureotinctis. radicalibufilimisque orbiculatis nunc subreniformibus Dune basi trineryata in petiolum longum feu longissimum planum contractis sepius denticulatis ^circiter pollicom diametro), superioribus 1-2 minoribus oblongis spathulatisve petiolo brevidilatato; capitulo magno (8-9 lin. longo et lato); involucre squamiti lanceolatis scarioso-marginatis 16-20 cum exterioribus 7-9 angustioribus immarginatis lazioribus Tel paullo vel dimidio brevioribus; ligulis oblongis 16-18 (flavis circiter 4 lin. longis) discum vix superantibus; acheniis glaberrimis. "On Gray's Peak," Dr. Parry,—who complimented the describer by naming this handsome and most distinct species, & *Grayi*; but the *S. Greyi*, Hook., f. of New Zealand forbids this.

| In Middle Park, Dr. Parry gathered one or two specimens of what appears to be & *hydrophilus* Nutt.

J] SENECEO UIQELown, (Gray in Bot. Whipl. Exped. Pacif. It. R. Surv. 4, p. (55) 111), var. *Eatii*: foliis fere omnibus lanceolatis cum caule pilis articulatispubescentibus(demum glabratis), caulinia omnibus sessilibus imiave in petiolum alatum contractis. *S. megacephalus*, Nutt^ thus far found only by Nuttall, has a similar pubescence, but more of it, and also on the involucre; the scales of the latter are narrower, the heads are radiate and erect, and the plant is dwarf.

fl SENECEO FREMONTII, (Ton\* & Gray, Fl. 2, p. 445): totus glaber; caule simplici vel corymbosoramoso usque ad apicem folioso (5-15->oHicari); foliis oblongis vel obovato-spathulatis carnosulis plerisque laciuato-dentatis omnibus sessilibus, superioribus pollicaribus vel scsquifpollicaribus, inferioribus decreescentibus, capitulis solitariis paucisvo brevissime pedunculatis croctis; in involucre campanulato(semi^ollicari)parcobracteato; liguis 10-16 luteis; ucheniis jjuberulis.

var. ? , Torr. and Gr. Fl., verging towards the next. 324. *S. AXDIXUS*, Nutt. ? from the locality (but the heads resemble those of the last, and are of equal size), or an undescribed species, if Nuttals *S. andinus* is Hooker's *S. serra*; intermediate between the latter and *S. triangularis*. Fremont collected a single specimen of it in his second expedition. 327. *S. EREMOPHILUS*, Richards. 328. *S. LOXGILOBUS*, Benth., from the plains, with pinnately-parted leaves (Parry's No. 407); with a mountain form, having the leaves all entire and the heads narrow. The latter is the same as Parry's No. 406. The variations of *S. Jilifolius*, *longilobus*, *spartioides* and *Riddellii*, are now wholly inextricable. 3210. *S. CANUS*, Hook., a form with large heads and the leaves all entire, the same as Parry's No. 20; "alpine and subalpine." 229. *S. ACREUS* var. *alpinus*, Gray, Enum. Pl. Parry, No. 63. This holds its character; but the heads are sometimes as many as three in a corymb. Different from *S. aureus* as it appears, it is inseparably connected with it through the var. *borealis*. «§18i I! *S. AUREUS*, var. *alpinus*, *wernericefolius*,\*—very peculiar, truly alpine form, which would almost anywhere be regarded as a very distinct new species; but I think it runs into the last and into Wright's 403, &c. These forms all teach that & *subundus*, DC, and *S. resedifolius*, Less., will also pass into *S. aureus*. Indeed, I know not where the species will stop. 332. *S. AUREUS*, L. ? var. *croceus*. Middle Park, &c. Both Dr. Parry (who has it as No. 405) and Mr. Hall note this as a form of the common *S. aureus* with copper-colored or saffron-colored flowers, and I cannot gainsay it, after reviewing a suite of specimens. Some of Hall and Harbour's specimens, except in the anomalous color of the flowers, very much resemble *S. aquaticus* of the Old World. One form is discoid. 333. *S. AUREUS*, var. *borealis* and var. *Balsamite*, Torr. and Gr.; glabrate or woolly, in various forms. "A common and very variable species, at all localities and heights, except strictly alpine. Some of the specimens are passing to *S\* Fendleri*, Gray.

334. *ARNICA AXGUSTIFOLIA*, Vahl.; broad-leaved forms of *A. alpina*, Laest. "A variable species, from the low middle to the alpine region, flowering early and late." 335. *A. MOLLIS*, Hook.; "alpine and subalpine." 336. *A. CORDI-FOLIA*, Hook., mixed with some *A. LATIFOLIA*, Bongard, (which Dr. Parry abundantly gathered in Berthoud's Pass; No. 408 of his collection); the latter known by the sessile cauline leaves, the narrower heads, and the almost glabrous achenia. 337. *A. CHAMISSONIS*, Less. South Park, &c. Passes into leafy forms of *A. angustifolia*. 338. *A. ANGUSTIFOLIA* ? var. *eradiata*, or perhaps a distinct species. This is Parry's No. 10, resembling some rough-hirsute forms of *A. angustifolia*, approaching *A. mollis*, but the cauline leaves decreasing upwards; and the rayless character holds in the numerous specimens gathered in 1862: the achenia are glabrate, although the ovaries are pubescent. It can hardly be a form of the Californian *A. discoidea*; but it needs farther comparison with that species.\*

339. *CIRSIIUM ACAULE*, All., var. *Americanum*. "Subalpine; common in wet

\* SENECIO AUREUS, L., var. (ALPIOTS) WERNERLBFOLTUS: multicipiti-cirsipitosns, primum arachnoidcus; foliis radicalibus confertis spathulato-oblancoelatis sen sputulato-linearibus basi attemiatis erectis corinccis rigidis aveniis integerrimis margiubus soppissimo revolutis niox glabratis (cum petiolo 2-4-poll. longis 2-3 lin. latis); seapoaphyllo. ^-S-pollicari) bracteis paucis subulato-setaceis lana obvolutis instructo coryniboHO-3-5-cpphalo; capitulis, etc., & aurei. The leaves may be likened to those of *Tf Wwrtta* or of *Culcitium longifolium* or *nirak*.

The following might be thought to be a form of thin, or of Wright's 403; but, besides the small leaves, the achenia are papillose-hirsute, instead of perfectly glabrous.

SENECIO THURBZRI (sp. nov.); esepitonus, cano-toiieitulosu\* mox glabrefcens: foliis plerisque radicalibus confertis angustissimis linearilms basi BCisim attenuatis (cum petiolo circiter pollicem longis) rigidullis integerrimis vel obsolete 2-3-dentatis marginibus quandoque revolutis; seapo spithamuo 3-5-cpphalo foliis perpaucis subulatis bractelave instructo; capitulis fere & aurei, sed acheniis crebre papilloso-hirtellia! *S. canus*, var. *pygmaeus*, Gray, in Bot. Mex. Bound. p. 108. Santa Kita del Cobre, >ew Mexico, Prof. Thurber, Dr. J. M. Bigelow.

f TETRADYMYIA CANXSCENS, DC, the form with rather smaller beads and shorter leaves (*T. inermis*, Nutt.), wad collected in the Middle Park by Dr. Parry, No. 410.

grounds." Stemless and polycephalous; at least my specimen has four heads nearly sessile on the crown, of equal size with those of the European plant, with which the specimens very well agree, except that the exterior scales of the involucre are all tipped with a manifest spine. Some of the leaves are barely sinuate, as in the common Siberian variety; others are nearly as deeply pinnatifid as in the European plant. 340. *C. EDULE*, Nutt. ? so named in Parry's former collection ; but very probably not that species. In the lack of certain original materials, and of a complete re-examination, I could not pretend to name the Thistles of the Rocky Mountains, Oregon, &c, and am not disposed to add to the existing confusion. 341. *C.* " a white-flowered species," between the last and *C. foliosum*, (Hook.) DC, if Bourgeau's plant from the Saskatchewan is rightly named.\*

343. *C. DIMMONDI*, Torr. and Gr. Caulescent and leafy-stemmed, the exterior flowers having a sparingly plumose pappus: certainly very near *C. pumilum*. 342. *ECHINAIS CARLIXOIDES*, Cass., var. *nutans*, DC. "Mountains, at middle elevations, and subalpine; and in fertile, open valleys of Middle Park, where it is very common, and certainly indigenous." I have a specimen of this collected by Mr. Samuels in California, which I had thought probably an introduced plant. But it would appear to be truly American as well as Asiatic. The specimens accord with Schrank's and with De Candolle's figures of the Caucasian and Himalayan plant, although, perhaps, the appendages of the involucre are a little more dilated.

344. *MULGEDIUM PULMELLUM*, Nutt. 345. *LYGODESMIA JUNCEA*, Don. 346. *STEPHANOMERIA RUXCIXATA*, Nutt. 347. *LYGODESMIA JUNCEA*, var. ? *rostrata*, "On the plains ; Sept. ; rare." 348. *CREPIS RUNCINATA*, Torr. and Gr. 349. *HIERACIUM TRISTE*, Willd. 350. *H. ALBIFLORUM*, Hook. "Subalpine, west of the range; rare." 351. *NANSAURUS RACEMOSUS*, Hook. "South Park; rare;" a low form. 352. See above, p. 66. 353. *CREPIS OCCIDENTALS*, Nutt. The same as Parry's 70, omitted accidentally. 354. *TROXIMUM GLAUCUM*, Nutt., var. *foliis dilatatis laciniato-pinnatifidis. segmentis lanceolato-attenuatis*. Evidently a form of Parry's 65. Mr. Hall writes that it "flowers in May and the early part of June, on low mountains," and must be different from the next, which flowers two months later in the same localities. 355. *MACRORHYNCHUS TROXIMOIDES*, Torr. and Gr. (*Troximon aurantiacum* Hook.); in a great variety of forms, large and small, from a foot and a half to as many inches in height, with entire, toothed, or lacinate-pinnatifid leaves; the size of the heads equally variable, and with yellow, orange, chocolate-colored or purple corollas. "Very variable at all heights, even alpine; flowers in July and August." The full suit of specimens show that to this clearly belongs *Troximon parviflorum* and *T. roseum*, Nutt., and *Macrorhynchus purpureus*, Gray, PL Fendl. The fruit, when well developed, is rostrate, with a beak of about equal length with the body of the achenium. 356. *TROXIMUM GLAUCUM*, Nutt., var. *dasycephalum*, Torr. and Gr. (*T. taraxacifolium*, Nutt.) "High alpine; seemingly different from any of the above." It is also 424 of Parry's separate collection, from Berthoud's Pass. 357. *TARAXACUM MONTANUM*,

\* *CIRSIIUM BRACHYCEPHALUM*, sp. nov. will be the most appropriate name for the high-alpine Thistle which I mentioned in the Enumeration of Parry's collection, 1861, p. 9, as *C. foliosum*, Hook. ? It was again collected in 1862, nearly in single specimens, both by Mr. Hall and Dr. Parry. It is remarkable for the heads of yellow flowers being crowded into a capitulum (cluster, as large as a man's fist, the involucre with very upright bracts, and clothed with long and very soft, implexed, perhaps deciduous wool; the stem a foot or two in height, very leafy; the leaves linear, concave beneath, pinnatifid, the lobes very short and crowded, armed with slender spines.

*LYGODESMIA JUNCKA*, Don., var. *BOSTATA*: achenium apice rostrato-attenuatis; capitulis paucifloris: foliis angustissime linearibus (in hisce specim. SM-pollicarihus). Heads rather larger than is usual in *L. juncea*; achenium half an inch long, the tapering beak directly continuing the generic character not contracted at the apex," as here they may be said to be beaked. Dr. Hayden collected the same form on the Laramie Mountains. The specimens all need to be defined anew.

X To this belongs Parry's No. 71 of the 1862 collection.

Nutt., a form of *T. pahstre*, DC. "In the mountains, at middle elevations, in wet ground; different from *T. Densleonis*, which was also met with, truly indigenous."<sup>1</sup> (In the high alpine region were collected a few specimens of another form,—viz.: of a very depauperate *T. lavigatum*, DC.)

#### CAMPANULACEJE.

358. CAMPANULA ROTUNDIFOLIA, L., an ordinary form. 359. C LANOSDORF-  
FIKA, Fischer; excellent specimens of Parry's 266, exhibiting the same  
characters. It is said to be "very common in the subalpine region and lower,  
in wet ground." 360. C. UMFLORA, L. "Pike's Peak; high alpine." 361.  
C. APAKINOIDES, Pursh, a depauperate form.

#### ERICACEJE.

362. VACCINIUM MYBTILLUS, L. "Alpine and subalpine;" in flower and  
fruit, connecting the small-leaved form with the ordinary European plant.  
363. V. CJESPIOSUM, Michx. 364. ARCTOSTAPHYLOS UVA-URSI, Spreng. 365.  
GAULTHERIA MYRSIKITES, Hook. 366. PYROLA SECUNDA, L. 367. P. ROTUNDI-  
FOLIA, L., var. *uliginosa*, Gray. 368. P. CILORAKTHA, Swartz; a small form.  
369. P. (MONESES) UNIFLORA, L. 370. KALMIA GLAUCA, L., the very dwarf  
form from the "high alpine" region. 371. PTEROSPORA ANDROMEDEA, Nutt.\*

#### PLANTAGINACEJE.

372. PLANTAGO ERIOPODA, Torr, (For the synonymy, see Proceed. Amer.  
Acad., 6, p. 55, note.) 373. Apparently the same species, with hardly any wool  
at the crown,—which happens in other species. "High alpine, near perpetual  
snow." 374. P. PATAGOICA, Lam., var. *gnaphalioides*, Gray.

#### PRIMULACEJE.

375. ANDROSACE FILIFORMIS, Retz. "Subalpine; not rare."\* 376. A. SEP-  
TENTRIONALIS, L. "Below the subalpine region and also alpine," f 377. A.  
OCCIDENTALS, Nutt. "On the plains." 202. A. CHAJLEJAFME, L. (*A. carinata*,  
Torr.) High alpine on Pike's Peak, where Dr. James collected it. 378. PRI-  
MULA FARIXOSA, L., var. *foliis sessilibus*; umbella capitata; calyce cylindraco  
tubum corolla subaequante. *P. dealbata*, Engelm. in litt. But it exactly  
accords with the left-hand figure of *P. farinosa*, var. *Magellanica* of Hooker's  
Flora Antarctica (*P. decipiens*, Duby), and with my Antarctic specimens, ex-  
cept that the calyx is perhaps a little longer, and the corolla bluish-purple.  
Mr. Burke collected the same form on the Rocky Mountains farther north, but  
with the tube of the corolla a little exerted. Bourgeau collected specimens  
in the Saskatchewan district, having this elongated calyx-tube along with pedi-  
cels of ordinary length. It is interesting thus to connect the Antarctic with  
the northern forms, by specimens from the Rocky Mountains in about lat. 40°.  
379. P. PARRYI, Gray, Enum. Pl. Parry, No. 311. "Alpine and subalpine;  
common." This holds its characters, except that the specimens of 1862 are  
generally less luxuriant, and the divisions of the corolla less bifid; indeed, in  
some of those of Dr. Parry's later collection they are barely emarginate; and  
in a few of them the calyx is very little glandular, and its lobes are ovate-  
lanceolate. The longer pedicels of the umbel are 1} to 2 inches, or in fruit  
even 3} inches, in length. Capsule short- ovoid, half an inch long, slightly  
shorter than the calyx-lobes. The thick root is said by Dr. Parry to be very

\* *Androsace jüilifarmii*, Itetz., a Siberian species, of which beautiful specimens are in the collec-  
tion, is now first recorded as of the American flora. It has, however, long since been collected in  
the Rocky Mountains by Reinout, in his first expedition (in whose report it was wrongly  
named *A. occidentalis*, Nutt.); by Burke (ex. Herb. Hook\*); and more recently by H. C. Engeli, in  
whose collection it was mistaken for *A. septentrionalis*. From the latter, beyond the characters  
assigned by authors, it is well distinguished by its almost hemispherical calyx, scarcely if at all  
angled, and with short and flat, not fleshy teeth.

j- Dr. Parry's 313 a of 1602, is the high alpine form of this.

fragrant. Seeds of this handsome Primrose were copiously collected, from which we may hope to have the plant in cultivation. 380. *P. ANGUSTIFOLIA*, Torr. 381. *DODECATUEON MEADIA*, L., the same form as Parry's 312. 382. *LYSIMACHIA CILIATA*, L. "Mountains at medium height." 60 and 577. *GLAUX MARITIMA*, L. *l.* in flower and in fruit.

## LENTIBULARIACEÆ.

580. *UTBICULARIA VULGARIS*, L. ? Without flowers. In a subalpine lake.

## OROBANCHACEÆ.

383. *APHYLLOX FASCICULATUM*, Torr. and Gray.

## SCROPHULARIACEÆ.

384. *PENTSTEMON GLABER*, Pursh; same as Parry's 260. 385. *P. ACUMINATUS*, Dougl., agreeing with Bentham's character "filamentosteriliglabro," which is very rarely the case, but a very narrow-leaved variety, just *P. secundiflorus*, Benth., excepting the glabrous sterile filament. "Mountains at low and middle elevations." 386. *P. ACUMINATUS*, Dougl., the ordinary form of the region (*P. nitidus*, Dougl., *P. Fendleri*, Gray), Parry's 258. 390. *P. ACUMINATUS*, Dougl., in some sets the common broad-leaved form, in others a variety with still narrower leaves than Parry's 264, i. e., a form almost exactly passing into *P. cceruleus*, Nutt., the name which may probably have to be adopted for the combined species. "Plains; May." 387. *P. HUMILIS*, Nutt., taller than Parry's 257, much larger than Nuttall's specimen. "Low mountains, an early and pretty species." Dr. Lyall has recently collected it in lat. 49°, at the elevation of 7000 feet. 388. *P. HALLII*, n. sp., described in "Revision of Genus Pentstemon,"<sup>7</sup> in Proceed. Amer. Acad. 6, p. 70,—which memoir see for remarks on most of these Pentstemons. This is a most beautiful dwarf species, "not uncommon in the alpine region, descending into the subalpine," the rich blue purple flowers large for the size of the plant. Dr. Parry must have overlooked it in 1861 by confounding it with his 259 (*P. glaber*, var. *alpinus*.) which, externally, it much resembles, but its affinities are with a different group. 389. *P. ALBIDUS*, Nutt. "Plains; flowers white." 391. *P. CONFERTUS*, Dougl., var. *purpureo-caruleus*, Gray, Rev. Penst. (*P. procerus*, Dougl.) A taller form of this, with large radical leaves, was sparingly gathered by Dr. Parry in the Middle Park. 392. *P. GLAUCUS*, Graham? var. *stenosepalus*, Gray, Rev. Penst. p. 70; the No. 262 of Parry. "South Park and Pike's Peak; alpine and subalpine." 393. *P. cassprosus*, Nutt., Gray, Rev. 1. c, p. 66. "South Park, at middle elevations." "Near the Upper Platte, first found by Mr. J. Harbour." Parry. A neat and very dwarf species, named by Nuttall, but unpublished, having been confounded with *P. pumilus*. 394. *P. PUBESCENS*, Soland., var. *gracilis*, Gray, 1. c. *P. gracilis*, Nutt. 395. *P. BARBATUS*, Nutt., var. *Torreyi*, Gray. 396. *P. HARBOUKII*, n. sp., Gray, Rev. Penst. p. 71. "Mount Breckenridge on Blue River, west of the main range, in the high alpine region near perpetual snow." A very distinct and dwarf species, named after its discoverer. 397. *CHIONOPHILA JAMESII*, Benth. High alpine, Pike's Peak, &c. Ripe seed having been collected, we may hope that this most rare and interesting plant may become known in cultivation.

398. *MIMULUS LUTEUS*, L.\* 399. *M. JAMESII*, Torr., var. *Fremontii*, Benth.; apparently a form of *M. glaberrimus*, HBK. 400. *M. FLORIBUNDUS*, Dougl. 401. *M. RUBELLA*, Gray in Bot. Mex. Bound, p. 116; but the limb of the corolla apparently yellow. "Subalpine; scarce." The same plant occurs in Dr. Lyall's collection on our northwestern boundary, from the Cascade

\* *Sf. LUTEUS*, L. var. *ALPINUS*; caulibus 3-pollicaribus «basif decumbente vel repente 1-3-floris; fl. rubiculis sive albis Bubintegerrimis. Alpine region, 13500 cull. Parry, 1842. Very glabrous. Farther north, Dr. Lyall collected a similar, but pubescent and small-leaved variety.

Mountains. 402. COLLINSIA. PARVIFOLRA, Nutt. SO. LIMOSELLA. AQITATICA, L. Apparently just the European plant. "Low mountains." (403, 404. See Poleinomiace;e.)

405. SYKTHYKIS PLANTAGINEA, Benth. Parry's 254, with a little P. A^PINA, Gray, Parry's 255.\* 406. VERONICA SERPYLLIFOLIA, L., an elongated form. 407. V. ALPINA, L. 408. V. AMERICANA, Schweinitz.

409. CASTILLETA BREVIFLORA, Gray, Ennm. PL Parry, No. 243, and p. (33S) 45, *Euchrcma*, Nutt. "High alpine." 410. C. IXTEGRA, Gray. 411. C. PAL-LIDA, var. *miniata*, Kunth., Gray, 1. c, (often with laciniate leaves,) with a dwarf form of *C. pallida* having purple bracts, Parry's 239 f 412. C. PAL-LIDA, the *C. Mptentrionalis*, Lindl. 413. ORTHOCARPUS LUTEUS, Nutt. 414. PEDICULARIS KACEMOSA, Benth. " Subalpine; common in pine woods. ^ 415. P. CRENULATA, Benth., in DC. Prodr. " Subalpine and alpine, South Park." This species was known only from very poor specimens collected by Fremont. These are good ones, but of a more dwarf and alpine form; stems only 6 to 9 inches high, glabrate, except some decurrent lines of pubescence; the leaves smaller and narrower. Corolla in the dried specimens of a deep violet-purple. 416. P. CANADENSIS, L. "In the mountains of middle elevation ;" not before known in this region. 417. P. BRAC-TEOSA, Benth. 418. P. PROCERA, Gray, Enum. PL Parry, No. 252. 419. P. GROZSLANDUA, Retz. *P. surrecta*, Benth., varying from' 4 to 16 inches high, and also in the length of the beak. 420. P. PARRYI, Gray, PL Parry, No. 251. 421. P. SUDETICA, Willd. var. Like the specimens of the preceding year; and Dr. Parry also collected a more dwarf-state. "Flowers red." 422. RHIHAXTHUS CKISTA-GALLI, L., var. *minor*.

#### LABIATIE.

423. HEDEOMA HISPIDA, Pursh. 424. H. DRUMMONDII, Benth. 425. MENTHA CAXADENSIS, L., var. *glabrata*. 426. SALVIA TRICHOSTEMOIDES, Puiah. Prob-ably a form of *S. lanceolata*, for which Bentham takes it. 427. S. PITCHERI, Torr. 428. MONAKDA AIUSTATA, Nutt. 429. LOPUAKTHUS AHISATUH, Benth. 430. DRACOCEPHALUM PARVIFLORUM, Nutt. 431. SCUTELLARIA RKSINOJIA, Torr.: pubescent and glabrate forms. 432. S. GALERICULATA, L,

#### BORRAGINAC2E.

433. ECHINOSPKRMUM REDOWSKII, Lehm., and a depauperate, diffuse or pro-cumbent form of EitiTRicHiuai CALIFORNICUH, DC. 434. ERITRICIUM CRASSI-SEPALUM, Torr. and Gr.; the specimens hispid with rough, spreading hairs, and the acliencia granulate, and also a more upright and narrower-leaved species, with pointed and smooth achenia, the same as Fendler's 635, named by Torrey *E. micnutthum*, sp. nov., and afterwards in my herbarium referred to *E. angustifolium*, Torr., which it hardly is. I think it is also *Cryptanthus hispidus*, Nutt., ined. 435. E. JAMESII, Torr. Very well marked by the smooth and acute-angled achenia, the section of each just a quadrant of a circle. 43C. HELIOTKOPIJUM (EUPLOCA, Nutt.,) CONVULVULACEUM, Gray. 192. H. CURAHSAVICL'M, L. Doubtless indigenous. 437. ECHIKOSPKKM'M FLORI-BCKDCM, Lehm. 438. ERITRICIUM GLOMERATIM, DC. ; a fine virgateform, like Parry's 2t-S, and a form with shorter and more branched inflorescence. (439, see Hydrophyllaceae.) 440. E. ARETIOIDES, DC. Beautiful specimens, like those of Parry's 278 in 18tfl; some of them Aretia-like, and only an inch high ; others with elongated flowering stems two inches high. While

• The latter. jiniiii copiously collected liy Dr. Pmry, in the high ilpino region, holds its charac-ters. (The haws *nro* aomofimea rotuiul-ovate and nmuifedly cordatu.) But a suite of specimeis supplied by Mr. Hall chown gradationR lietween the two.

T Parry\* '140. nRhin trarlingly collected In the alpine ivpion, is a similar form rf *C paJh'da*, with o short galca anil bright rod bracts, occasionally parti-colored with white: his 242 a dwarf, pale, alpine form, *C. occUUntalis*, Torr.

the scanty remains of the fruit of the former collection were analogous to that of *E. nanum* var. *Terglovense*, DC, well-formed fruit of the present collection is nearly as *E. villosum* is described and figured, having an inflexed margin with ciliate-spinulose teeth, thus lending confirmation to Dr. Hooker's view. And the back is almost as concave as in an *Omphalode*\*. It will thus apparently take the name of *E. villosum* var. *aretioides*, 441. LITHOSPERMUM PILOSUM, Nutt.; same as 295 of Parry. 442. MERTENSIA SIBIRICA, Don., non DC. Small form, exactly the *Pilmonaria ciliata*, Torr. Dr. Parry, as before (285), collected large forms, and now some with the leaves more glaucescent beneath. 443. MERTENSIA ALPIXA, Don. *Palmonaria alpina*, Torr. Barely a span high. 444. A very dwarf and hirsute form of the last, the sepals strikingly ciliate with long hirsute hairs, from South Park. These two numbers, and additional still dwarfer specimens of Parry's No. 280, induce me now to refer the latter (along with *M. Drummondii*) to *31. alpina*. 445. M. ALPIXA, Don., var.; the loosely paniculate, small-flowered form, Dr. Parry's 284, mixed in my set with *M. FENDLERI*, Gray, Rev. Mertens., in Suppl. Euum. PI. Parry, p. 46 (339); the latter, perhaps, runs into the former, but it is readily known by the barely 5-cleft calyx; the lobes only equalling or shorter than the tube.

## HYDROPHYLLACEJE.

439. PIACELIA CIRCINATA, Jacq. 446. P. POPEI, Torr. and Gray. "Flowers white." 447. P. (EDTOCA) SERICEA, Gray.

## POLEMONIACEJE.

448. POLEMONIUM CIERULEUM, L. A very viscid-pubescent and glandular variety; same as Parry's 275, and, (except that the stem is very leafy to the top,) Geyer's 530, and Fendler's 645. \*\*Low and middle elevations.<sup>1</sup> 449. P. CARULEUM, L., answering to the plant of the Old World, except that the seeds are more or less wing-margined at each end; so it is the var. ? *pterosperma*, Benth. in DC. "Subalpine, in swampy places." 450, 451. P. CONFERTUM, n. sp.\* *P. pulcherrimum* in Enum. PI. Parry, No. 274, but not of Hook. "High alpine, and at lower elevations." 452. P. PULCHELLUM, Bunge; just the Altai plant; and also accords with some of Hooker's speci-

\* P-LBMD<urt oVPwrimrNp. nov.): hu.nlle (%->-pollicire) pi. in. viscoso glawlulosum. odorem moschatum rcdolens; foliis numeroais.iiniH par vis (H-5 lin. longis) ovalibua seu lineari-oblongis \$leri9<i)ie |rrcg|i|Aiiiterverticillato seufascicuteto-conftrtis {nempe xingulis 2-3-wcf/s); floribus ad apiceni caulis simplicis capf tato-confortis nutanfibiw; ralycis segmentis lanceolatis acutis tubo oblongo brevioribus; cnoUa-infundihubformi (saepius pollicari) calyem bis terve superante, lobiſ rotun<latis tubo 2-5plo brovioribus. Var. a. (*P. pulcherrimum*, Gray, Enum. PI. Parry, non Hjuk.): capituln floruin deqpo, fructifi-TO arete spicat>; corolla? laete cterulete lim>o amplo. Hall and Harbour coll. 450; strictly alpine Var. j3 MELLHUM: floribus in spicam laxiorem foliosuni dieeatis nunc subpaniculatin odorcem mellisupiruntibiis; c>rolln aut cierulea aut saepius ochroleuoa, lobiJ minoribus tubo productiure 3-4-plo brevioribur. In crevices of rocks, wholly below the alpine region. Leaves exalngthe musky odor of var. a: the flowers with a delicious honey-like fragrance. Hall and Harbjur,coll. 451. In the present condition of the species of *Polemonium*, I could not venture to add another to the list, if the present were not shown, by the fine suite of specimens now collected, to be a moat distinct one. It is probably (at least in the var. a) the very handsomest of the genus; and, as ripe seeds were collected, it may be brought into cultivation. I cannot doubt that the two varieties are of one species. The ampler limb of the corolla of var. a (when fully expanded sometimes ten or eleven lines in diniriHter), often renders the funnel form tube less conspicuous; but this form passes by gradations into those of var. j3, in which the narrow tube of the corolla (9 or 10 lines 1>ng) three or four times <xends the smaller lobes. Indeed, this connects Jb-Umoniuu as closely with *Ipimopsi*\* as the latter is conn'ct.1 with true *Gilia*. A high alpine form of Tar. a was collected by Dr. Lyall intho llucky Mountains farther north, lat. 49°, at tho height of 8000 feet, having the verticillate leaflets of the species, but a less exuerto.l corolla. It was taken for /. viscosum, Nutt.; but the minute leaflets of the latter are not verticilUtc or fascicled, although much crowded, and its calyx and corolla are quite different, allying it to *P. pulchellum*. I make small account of the ovules, finding them to vary widely in number in FffiuOit flowers of the same inflorescence; but in var. a, I have eountc I a dozen in each "till, in var. p, usually only 4 to 6. The anthers arc more oblong than in *P. cieruleum*. Bew.iiu of the change of shape which the effete anthers undergo: when dry, they are short-oval, when soaked they boome elongated-oblong, as *P. Richardmnii* is figurol in Hot. Mag. In liko mauner those of *P. cxrukum* change from rotund to short-oblong.

inens of *P. pulcherrimum*; both of which, with *P. capitatum*, etc., do seem to pass into Arctic forma of *P. cosruleum*. 453. PHLOX DOUG LASH, Hook. 454. *P. nuMILis*, Dougl. ? 455. *P. HOODII*, Richardson. 403. COLLOMIA GRACILIS, Dougl. 404. C. LINEARIS, Nutt. 456. GILIA PINNATIFIDA, Nutt. ined. 457\* G. INCONSPICUA, Dougl. 458. G. LONGIFLORA, Benth. (*Cantua longiflora*, Torr.) 459. Gk AGCUSEGATA, Spreng. (*G. pulchella*, Dougl.) With white as well as red flowers. 460. G. SPICATA, Nutt., in PL Gamb. The same as 271 of Parry's collection. 461. G. COXGESTA, Hook, var. ? with the leaves mostly entire. "Alpine." (462. *Chamrerkodis erecta*. See Rosaceae.) 463. GILIA (LEPTODACTYLON) PUHGEXS, Benth., from which *G. Hooheri* scarcely if at all differs.

## CONVOLVULACEIE.

464. CUSCUTA ARVENSIS, Beyrich, var. *pentagona*, Engelm., a form with a small calyx. 579. EVOLVULUS ARGENTEUS, Pursh.

## SOLANACEJE.

465. SOLANUM ROSTRATUM, Dun. 466. PHYSALIS LOBATA, Ton\*, a form with the leaves little lobed; the corolla purple or blue. 467. SOLANUM TRIFLORUM, Xutt.

## GENTIANACEJE.

468, 469. GENTIANA AFFINIS, Griseb. ;\* the former a more condensed form; the latter is 439 of Parry's separate collection. "Common in the subalpine region." 470. G. PARKYI, Engelm.f, a form with narrower leaves than Dr. Parry's specimens of the preceding year. ^Subalpine." 471. G. DETONSA, Griseb., which Dr. Engelmann, with reason, reduces to a variety of *G. crinita*.% 472. G. FITIGIDA, Haenke, var. *alyida*, Griseb.: most beautiful specimens of Parry's 305, so new to this country. 473. G. ACUTA, Michx.; in various forms; perhaps in some sets with a little of the too nearly related *G. tenuis*.§ 474. G. HUMILIS, Stev. 475. G. PROSTRATA, var. *Americana*, Engelm. 476. SWERTIA P^RENNIS, L. 477. PLEUROGYNE ROTATA, Griseb.|| "South Park, subalpine:" 553. FRASERA SPECIOSA, Dougl.]

## ASCLEPIADEIE.

478. ASCLEPIAS BRACIYSTEPiAyA, Torr.; a dwarf form of this rare species, collected on the plains. 479. A. SPECIOSA, Torr. (4. *Douglasii*, Hook.)

\* GENTIAN\* AFFINIS, Gris. *genuina*: caule virescule; bnictis cjilycem fere scquantibus; calycis lobis insqualibustubum longioremIntegrum seu vaiusspatbacsu-fissumsubatquautibus; corolla anguste clavata pallide oerulscnte.

(iENTiA\A AFFINIS, var. *brachycalyf*: caule purpurascnte; bracteis floruin superiorum brevisimia; calycis tubo.abbreviato truncato seu breTissime dentate lubatove; corolla majore subTen\* trienfla azurea.

This form has the appearance of a distinct species, but the characters taken from the talyx are variable; besides, Dr. Parry has bent specimens of it with a more distinctly lobed calyx. Other Mpecimens collected by Mr. II. Engelmann, on Sweet Water Hirer, have either an entire or a scmispathaccous calyx, with lobes of different proportions: his specimens show many ascending stems growing from a large root, with numerous yellowish fleshy fibres.—O. Engelmann.

f GKNTIANA PAKRYI, Eug, a narrow-leaved form. Dr. Parry informs me that the iarrow-leaved varieties are often one-flowered, and their stems single, while the bnmdr-loav.nl form (coll. tarry, 1861, No. 304) usually occurs iu bunches; the boat-uhaped bracts, the small calyx lobos, and the bind folds of the corolla are never wanting, and distinguish it readily from the allied *G. calycosa* —G.E.

X GBNTIANA BARBELLATA, Kng'ilm. in Trans. Acad. St. Louia, 2, 1. 11 (ineJ.). ia Dr. Purry'fe 440, a truly alpine, dwarf and very beautiful species, closely related to *G. crinita*, *ciliata*, Ac.

| On examination of a series of specimens, Dr. Engelmann is inclined to view *G. teitirit*, Grifeb. as an extreme form of <?. *acuta*, and also to adopt the conclusions of those who regard the latter as specifically identical with *G. A mar el la* of the Old World. Hu adds the following note.

GENTIANA ACUTA, Michx. Undoubtedly an American subspecies of *G. Amurdla*. Messrs. Hall and Harbour have sent a large suite of specimens, which, together with Dr. Parry's (1801, NOB. 30? and 309), show an extreme variability in size, manner of branching and arrangement of flowers, shape and size of leaves, proportion of calyx, size and color of corolla and size of seeds.—G. Engd\*mann.

R Dr. Engelmann remarks up >n this, 1st. That the ovules cover the whole surface of the ovarian cavity; 2d. That the structure of the corolla is that of *Swertia*, the nectarun glands at the base of the segments of the corolla being surrounded by a petaloid funnel with fringed edges; so that the curious lateral stigma principally separates the genus\* fioni *Swertia*.

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"On low mountains." 480. A. OVALIFOLIA, Decaisne, Gray, Man., 1862, var. 481. A. VERTICILLATA, L., a common dwarf variety of the region, only three or four inches high.

## NYCTAGINACEJE.

482. OXYBAPHUS ASGUSTIPOLIUS, Sweet; the same as Fendler's 745. 483. 0. NYCTAGINEUS, Sweet, with the upper leaves nearly sessile; both glabrous and hirsute forms. 572. ABRONIA FRAGRANS, Nutt. 573. A. CYCLOPTERA, Gray.

## CHENOPODIACEJE.

484. OBIONE ARGENTEA, Moq. "The same as 574 of Wright, and 708 of Fendler. 485. CHENOPODIUM HYBRIDUM, L. "Low mountains; rare." 486. MOXOLEPIS NUTTALLIANA, Moq. (487. See Amarantaceae.) 488. CHEXOPODINA. DEPRESSA, perhaps also *C. prostrata*, Moq. "South Park, and on the plains." The root is annual. 489. C. MARITIMA, var. *erecta*, Moq. 308. OBIONE CANESCENS, Moq.

## AMARANTACBJS.

487. FRSLICHIA (OPLOTHECA, Nutt.) FLORIDANA, Moq. "Sand hills, on the plains."\*

## POLYGONACEJE.

490. POLYGONUM BISTORTA, L., var. *oblongifolium*, Meisn. 491. P. VIVIPARUM, L. 492. P. TENUE, Michx., in several varieties, one of them (Parry's "No. 322a of 1862) from the alpine region, only two or three inches high, with oblong or oblong-lanceolate leaves, appears to be to *P. tenue* what *P. aviculare*, var. *nanum*, Boiss., is to the ordinary *P. aviculare*. 493. P. COARCTATUM, Dougl., var. *minus*, Meisn.; a depauperate form? "Blue River, on the western slope of the Rocky Mountains." 494. OXYRIA DIGYNA, R. Br. 495. RUMBX VENOSUS, Pursh. 496, 498. R. SALICIFOLIUS, Weinm. 497. R. RUMITIMUS, L. "Subalpine, and on the plains of Nebraska." 499. R. LONGIFOLIUS, DC. (*R. Hlppolapathum* and *R. domesticus*, Fries. Extends into the mountains; very common. 500. ERIOGONUM ALATUM, Torr. 501. E. ANNUM, Nutt. 502. E. EFFUSUM, Nutt., with rose-colored flowers. 503. E. CERNUUM, Nutt. 504. E. UMBELLATUM, Ton, both with straw-colored (Parry's 318,) and with deep yellow flowers (Parry's 315). 505. E. FLAVUM, Nutt., a low form from the alpine region, and a large variety (var. *crassifolium*, Benth.) from a less elevated region. \*

## ELJEAGNACEJE.

506. SHEPHEBDIA CANADENSIS, Nutt. "Subalpine pine woods."

## SANTALACEA

507. COMANDRA PALLIDA, var. *angustifolia*, A. DC. *C. angustifolia*, Nutt.,  
1116 d,

## LORANTHACB2E.

574. ARCEUTHOBIUM CAMPYLOPODUM, Engelm. Probably only *A. Amerikanum* Nutt.

## EUPHORBIACEJE.

508. EUPHORBIA MARONATA, Pursh. 509, ("also 438 of Parry) E. MONTANA, Engelm. 510. E. DICTYOSPERMA, Fisch. and Mey. 511. E. HEXAGONA, Nutt.

\* On the plains, in similar situations, Mr. Hall collected *Amblygyna (Sarratia) Ibyi*, Gray, in Proceed. Amer. Acad., 5, p. 169, the narrow form, noted in H. Engelm's collection. Parry's No 323, referred doubtfully to *Montdia*, is probably the male of this.

f Dr. Engelmann, in a letter, referring all the forms of No. 492 to *P. tenu*, arranges them as follows:—"Var. a. COMMUNE: majus; nucibus majoribus (sesquilineam longis). p. MICROPERMCM: minus, gracilius; nucibus viz lineam longis. y. LATIFOUUM; huinilo; foliis oblongis; spioiB coarctatis; bracteis superioribus (aristo destitutis) muticis. Meisner, in the Prodrum. is wrong in saying that the nuts are subopaque rough on the edge; they are perfectly smooth and shining with concave side\* and an acuniation."

512. *E. PETALOIDEA*, Engelm., with the small-flowered form named *E. polyclada* by Boissier. 513. *E. FENDLERI*, Torr. and Gray; the inappendiculate form. 514. *CROTON (HENDECANDRA) MUBICATUM*, Nutt. 309. *TBAGIA BAMOSA*, Torr.

## CUPULIFER-ffi.

515. *QUERCUS DOUGLASII*, var. *Neo-Mexicana*, A. DC. 516. *COBTUS BOSTRATA*, Ait.

## BETULACE^,

517. *BETULA OLANUIOSA*, Michx. "Subalpine." 518. *B. POPYBACEA*, Michx., var., called *B. alba*, var. *glutinosa* in Parry's Enumeration. 519. *ALNUS VIBIDIS*, Ait.

## SALICACE^.

520. *SALIX ARCTICA*, R: Br. 521. *S. BETICULATA*, L. This and the last are high alpine species. 522. *S. BOSTBATA*, Richards. (6\*. *vagans*, Anders.) 523. *S. GLAUCA*, L. "Subalpine." 524. *S. COBDATA*, Muhl., or *VITELLIHA*, L. 525. *POPULUS ANGUSTIFOLIA*, Torr. "Foot of the mountains." 526. *P. BALSAMIFEKA*, L., var. *candicans*. "Subalpine; rather rare." 527. *P. TBEWTOIDES*, Michx.

## CONIFERS.

528. *PIBUS PONDEBOSA*, Dougl.; Engelm. in Enum. Pl. Parry, Suppl., p. (39) 332. 529. *P. PLEXILIS*, James; Engelm., l. c. 530. *P. ARISTATA*, Engelm. l. c. 531. *P. COHTOETA*, Dougl.; Engelm., l. c. 532. *P. KDDLIS*, Engelm. 533. *ABIES MESZIESII*, Lindl. 534. *A. DOUGLASH*, Lindl.

## ORCHIDACEiB.

535. *PLATANTBERA HYFEBQXBA*, Lindl. 536. *P. OBTFSATA*, Lindl. 537. *CALYPSO BOREALIS*, Salisb. 538. *CYPBIPEDIUM PABVIFLOBUM*, Salisb. 539. *SPIRANTHSS GEMMIPARA*, Lindl., from South Park, in the Rocky Mountains, (and one or two specimens were collected by Dr. Parry on South Clear Creek, July, No. 441);—quite resembling the Irish plant in aspect and in the labellum, etc., but the sepals rather narrower and less blunt,—mixed (in my set) with taller specimens, from the plains, of a narrow-leaved form of *S. CEBNUA*, having very large nipple-shaped calli on the base of the labellum. The labellum of the former, when flattened gut, is in outline ovate or ovate-oblong, with a narrowed subapical portion below the cordate-rotund erose-crested summit. The forms of *S. cernua*, or the species allied to it, are thus far quite inextricable. The present Rocky Mountain specimens are exceedingly interesting, whether absolutely identical or not with the much-vexed and isolated *S. gemmipara*. They have not the long-acuminate bracts of *S. Romanzoviana*, of which my specimens are too young to allow a comparison of the flowers.

## AUSMACEiE.

540. *TRILOCHIN PALUSVRE*, L. 541. *T. MABIMUK*, L. Both from the mountains.

## IRIDACEÆ.

542. *IRIS TEKAX*, Dougl.? "Subalpine, and at lower elevations; common." This, now collected in flower, we had in fruit, collected on the Laramie Mountains by Dr. Hayden, and at Bridgets Pass by Mr. H. Engelmann. The spathe is more ecarious and the capsules larger than in *I. tenax*.

## LILIACEJE, incl. SKILACEA, MELANTHACRX, etc.

543. *STREPTOPUS AMPLEXIFOLIUS*, DC. 544. *SMILACINA STELLATA*, Deaf. 545. *ALLIUM BIPELLATUM*, Fraser. 546. *A. SCHCKNOPRASUM*, L. 547. *A. CEBHUUM*, Roth. 548. *LEUCOCBIKUM MOICTANUM*, Nutt. 549. *CALOCHORIDS TENUS-*

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TUS, Benth. ex Torr. 550. ZYGADEXUS GLAUCUS, Nutt. 551. AMIANTHIUM NUTTALLII, Gray. 552. LLOYDIA SEBOTINA, Reich. "Pike's Peak, in the alpine region."<sup>11</sup> (553. See Gentianaceae.)

## JUXCACEJE.

554. LUZULA SPICATA, DC., var. near *L. Peruviana*; the same as 392 of Dr. Parry. 555. *L. PAKVIFLORA*, DC. 556. *L. COMOSA*, E. Meyer (with a little *L. campestris*). 557. *JUNCUS TRIGLUMIS*, L. 558. *J. ARTICULATES*, L., var. *pelocarpus*, Gray, Man. 559. *J. BUFONIUS*, L. "Subalpine."<sup>1</sup> 560. *J. CASTANEUS*, Sm., an alpine form, the same as Parry's 358. 561., 562. *J. ARCTICUS*, Willd., var. *gracilis*, Hook. ? Alpine and subalpine. The same as Parry's 360. It appears like a depauperate and attenuated form of *J. arcticus*; but as most of the cauline sheaths are leaf-bearing, it is probably of a distinct species, so far as I know, yet undescribed. Dr. Lyall collected it, as well as the true *J. arcticus*, in the Cascade Mountains, farther north. 563. *J. ARCTICUS*, Willd., proper, with leafless sheaths and more less attenuated stems. 564. *J. XIPHIODES*, E. Meyer. Well marked by its flattened stems as well as leaves. It was also collected in this region by Fendler (858), H. Engelmann, and in the Rocky Mountains, farther north, by Bourgeau. 565. *J. ENSIFOLIUS*, Wikstr. This has "terete flaccid culms." 566. *J. MENZIESII*, R. Br.; the same as Parry's 361 so named, Fendler's 857, Wright's 1924, and Coulter's 808, the var. *Californicus*, Hook, and Am. Probably an unpublished species. 567. *J. BALTICUS*, Willd.

568—580. Various Dicotyledonous plants, enumerated above under their respective orders.

## CYPERACEÆ.

581. *FIMBISTYLIS LAZA*, Vahl. 582. *SCIRPUS PAUCIFLORUS*, Lightf., which Drummond had formerly collected in the Rocky Mountains, and which has been detected at several points along the northern frontier of the United States. 583. *C. CBSITOSUS*, L. Also eubalpine. 584. *CYPERUS SCHWEINITZII*, Torr. "Low mountains, lat. 39°."

585—620. *Carices* here given from the determination and notes of Dr. Boott:—

585. *CABEX ATBATA*, L. (OVATA) : spicis 3 oblongis (inferioribus pedunculatis parce masculis) atro-purpureis; perigyniis floriferis glauco-viridibus. 586. *C. ATBATA* : spicis confinis ovatis crassis, inferiori subsessili; perigyniis floriferis margine viridibus squamis atropurpureis demum ferrugineis subquilonis. Vide Parry, 389. 577. *C. ATRATA* (NIGRA) : spicis subtrotundis congestis vel infima discreta sessilibus; perigyniis ovalibus vel ellipticis cylindrico-rostratis superne praecipue ad margines rostri dentatis; stig. 2-3. Graoillior, altior quam pi. Helvetica rostroque longiore, perigyniis pallidis. Eadexn ac Parry, 383. 588. *C. ATBATA*, L. and *C. BIGIDA*, Good., mixed. 589. *CABEX FESTIVA*, Dewey. 590. *C. FESTIVA*, Dewey; young.

591. *CABEX BOVPLAVOII*, Eunth. ? var. *minor*: perigyniis rarissime ad margines scabris. See Couthouy's specimens from the Andes of Quito.

592. *CABEX MUBICATA*, L. ? with smaller perigynia, like Fendler's No. 884, in part. 593. *C. BICCATA*, Dewey. 594. *C. DISTICHA*, Huds. (*C. Sartwellii*, Dewey.) 595. *C. GATANA*, Desv., Boott, 111, t. 411. 596. *C. DEWEYANA* Schw. 597. *C. STENOPHYLLA*, Wahl.

598, 599. *EOBBESIA SCIBPINA*, Willd., or perhaps with some *K. CABICIXA*, Willd.

600. *CABEX DOUGLASII*, Boott. Here, as in all other collections, in flower only. 601. *C. TENELLA*, Schk. 602. *C. CANESCENS*, L. 603. *C. POLYTIBICHOIDES*, Muhl.

604. *CABEX FILIFOLIA*, Nutt., var. *culmo validiori*; perigyniis plano-triquetris glaberrimis margine serrulatis; squamis minus late scariosis; rhaeolea ut in 1863.]

forma typica. 605. *C. PILIFOLIA*, Nutt.; the ordinary form. [Parry's 442 is a high alpine form of the same species.]

606. *CAREX OBTUSATA*, Lil. 607. *C. PAUCIFLORA*, Lightf. 608. *C. PYEENAICA*, Wahl. 609. *C. NIGRICANS*, C. A. Meyer. 610. *C. SCIRPOIDEA*, Michx. 611. *C. GEYBBI*, Boott. 612. *C. BACKII*, Boott. 613. *C. CAPILLARIS*, L.

614. *CAREX LONGIROSTRIS*, Torr., var. *minor*; culmo brevi; spicis abbreviatis; roatro brevior. 615. *C. AMPULLACEA*, L. (*utriculata*, Boott.) 616. *C. JAMESII*, Torr. and *C. AWGUSTATA*, Boott, mixed. 617. *C. PARRITA*, Dewey. Some specimens have two spikes, the terminal masculine; others have either one or two spikes; both wholly feminine. 618. *C. ALPINA*, Sm. (*Vahlia*, Schk.) 619. *C. BUXBAUMII*, Wahl. 620. *C. Rossii*, Boott.

#### GRAMINE.E.\*

621. An ambiguous and undetermined Grass, between *Fetluca* and *Melica*. 622. *DANTHONIA SERICEA*, Nutt. [2>. *unispicata*, Munro, ined., is a reduced form of this, to which belongs Geyer's No. 189.] 623. *A VENA STBIATA*, Michx. 624. *CALAMAGROSTIS SYLVATICA*, DC. 025. *TBISETUM SUBSPICATUM*, Beauv., with a remarkable open-paniced form. 626. *STIPA VIRID-ULA*, Trin., the *S. parviflora*, Nutt. 627. *AIRA CSSPITOSA*, L., two forms; the smaller and more alpine of which is the var. *arctica* (*Deschampsia brmfolia*, R. Br.); the larger is intermediate between that and the ordinary form of the species. Parry's 36? of 1862 connects the two.

628. *HIEBOCHLOA BOREALIS*, R. and S. 629. *GLTCERIA AQUATICA*, Smith. • 630. *G. (HELEOCHLOA) AIBOIDES*, Thurb., the *Poa airoides*, Nutt.

631. *VILPA TRICHOLEPIS*, Torr.; a remarkable species, which it may be necessary upon further study to remove from the genus. 632. *MUHLENBERGIA PUNGENS*, n. sp.f 633. *ERIOCOMA CUSPIDATA*, Nutt. 634. *ORYZOPSIS MICRANTHA*; *Urachne micrantha*, Trin. A very distinct species, differing from *O. Canadensis* Torr., in its elongated panicle, smaller spikelets, glabrous palcae, and much longer awn. 635. *GRAPHEPHORUM? FLEXUOSUM*, n. sp.J 636. *BOUTELOUA OLIGOSTACHYA* Torr. 637. *BUCHLCE DACTYLOIDES*, Engelm. *leria*, Nutt.); the staminate plant only. 638. *MUNROA SQUARROSA*, Torr. 639. *SPARTINA GRACILIS*, Trin.; the name wrongly attributed to Hooker by Steudel; it is *S. JUKCIFORMIS*, Engelm; and Gray, Pl. Lindl. 1, No. 207. 640. *BRIZOPYRUM SPICATUM*, Hook, var. *ttrictum*.

641. *SPOROBOLUS ASPERIFOLIUS*, Nees and Meyen. 642. *MUHLENBERGIA GRACILLIMA*, Torr. 643. *SPOROBOLUS RAMULOSUS*, HBK. 644. *LEPTOCHLOA FASCICULARIS*, Gray; a remarkable and large form; which has been by seven

\* By Prof. George Thurber. On account of illness, Prof. Thurber has been prevented from studying those Grasses as thoroughly as could be wished. A more critical account of some of them may be expected hereafter.

f *MUHLENBERGIA PUNGENS* (Thurber, sp. nov.): culmo e rhizomate ropento 1-lfr-pedali foliisque rigidia convolutis pungentibus patentibus (1-1| poll, longid haud lineam latis) minute pul)escentibus, ligula brevi ciliata; paniculis 3-4-pollicaris radiis solitariisdissitisbasi nudisfasciculatim ramobis; pedicellio capillaribus scabris spiculis (cum arista 2) lin. longis) pluries longioribus; glumiq fere equalibus) acuminatis vel seta apiculatis floro dimidio brevioribus; callondu rudimonto minimo prsedito; palea inferiori scabra acuta in aritam asperam Bem i-vel Bublinoam longam producta. superiori subaequilonga, nervis ezcun'entibus bisetiferis; staminibus 3.—A striking species, with very pale green foliage, and a purplish panicle. Collected also by Mr. H. Engelmann in Nebraska, ami by Dr. J. S. Newberry in Ives' Colorado Expedition.

t *GRAPHEPHORUM? VLBXUOSUM* (Thurber, sp. nov.): culmo tripediili lsvi; vaginis internodia suporantibus annulo pilorum pro ligula instructis; foliis sesquipedalibus 2 lin. latis setaceo-acuminatis; panicula laxiflora, radiis sparsis (iiflrais distantibus circ. 4 poll, longis) inferne nuda in ramulos paucos capilbires solutis; podicellis spiculis ovatis compressis 3-6-floris) 2f-3 lin. longis) duplovel quidruplo longioribus; gluuiin mombranacois uninerviitf acutis spicula dimidio brevioribus; palei inferiori carinata trinorvi (norvis latoralibu9 prominontibus) scabro-pubescente apice ero80-denticulati cum mucrone baai villifera, superiori subaequilonga oximie bicarinata bidootata. Stain 3. Ovarinm Htipitatum. Squamula 2, oblique truncatsB. Caryopsis libera. Dr. J. M. Bigelow collected this Grass several years ago on the Canadian lttver. It is doubtfully referred to *Orophophorum* as that genus is defined by Dr. Gray in the Proceedings of the Botanical Society of Canada. But the joints of the rhaohia are very short, and the tuft of hairs seems rather to belong to the palea.

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ral western collectors, but I am unable to distinguish it specifically from the plant of the Atlantic States. 645. TBICUSPIS PURPUREA, Gray. 646. STIPA MONGOLICA, Turcz. (*Ptilagrostia Mongolica*, Griseb. in Ledeb., Fl. Ross.) I have no specimen by which to confirm this determination, but it accords so well with the description, except as to size, as to leave little doubt.\* This makes the third species with a plumose awn found in our territory.

647. SPOROBOLUS AIROIDES, Torr. 648. S. CRYPTANDRUS, Gray, same as 945 of Fendler. 649. CALAMAGBOSTIS BTRICTA, Trin., with some C. SYLVATICA intermixed. 650. KCELERIA CRISTATA, Pers., a very attenuated form. 651. ANDROPOGON ARGENTEUS, DC. (-4. *Jamesii* and *A. glaums*, Torr.) 652. ARISTIDA PURPUREA, Nutt.; the form called *A. Fendleriana* by Steudel. 653. PASPALUM SETACEUM, Michx.

654. ELYMUS near COXDENSATUS, Presl. and apparently E. TRITICOIDES, Nutt., mixed. 655. TRITICUM REPENS, L., var. [656. T. CANINUM, L. var., the same as Parry's 381, named *T. agilopoides* in the coll. of 1861, but wrongly; along with attenuated T. REPENS, L. 657. T. EGILOPOIDES, Turcz., *A. gropyrum divergent*<sup>^</sup> Nees.]

658. BBCKMANNIA ERUC<sup>^</sup>FORMI<sup>^</sup>, Host. 659. SPOROBOLUS AIROIDES, Torr. 660. VILFA DEPAUPERATA, Torr. This was described from an extremely reduced form of a very variable species, of which *V. utilis*, Torr., is an attenuated state. 661. V. CUSPIDATA, Torr. Like others of the genus, this presents great differences in the relative length of the glumes and paleae.

662. GLYCERIA PAUCIFLORA, Presl. 663. GATABROSA AQITATICA, Beauv. 664. MUHLENBERGIA GRACILIS, Trin. 665. FESTUCA OVINA, L., var. *duriuscula*, Gray. 666. F. RUBRA, L.; very young. 667. F. SCABRELLA, Torr.? Perhaps a very narrow-leaved form of this species, of which specimens collected by Dr. Bigelow in New Mexico are the opposite extreme.

668. POA near P. NEMORALIS, L. It is 375 of Parry. 669. P. ANDINA, Nutt. in herb. Acad. The Poas of this collection, including some undistributed specimens, present several puzzling forms, which can be accurately determined only by a much more thorough study than can be given them at present. 670. P. ARCTICA, R. Br., (Parry's 376,) mixed with some of *P. alpina*.

671. AGROSTIS VARIANS, Trin. Agrees well with Hooker's No. 217, quoted by Trinius, but some specimens have a strong awn. 672. POA SEROTINA, Ehrh. 673. AGROSTIS near RUPESTIBIS. 674. POA ALPINA, L., mixed with one which may be a variety of it. [675. POA, near 669 and 677.] 676. P. ARCTICA, R. Br.? 677. P. ANDINA, Nutt. 678. POA, undetermined species.

679. SITANION ELYMOIDES, Raf. Two forms of this variable grass, which will probably be reduced to *Elymus*. 680. TRITICIUM CAXINUM, L., var. same as 381 of Parry. 681. HORDEUM JUBATUM, L. 682. ALOPECURUS PRATENSIS, var. AXPESTRIS, Wahl. (*A. glaucus*, Less.) ex Gray. 683. A. GENICULATUS, var. ARISTULATUS, Michx. 686. LEPTANS PANICULATUS, Nutt. 685. VASEYA COMATA, n. gen. and sp. This remarkable grass, which really appears to form a new genus, intermediate between the Arundinaceae and the 4-grostidese, is dedicated (by the collectors' desire, seconded by Dr. Gray) to Dr. George Vasey, of Ringwood, Illinois, one of the most zealous of our Western botanists. The following are its principal characters:

#### VASEYA, nov. gen.

Panícula coarctata. Spiculae uniflorae, herbaceo-membranaceae. Glumae uninerves florem aequantes. Callus obliquus, comam pilorum paleis aequilongam gerens. Palea inferior trinervis in aristam gracilem attenuata; superior aequilonga, acuminata. Stamina 3. Ovarium stipitatum. Styli ultra medium pilis stigmaticis longis simplicissimis instructi. Squamulae . . . Garyopris . . . V. COMATA, a native of the plains of Nebraska; is a

\* A comparison with an authentic but imperfect Mongolian specimen confirms Prof. Thurber's determination.—A. G.

perennial grass, with the aspect of a *Mulenbergia* or of a *Polypogon*, but with\* a coma of silky hairs around the flower, as in a *Calamagrostis*. Culm a foot and a half high, from a creeping rhizoma, retrorsely pubescent at the nodes. Sheaths scabrous, equalling the internodes; ligule short, fringed; leaves 3 or 4 inches long, dull green, rough on both sides. Panicle lead-colored, about 3 inches long; the branches solitary, appressed, densely many-flowered. Spikelets very short-pedicelled, compressed, pubescent, a line and a half long. Glumes narrow, very acute, serrulate on the keel, the lower a little the longer. Awn rough and flexuose, purplish, three or four lines long.—G. *Thurber*.

#### FILICES.

687. ASPIDIUM FILIX-MAS, Swartz.; apparently identical with the European plant. 688. CRYPTOGRAMME ACROSTICHOIDES, R. Br., by Sir Wm. Hooker regarded as a variety of *AUOSOTUS crispus*. 689. ASPLENIUM SEPTENTRIONALE, L. This was collected by G. Wright farther south; and these two stations are the only known American ones. 690. CYSTOPTEBIS FRAGILIS, Bemh., mixed with a *WOODSIA*, the same as Parry's 394, formerly named *W. obtusa*; but it is of a different species. 691. CHEILANTHISS FENDLERI, Hook. 692. ASPLENIUM TRICHOMANES, L. 693. NOTHOCHLJENA FENDLERI, Kunze, *Filices*, 2, p. 87, t. 136; the same as Parry's 396. A species recently distinguished from *N. dealbata*. 694. POLYPODIUM VULGARE, L. 695. P. DRYOPTERIS, L.

### Catalogue of the FISHES of Lower California, in the Smithsonian Institution, Collected by Mr. J. Xantus.

BY THEODORE GILL.

#### PART IV.

##### Subfamily *SERRANINJE* (Swainson.)

Nine genera of this subfamily are now known to be represented by species along the western coast of America and the Gallapagos Islands. They may be thus distinguished:—

- I. Caudal with the lobes acuminate.
  - Lateral line before superior, deflected behind.....Pronotogrammus.
  - Lateral line normal.....Brachyrhinus.
- II. Caudal not forked.
  - A. Canine teeth developed.
    - B. Dorsal spines XI.
      - C Nostrils in a vertical row.....Mycteroperca.
      - CC. Nostrils in a longitudinal row.
        - Body oblong; smooth above lateral line.....Labroperca.
        - Body oval, with ctenoid scales.....Epinephelus.
      - BB. Dorsal emarginated; spines X.
        - C. Head with profile decurved, scaly above.....Paralabrax.
        - CC. Head conic; naked between eyes.
          - Spinous dorsal rounded.....Atractoperca.
          - Spinous dorsal, incurved behind the third elongated spine.....Gonioperca.
      - AA. Canine teeth entirely obsolete.....Dermatolepis.

The preceding table gives only the more striking characters; those are accompanied by others, which appear to amply authorize their generic distinction. In the table, the genera do not follow each other in a strictly natural order.

#### Genus PRNOTOGRAMMUS Gill.

This genus has the form of *Brackyrhinus*. The body is covered by moderate,  
[Mar.]

ctenoid scales. The lateral line runs high on the sides for the greater part of its length, but is abruptly deflected behind, and thence continued along the middle of the caudal peduncle. The head most resembles that of *Brachyrhinus*. The preoperculum is serrated on its posterior margin, and has a strong compressed spine at its angle. The operculum has three acute angles, the middle continued from an internal rib. The teeth are like those of *Serranus* &c.; two large ones exist on each side of the front, in the margin of the upper jaw, and one on each side, near the symphysis in the lower; while there are also two on the sides. The vomer and palatine bones have villiform teeth. There are, apparently, only six branchiostegal rays. The dorsal is undulated, and has ten spines. The anal has three strong spines, the second of which is largest. The lobes of the caudal are acute; the pectorals acutely rounded; and the ventrals angulated.

PRONOTOGRAMMUS MULTIFASCIATUS Gill.

The greatest height equals or slightly exceeds a quarter of the length from the snout to the end of the median caudal rays. The head equals a third of that length, and contains the diameter of the eye,—which is oval,—three times. The snout is less than half the diameter of the eye. The spines of the dorsal rapidly increase to the fourth, which nearly equals a seventh of the length, and thence decrease to the last, which equals about an eleventh of the same. The longest ray about equals the longest spine. The second anal spine is more than twice as long as the first, equals the fourth dorsal one, and is considerably longer than the third anal one. The median caudal rays enter 6 times in the total length, while the longest exceed the greatest height. The pectoral fin commences little before the end of the first third of the length, (32,) and equals a quarter of that length. The ventral is inserted considerably in advance of the pectoral, (28,) and is rather shorter than it.

1  
D. X. 15. A. III. 6— P. I. 14. V. I. 5. C. 10. 1. 8. 7. 1. 9.  
1  
3 5  
Scales 31+2+12—  
17 5

The latter is deflected on two scales. The color is tawny yellow, with numerous (-20) rufous bands descending nearly to the middle, and rather wider than the tawny intervals.

Only one specimen, whose extreme length was little more than two inches, was obtained.

Family *OFFILODIPTEROIDJ0* Bleeker.

Genus *AMIA\** Gronovius.

The *JHonoprion* of Poey is perfectly congeneric with the type of the genus *Amia*; the genus *Apogonichthys* of Bleeker appears to be at least very closely related to it, while both genera include forms that do not appear to be strictly allied, but more distinct from the types of the respective genera than the latter are from each other. The species of the old genus may be divided as follows:

I. Preoperculum serrated.

Anal II. 7—9 (—10).

2—3

Scales 20—28.....Amia.

5—8

Scales 33—36 (*Apogon kalosoma*, Blkr.).....Lepidamia.

Anal II. 12—17 (*Apogon Bleekeri*, Gthr.).....Archamia.

1863.]

## II. Preoperculum entire.

Scales 20—26 „.....Apogonichthys.

5

Scales 40 — (*Apogon aprion*, Rich.).....Glossamia.

13

As there is no gradation from one type to the other among the great number of species already known, the characteristics above given appear to be the indices of distinct genera. *Amia* and *Apogonichthys* are probably the most closely allied groups.

## Family SPAROIDJE (Ouv.)

## Subfamily XENICHTHTINJS Gill.

## XENICHTHYS Gill.

Body moderately elongated and subfusiform, compressed, and with the caudal peduncle also compressed and robust. Scales deciduous, rather small, high and ctenoid. Lateral line tubular, in more conspicuous scales. Head compressed, conic, longer than high, with the occipito-rostral outline rectilinear. Upper surface of head to the nostrils covered with small scales. Occipital crest prominent. Eyes circular, large, and mostly in the anterior half of the head. Preorbital bones rather narrow and oblique. Operculum with two spines. Preoperculum pectinated behind, the teeth higher up progressively directed upwards.

Mouth rather small, with the lateral cleft very oblique, and not continued to eye; supramaxillary bones broad, enlarged in front below the intermaxillary, and behind the latter covered by a cutaneous flap from it. Lower jaw shorter than upper, but with the chin projecting beyond it, and with a pore on each side of the symphysis. Lower lip continuous and free at symphysis; plicated behind, where it is received under the upper jaw.

Teeth small, recurved, and in rather narrow bands on each jaw. Vomer with its projecting front provided with a villiform rhomboid patch; palatine bones and tongue edentulous.

Nostrils above anterior, and in a line with upper margin of orbit, near each other; the anterior circular: the posterior cleft transversely. Branchiostegal rays seven on each side.

Pseudobranchise present.

Dorsal fins connected by a low membrane at the base; the first with ten rather slender but perfectly rigid spines; the third, fourth and fifth of which are longest, (with no recumbent spine in front); the membrane has a fibrous appearance. Second dorsal lower than the first, and elongated. Anal fin about as long as second dorsal, but rather farther back, with three small, regularly increasing spines. Caudal fin emarginated, with rounded lobes.

Pectoral fins small, with the upper angle produced, but apparently rounded. Ventral fins inserted close behind the pectoral; each with a spine and five branched rays, and a pointed axillar scale.

As there might be some doubt as to the affinities of this genus, on account of the few palatal teeth and the number of branchiostegal rays, an extended description of its generic characters has been given. The spinous dorsal being received in a groove, the upper jaw closing under the preorbital bones and axillar ventral scales existing, it belongs to the family of Sparoids, as now modified. It cannot be referred to the Sciaenoids, as its skull is smooth. The nearest allied genus appears then to be *Moronppsis*, (*Dules marginatus* C. V.\*) That genus differs in its more compressed body, the scales and the similarity of those of the lateral line to the others, the stouter dorsal spines,

\* The *Dules auriga* and *D. flaviventrit* are, of course, not regarded as allied to *D. marginatus*. Ac I son unable to perceive any affinity between them, and they have been united only in accordance with an artificial system.



between which the membrane is acutely notched, the scaleless crown and little development of the occipital crest, the dentition and the number of branchiostegal rays, and, finally, the absence of axillar scales. With any other form it is unnecessary to compare the genus, as its natural affinities appear to be more intimate with *Moronopsis*\* than any other. Naturalists can decide from the above enumeration of the differential characters, in comparison with *Moronopsis*, if there is any other group to which it could be more naturally approximated. If it is stated that the physiognomy of the two genera is quite similar, the chief difference being caused by the procurrence of the occipital crest and the rectilinear profile, as well as the character of the scales, the ichthyologist can appreciate the aspect of the newly-described form.>

\*  
XENICHTHYS XANTI Gill.

The greatest height equals three-tenths of the length (*exclusive of the caudal*). The head forms a third of the same. The diameter of the eye equals a third of the head's length, is about a third greater than the interorbital area, and nearly a third greater than the length of the snout. The fourth or longest dorsal spine equals nearly a fifth of the total length, and is nearly five times longer than the tenth. The third or longest anal spine is scarcely more than a twelfth of the length. The pectoral fin at least exceeds a seventh of the length, while the ventral equals a seventh.

D. XII. 14. A. III. 17. C. 11.1. 8. 7.1. 9. P. 1.15. V. I. 5.

Scales, lat. line 50.

The color is light; on each side of the back are two indistinct, purple, longitudinal bands; and before the dorsal fin is another. The color below is silvery. At the base of the caudal there is an indistinct spot. The tip of the spinous dorsal fin is dark.

This most interesting and even remarkable type is dedicated to Mr. John Xantus, to whom we are indebted for the noble collection of fishes and other animals of Lower California, and who has, more than any other single man, contributed to our knowledge of the natural history of the Western coast.

Family CARANOIIDJE.

Genus ARGYRIOSUS Lac.

Two representatives of this genus are found on the Atlantic coast of the United States: they are the *A. vomer*, of Linnaeus, and the *A. capillaris*, Dekay, the *A. unimaculatus* of Batchelder and Storer, and the form which has been considered by Günther as the young of *A. vomer* or a new species,—appears to me to be the young of *Vomer setipinnis*, and at least belongs to the same genus. The *Argyriosus Spixii* of Castelnau is the unfortunate *Selene argenea* of Lacépède, first well made known by Mr. Brevoort, but which has received a number of names from different writers.

ARGYRIOSUS BREVOORTII Gill.

The greatest height in an oblique direction nearly equals nine-tenths (\*87) of the length in a straight line, from the *vertical of the snout to the end of the median caudal rays*. The head forms less than a third of that length. The profile is oblique, and slightly incurved below the angular crown; its distance from the vertical of the snout equals an eleventh of the total length, and before the eyes, two-thirds of the preceding. The diameter of the orbit equals an eleventh of the length, and its distance from the profile equals two-thirds of the diameter. The height of the preorbital is twice as great as the diameter, of the orbit. The base of the arched portion of the lateral line equals three-tenths of the total length, and its elevation above the horizon equals a

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\*The *Datniat ambigua* of Richardson, which has been referred by Günther to the genus *Dides* differs from *Moronopsis* by the shorter convex anal fin, the large second anal spine, the small eyes and the entire physiognomy. It may be called *Plectropliles ambiguus*.

third of the base; the straight portion equals a third of the total length. The second dorsal spine is very long; the third little longer than the base of its fin. The caudal lobes diverge at nearly a right angle; the length of the lower nearly equals three-tenths of the total. The pectoral fin equals a quarter, and the ventral two-fifths of the total length.

D. VIII. I. 22. A. II. I. 18.

The color is silvery, punctulated, with black near the edge of the back, and with a black bar on the head above the eye, parallel with the forehead. The filamentous dorsal spines and the elongated dorsal and anal rays are blackish. The ventrals have the terminal half blackish, and the other whitish, with a median black band.

This species is distinguished by its proportions, oblique profile, lateral line and color. It may be further remarked that the branch of the lateral line ascending from the scapula divides into two branches, diverging at less than a right angle; the anterior branch appears to be a groove.

I have dedicated this species to my excellent friend, Mr. Brevoort, who has paid much attention to the group of fishes of which the present is a member\*

Genus HALATRACTUS Gill.

HALATBACTUS DOBSALIS Gill.

The greatest height equals a quarter of the length to the end of the median caudal rays. The head enters more than three times and a half (-28) in that length. The diameter of the eye equals a quarter of the head's length, and is shorter than the length of the snout (=09). The median caudal rays forms an eleventh of the length, and the longest equal a fifth. The pectoral fin nearly equals a seventh ("13), and the ventral nearly a sixth (-16) of the length.

D. VII. I. 31. A. II. + 1. 21. P. 2. 19.

The color is brassy, purplish on the back, and\* with ten indistinct darker bands, twice as wide as their intervals; the second between the second and fifth dorsal spines. The dorsal and anal fins are nearly black; the anterior angle of the latter lighter. The ventrals dusky, with the rays externally white.

This species is most nearly related to *Halatractus zonatus* Gill, and *H. carolinensis*, Gill, of the Eastern American coast; but readily distinguished by the color and proportions.

Genus T&ACHYNOTUS Lacépe\*de..

TBACHYNOTUS CABOLINUS Gill.

This species is extremely variable, as are also the other well-known representatives of the genus. In extreme youth, the jaws and palate are denticulous, **and the angle of the preoperculum armed with three radiating spines! while the spinous dorsal and anal are elevated, and the angles of the soft fins, scarcely produced.** Later, the preopercular spines become obsolete; then the palatal teeth are lost; the spines of the fins meanwhile become abbreviated, and, finally, in old age, the teeth have entirely dropped out, the spines become much shortened, and the angle of the fins considerably produced. Half-grown specimens answer to the genus *Doliodon*, of Girard; nearly mature ones, with teeth in the jaws, *Trachynotus*, C. V.; and old ones, without teeth, to *Bothrolsemus* Holbrook. Relying on the correctness of my predecessors, who had certainly the opportunities, if they had availed themselves of them, to avoid such errors, I adopted the several genera proposed by Holbrook and Girard in my Catalogue of the Fishes of the Eastern Coast; Giinther first corrected the synonymy as lately given, and, under the other North American species, **has** brought together nine of Cuvier's species and two of other authors I

[Mar.

The radial formula is also variable. Small specimens between one and two inches long exhibit the following variations:

1. D. V. + I. 26. A. II. + I. 24.
1. D. VI. + I. 26. A. II. + I. 24. #
2. D. VI. + I. 26. A. II. + I. 23.
3. D. VI. + I. 26. A. II. + I. 22.
1. D. VI. + I. 25. A. II. + I. 23.
2. D. VI. + I. 25. A. II. + I. 22.
1. D. VI. + I. 24. A. II. + I. 21.
1. D. VI. + I. 23. A. II. + I. 21.

TBACBTOTUS BIODOPTIS Gill.

The greatest height equals a third of the length from the snout to the end of the median caudal rays. The head forms scarcely more than a quarter of the length. The diameter of the eye exceeds a third of the head's length, and is a third greater than the length of the snout. The latter is as high as long, and truncated. The lower jaw is not received within the upper. The spinous dorsal from the third spine arched, and highest at its fifth spine, which equals an eighth of the length. The first two spines are short. The second anal spine equals a tenth of the total length. The median caudal rays form nearly a sixth of the length, and nearly equal two-thirds of the longest ones, or of the head. The pectoral fin is contained about five times and a half in the length.

D. VI. + I. 20. A. II. + I. 18, 19.

The color is bluish-silvery; the spinous portions of the dorsal and anal fins punctulated with black; the ventrals rose-colored; the other fins yellowish and mostly immaculate.

Numerous specimens of this species were obtained by Mr. Xantus; but all of them are young, (between one and two inches long,) and have the three radiating spines, &c, of the preoperculum. It must be remembered that the portion of the description referring to the spinous and soft dorsal and anal fins, is only applicable to the young; the adult doubtless resembles *Trachynotus Carolinus*. \* The present species is allied to the latter, but at once distinguished by the small number of dorsal and anal rays. The radial formula equally distinguishes it from all previously known species having the same form. The young of *Trachynotus ovatus*, Gthr., does not essentially differ in form from the adult.

TBACHYNOTUS NASUTTIS Gill.

The greatest height equals two-fifths of the length from the snout to the end of the median caudal rays. The head forms three-tenths or more of the length; the snout is produced and subconic, and equals the diameter of the eye, and scarcely less than a tenth of the head's length. The lower jaw is received within the upper. The spinous dorsal is highest at the fifth spine, which equals an eighth of the length, or nearly a third of the height of the body beneath. The second anal spine is as long or longer than the fifth dorsal one. The median caudal rays form an eighth or more of the total length, while the external rays only equal a sixth of the same. The pectoral fin is contained five times and a half in the length.

D. VI. + I. 20. A. II. + I. 19.

The color is silvery; the spinous portions of the dorsal and anal fins thickly punctulated with black; the ventrals white.

This species is very readily distinguished from *T. rhodopus* by the conoid

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\*The descriptions of *Trachynotus marginatus*, C.V. and *T. cayenneruis*, C.V., must be scooped with similar reserve. The statement of the height of the fins of the two new species here described has been retained in order to show how great is the difference between the young and old.

produced snout and the reception of the lower jaw within the upper, as well as by the shorter and less emarginated caudal fin, greater height, Ac. Several specimens were obtained, mostly under an inch long. The description of the dorsal and anal fins, as in *Trachynotus rhodopus*, refer only to the young.

TRACHYNOTUS PASCIATUS Gill.

This species is closely related to the *Trachynotus glaums* of the Atlantic and Caribbean Sea, but is distinguished by the scarcely gibbous snout and the distribution of the vertical bands: the first commencing close in front of the first (erect) dorsal spine; the second between the fourth and fifth, and the third under the fourth and fifth rays. A black spot also appears to exist on the lateral line below the seventeenth dorsal ray, and a black blotch behind the dorsal fin. The produced dorsal and anal lobes are nearly coterminous with the caudal lobes.

A single dried specimen, nearly eight inches long, was given to the Smithsonian Institution by Capt. John M. Dow. The snout is doubtless always less gibbous than, or rather not vertical as in, *T. glaucus*. It cannot be the more mature form of *T. rhodopus* or *T. nasutus*, as the snout, when it does change, becomes more elevated with age. The colors are also quite different, and probably undergo no essential change with age.

Family SPHYR&NOIDJE Ag.

SPHYRJEXA LUCASANA Gill.

The greatest height equals a tenth of the length, and is a quarter the thickness. The head forms about three-tenths of the length. The snout enters 2.} times in the head, and is more than twice as long as the diameter of the orbit ('05}). The maxillary bone ceases at a vertical, whose distance from the orbit equals the diameter of the pupil. The tip of the lower jaw has a square, thick flap.

The first dorsal fin commences more than four-tenths (-42) of the length from the lower jaw; its second spine rather exceeds the width of the body (\*08); the second dorsal commences more than six-tenths (-62) from the jaw, and is rather lower than the first (-07 J). The caudal enters 6\$ times in the whole length.

• The pectoral fin extends for about two-thirds of the distance between its base and the ventral, and is less than of the length (-07J). The ventral is rather longer than the pectoral, and is inserted under the anterior margin of the first dorsal.

The first dorsal commences about over the thirty-fifth scale of the lateral line, and the second over the ninetieth.

D. IV. 1.8. A. 2. 9.

Scales 134.

The color is reddish-brown above the lateral line, and silvery below, with darker blotches along the line.

Family BER TCOWJE Lowe.

HOLOCENTRUM SUBORBITALE GUI.

The greatest height does not equal a third (-31) of the total length; the tail behind the vertical fins nearly equals a ninth of the total length, and nearly the length of the base of the rays; its least height is rather less than a twelfth (-08) of the same. The head, from the snout to the opercular margin, forms more than a fourth (\*26) of the length; the opercular spine is long, and nearly equals a third of the diameter of the eye (-03). The preopercular spine extends to the vertical from the base of the opercular one. The diameter of the eye equals a tenth of the total length, and is a third greater than the length of the snout (= '0\*7). The preorbital has six or seven moderate teeth, directed backwards.

[Mar.

The spinous dorsal commences above the posterior margin of the scapular bone; its first spine equals the eye's diameter (\*10), and the third is a half longer (\*15). The second dorsal at its longest rays rather exceeds an eighth (=•13) of the total length j it ends over the twenty-fifth scale of the lateral line. The anal fin is somewhat larger than the second dorsal; the third spine is very large, its length entering nearly five times and a half ('18) in the total. The caudal fin forms more than a fifth (-21) of the length, while the median rays only equal a tenth.

The pectoral and ventral fins are equally long, and rather less than a fifth (•19) of length.

D. XI. 1. 12. A. IV. 9.

Scales 35 —  
3  
7

The color is steel, thickly sprinkled with dark dots, which become less numerous downwards. The fins are dark; the dorsal lighter at the anterior half at the base between the spines. The suborbital chain is bright silvery and immaculate.

Genus MYRIOPBISTIS Cuv.

MYRIOPRISTIS OCCIDENTALS Gill.

The height of the body equals 28-100 of the extreme length, while the head forms 3-10 of the same. The snout is much decurved, and, from the apex to the eye, equals nearly half the diameter of the orbit and a fifth of the head's length. The pectoral fin equals a sixth of the extreme length, and the ventral enters 7J times in the same. The caudal forms a fifth of the whole length.

D. X. 1.13. A. IV. 11.

Scales 35—36—  
3  
7

Color on the upper half reddish-purple merging into silvery below, punctulated with blackish, especially where the longitudinal rows overlap each other. The fins are immaculate, except a linear border which sometimes margins the spinous dorsal.

Numerous specimens were obtained by Mr. Xantus at Cape St. Lucas.

RHAMPHOBERYX Gill.

This genus is very closely related to *Rhinoberyz*, but has considerably smaller scales (34-36-) and entire rostro-frontal carinae, the spine at the angle of the preoperculum is not essentially enlarged, but simply forms the angle at the preoperculum.

RHAMPHOBERYX PCECILOPU3 Gill.

The height of the body equals nearly three-tenths (-29) of the extreme length, and the head forms 27-100 of the same. The snout is blunt, but considerably produced and forms about a fifth of the head's length; the diameter of the orbit is contained three times in the head. The pectoral and ventral fins are equally long, rather exceed a sixth of the extreme length, and nearly equal the caudal fin.

D. X. 1. 14. A. IV. 11.

Scales 35—36—  
3  
7

The color above the lateral line is olive green, golden green below, and 1863.]

cupreous in the opercula. The spinous dorsal is dark green in front of each spine, but light behind as well as above and below; the margin is also very dark. # The ventral fins have each a broad blackish terminal band. The base of the caudal fin is punctuated with dark spots.

The specimens 1j—2J inches long.

RHAMPHOBERYX LEUCOPUS Gill.

This species is very closely related to the preceding and has almost precisely the same proportions, but the snout is perceptibly less produced, and the spinous dorsal and ventral fins almost immaculate, the former having only a linear darker border, and the ventrals sometimes tipped with darker.

D. X. I. 14. A. IV. 12.

3  
Scales 34—35—  
7

Cape St. Lucas, (2 specimens.)

Family ECHENEIDOIDM.

Genus REMORA (A. Dum.) Gill.

The *Echeneis osteochir* of Guvier and the *E. brachypterus* of Lowe should both be removed from this genus and accepted as the types of as many distinct ones. The *E. osteochir* is distinguished by the rhombic form of the pectoral fins and the ossification of the rays. I have therefore named the specimens in the Smithsonian Institution *Rhomboehirus osteochir*. The *E. brachypterus* is distinguished by the shorter anal fin and angular upper jaw. It may be called *Remoropsis brachypterus*.

REMORA JACOBOBA Gill.

*Echeneis remora* Günther, Catalogue of the Acanthopterygian Fishes, &c, Vol. it. p. 378.

\*A specimen of *Remora* obtained by Mr. Xantus at Cape St. Lucas is provisionally referred, as by Dr. Günther, to the old *Echeneis remora* of Linnaeus.

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Descriptions of some new species of PEDICULATI, and on the classification of the group.

BT THEODORE OILL.

The group called by Cuvier *Acanthopterygiens a pectorales pediculati* and estimated as a family, is a very natural one, distinguished by the incomplete ossification of the skeleton, the prolongation of the carpal bones to form "pedicles" for the pectoral fins, and, finally, by the abnormal position of the very small branchial apertures. While these characters are not sufficient to entitle the group to ordinal distinction, they seem to be of much more than family value; it may be called a suborder, for which the name *Pediculati* may be retained. The genus *Batrachus*, referred to the *Pediculati* by Cuvier, has really little affinity to the true representatives of the group, and has been, by general consent, separated from them by all the more modern systematists.

In the suborder, four very distinct types distinguished by difference of form and structure are comprised. Those types must therefore be regarded as representative of as many families. Dr. Bleeker has attempted to distribute the several genera among families, which have not been characterized, but which were evidently separated on account of superficial differences of form\*. This is apparent on an examination of his system.

Phalanx 1, Herpetoichthyes seu *Pediculati*, Cuv.

Ordo 15, *Antennahi*.

[Mar.]

The group of frustules, moreover, is not always symmetrical, or **arranged** upon the same plane.

VI. TRYBLIONELLA ? or DENTICULA ? n. sp.

The form figured at No. 6 of the plate occurs sparingly in this deposit, **and** more abundantly in the Wolfboro<sup>1</sup>, but not in sufficient quantity to enable me satisfactorily to determine its true generic position. It seems to be solitary. Providing it be not a *Denticula*, its analogies to *TryblioneUa* are stronger than to any other genus. The valvular surface is transversely and continuously striate, with no indication of a central line. The costae are marginal.

This diatom is very minute.

Leaving a further consideration of this curious species, to which I hope to be able to return on a future occasion, I shall briefly conclude this somewhat protracted notice, by calling attention to one or two points in connection with the mode of growth and extreme variation of a few of the known species in the Saco mud.

(1.) *Eunotia hemicydus* I have sometimes found growing like *Synedra lunaris*: several frustules attached to a fixed point. *E. hemicydus* is not abundant in the gathering, and varies somewhat in the amount of its curve. The extremities are usually bevelled off into a subacute conical point. (2.) *Surirella intermedia*, in its smaller sporangial or embryonic form, commonly occurs in groups of from three to four parallel frustules. I have not found it in bundles like *Homeocladia* or *Colletonema*, but the position of the frustules is somewhat suggestive of those thalloid growths. *Navicula rhomboidea* is similarly arranged. It presents a remarkable range of variation, as does *JV. jvrma*. (3.) *Eunotia incisa* is very variable in outline and striation. It shows a tendency to unequal development at the extremities. These varieties or anomalies I propose figuring in a paper on the Diatomaceas of the River Delaware blue clay, to be shortly presented to the notice of the Academy, and which was originally intended to be combined with the present communication.

I have, in noticing these species, purposely placed them in the order in which they occur, beginning with that most remote from the *Synedroid* type, and ending with those which approximate most nearly to *Synedra*. Whatever opinion may be entertained concerning the theory of the geological position of these forms, will not, I think, materially invalidate the following points, which are fairly deducible from the premises:

(1.) That the species and varieties in this deposit are singularly like, like those of the sub-peat.

(2.) That there is a notable absence of surface genera—*Nitzschia*, *Amphipleura*, *Tryblionella*, *Cymatopleura*, *Fragillaria*, *Odontidium*, &c, &c, all of which occur in adjacent localities.

(3.) That certain exceptional forms are present, which appear to represent types intermediate between the fossil *Surirella* and *Eunotia*, and the more modern genus, *Synedra* (and *JVfczwAia?*), *Surirella Baileyi*, *S. intermedia*, *S. aneep*, *S. delicatissima*, illustrating the synthesis in the case of the former, and *Actinella* in the latter, (*Eunotia*.)

(4.) That these forms are exceedingly rare, and seem to be confined to localities having peculiar conditions of soil, which, in all likelihood, depend on the mineral constitution of the water percolating through it.

(5.) That there is an unusual tendency to variation in nearly all the species, and a strong disposition shown by some of them to become attenuate and elongated, and also to assume a marginal punctate arrangement, suggestive of a Nitzschoid bias.\*

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\* I may add that this name tendency to extreme variation affects the *Desmidia* which abound in this locality. This is particularly the case with *Triploceras verticiUatum*, (Bailey), which beautiful and showy Deunld presents every variety of outline and proportion reconcilable with specific identity. The prevailing variety differs from that fixed by Bailey, in the more un-guleulate character of the terminal horns, and the inclination of the knot-like prominences.

(6.) That there is reason to suppose that these species are nearly extinct as living organisms; although to what extent they may have flourished in a previous epoch, and how universally have been diffused, can only be a matter for speculation, until further and more thorough investigations in this and other localities, shall have been made.

*References to Plate.*

- (1.) *Surirella Baileyi*, a, V. b, P. V. n. sp.
- (2.) " *intermedia*, a, V. b, F. V. "
- (3.) " *anceps*, a, V. b, P. V. "
- (4.) " *delicatissima*, a, V. b, P. V. "
- (5.) *Actinella punctata*, nov. gen. a, V. b, F. V. c, group of frustulee X 100 d.
- (6.) *Denticula?* or *Tryblionella*, n. sp.
- (?) *Amphora intermedia*, n. sp.
- (8.) *Navicula*, n. sp.
- (9.) *Mastogloia elegans*, n. sp.
- (10.) *Amphiprora pulchra*, Var. B. = *A. conspicua* (Greville).

These are all magnified about 500 d, excepting *Surirella delicatissimo*, which is amplified to 1000 d. The Figs, from 1 to 10, inclusive, illustrate a paper on the Diatoraceae of the Delaware River and marine localities adjacent thereto, which will be submitted to the Academy in a short time.

Synopsis of the species of HOSACKIA.

BY ASA GRAY.

§ 1. SYRMATIUM, Vogel. (*Drepanolobus*, Nutt.) Legume small, subulate or caudately attenuate, often torose, inemved or sickle-shaped, 1—4-seeded. Keel of the corolla not attenuate upwards, mostly obtuso. Claws of the petals slightly exerted or included; that of the vexillum somewhat distant from the others. Perennial herbs or suffruticose plants, or one species annual. Leaves 3—7-foliolate, with a very short petiole and rhavhis. Stipules in the form of small black glands. Flowers small, in sessile or short-peduncled umbels, yellow, or sometimes whitish, often changing to reddish.

\* Shrubby or suffruticose, with rigid slender branches, glabrous or glabrate, the young parts often silky puberulent, with (3—5, commonly 3) small and thick leaflets, somewhat sempervirent.

1. *H. JUKCEA*, Benth. in Linn. Trans. 17, p. 366. Shrubby, erect, bushy-branched, broom-like, with obovate, oval, or oblong leaflets, and very short peduncled few-flowered umbels; the calyx-teeth extremely short and blunt I—California. The only specimens before me are an original one of Douglas' collection, and those of Dr. Brewer, recently collected in the mountains near San Luis Obispo, in the Geological Survey of California.

2. *H. SCOPARIA*, Nutt. (under *Drepanolobus*), in Torr. & Gray Pi. *Syrmatium glalrum*, Vogel, in Linnaea, 10 (1836), p. 591. Almost wholly glabrous, shrubby, erect, 2—8 feet high, very bushy-branched and broom-like; with linear-oblong or barely oblong (obtuse or acute) leaflets, and strictly sessile umbels, which are usually crowded along the flowering branches, so as to form a virgate interrupted inflorescence. Teeth of the calyx subulate and acute, varying from one quarter to nearly half the length of the narrow tube. California, common from San Francisco to San Diego.

>Var. DIFFUSUM (*H. crastifolia*, or *Drepanolobus crassifolius*, Nutt., 1. c), is fit

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decumbent, suffruticose, apparently dwarfed, less smooth form of the above species, which probably varies a good deal, according to situation and season.

3. *H. CTISOIDES*, Benth. 1. c. (*Drepanolobus cytoides* and *D. rubescens*, Nutt. 1. c.) Suffruticose, minutely silky-pubescent on the young parts, or soon glabrate, decumbent or sarmentose; with obovate, oblong, or linear-oblong obtuse leaflets, and many-flowered umbels, on a peduncle which often considerably exceeds the leaf, but is sometimes very short; the calyx-teeth about half the length of the tube, subulate aristiform and recurved. California, near San Francisco and Monterey.

\*\*Suffrutescent or nearly herbaceous, diffusely decumbent, silvery white with appressed silky pubescence or tomentum, the branches somewhat virgate.

4. *H. SERICEA*, Benth. Silky-canescens, much branched, ascending. Leaves mostly trifoliolate and subsessile; leaflets oblong-linear, or the larger ones spatulate-oblong. Umbels subsessile and few-flowered. Teeth of the calyx short or minute, in original specimens from Douglas about one-third the length of the turbinate-campanulate tube; in those recently collected by Dr. Brewer (Geol. Survey of California), very short. Flowers small, 3 lines long, yellow: the incurved apex of the keel somewhat acute. California; rare.

5. *H. ARGOPHYLLA*, Gray, Pl. Thurb. p. 316. *H. argentea*, Kellogg, in Proceed. Calif. Acad. 7, p. 38, fig. 8? Densely silky-tomentose, the long and rather simple branches decumbent. Leaves 3—5-foliolate; leaflets obovate, obtuse (3—6 lines long). Umbels 8—12-flowered and with a unifoliolate bract, capitate; the peduncle short, sometimes very short, occasionally longer than the leaf. Teeth of the calyx slender, about half the length of the cylindrical tube. Flowers 4 or 5 lines long, yellow, occasionally turning reddish; the broad incurved apex of the keel obtuse.—Southern and interior part of California; Thurber, Bigelow, Wallace, Newberry, &c. The specimen from Mr. Wallace has peduncles of considerable length.

Var. ? *PREMONTI*. Leaflets obovate-oblong and acute; the flowers 5 lines long; the teeth of the calyx setaceous and almost as long as the tube. Eastern side of the Sierra Nevada. The length of the calyx-teeth varies considerably in species of *Hosackia*.

Herbaceous, or scarcely suffrutescent at the base, pubescent, tomentose, or glabrate, diffusely procumbent or prostrate. Leaflets 3-5, sometimes 6 or 7, not thick, not silvery-white; the petiole or rhachis not abbreviated.

Teeth of the villous calyx slender. Plants silky or tomentose-pubescent. Semiferous part of the legume short, little longer than the calyx, canescent.

6. *H. TOMENTOSA*, Hook & Am. Bot Beech., p. 137, and certainly of p. 332. *Sirmatium tomentosum*, Vogel, 1. c. Loosely tomentose-villous with whitish or fulvous spreading hairs. Leaflets obovate, 4—7 lines long. Umbels capitate, 6—12-flowered, and with a unifoliolate bract; the peduncle sometimes hardly any, sometimes nearly equalling the leaf. Teeth of the villous calyx setaceous subulate, fully the length of the turbinate-campanulate tube. Flowers 3 to 4 lines long, mostly turning reddish; the keel very obtuse.—California, San Francisco to Santa Barbara.

7. *H. DECUMBENS*, Benth. Silky with appressed pubescence; stems decumbent from a lignescent root or caudex, rather rigid. Leaflets cuneate-obovate, rhombic-ovate or obovate-oblong, cinereous, 4 or 5 lines long. Umbels capitate, many-flowered, and with a 1—3 foliolate bract; the peduncle distinct, but seldom equalling the leaf. Teeth of the silky-downy calyx equalling or shorter than the campanulate tube. Flowers nearly 5 lines long, apparently 1863.]

unchanging yellow; the keel somewhat produced or narrowed at the incurved apex, acutish.—Oregon and Washington Territory.

8. *H. HEERMANNI*, Durand & Hilgard, in *Pacif. R. R. SUIT*: 5, part 3, p.'6, t. 4. Villous-pubescent, diffusely much branched (from a "suffruticose" base?) very leafy. Leaflets obovate, roundish, or oval-oblong, 2—5 lines long. Umbels 4—9-flowered and with a unifoliate bract; the peduncle often equalling the leaf. Teeth of the loosely villous calyx considerably shorter than the campanulate tube. Flowers 2 lines long, yellow turning purplish; the keel with a broad and very obtuse summit.—Southern part of California. Tejon Pass, Dr. Heermann. Near Los Angeles, Mr. Wallace. A very branched and floribund species, the pubescence in kind nearly that of *H. tomentosa*, but far finer and less copious.

Var. ? *ORBICULARIS*. *H. orbicularis*, Torr, ined. Villous-downy; the leaflets almost orbicular, 1½ to 2 lines long; and the umbel only 3—5-flowered.—San Francisco hills near San Francisco, California, Rev. A. Fitch. Flowers small in proportion, scarcely larger than in the next, and perhaps a form of that species,

9. *H. MICRAVTHA*, Nutt., 1. c., under *Drepanolobus*. Diffusely procumbent from an apparently annual root, minutely villous-pubescent, at length glabrate, slender. Leaflets mostly 5 or 6, obovate-oblong, 1½ to nearly 3 lines long. Umbels 3—5-flowered and without a bract, short-peduncled. Teeth of the pubescent calyx not half the length of the tube. Flowers only a line and a half long; the short incurved apex of the keel obtusish. California. Here described, not from the original of Nuttall, from near Monterey, but from a specimen in Mr. Durand's herbarium, named by Nuttall, from "Catalina," probably therefore collected by Dr. Gambell. The root seems to be annual.

10. *H. PROSTRATA*, Nutt., 1. o., under *Drepanolobus*. *H. decumbens*, var. *glabriuscula*, Hook, and Arn. Bot. Beech, p. 137? ex. char. Glabrate, the nascent parts minutely silky-puberulent, diffusely procumbent; the branches slender. Leaflets 5 or 7, oblong-obovate, obtuse, about 3 lines long. Umbels lax, 5—10-flowered and with a unifoliate bract, on slender peduncles exceeding the leaves. Teeth of the campanulate calyx very short. Flowers 3 lines long, yellow tinged with red. Said by Nuttall to be "suffruticose," but the specimen before me does not indicate it. Coast of the southern part of California, Nuttall.

§ 2. *EUHOSACKIA*, Benth. Legume linear, straight or nearly so, not rostrately attenuate. Keel of the corolla not falcately attenuate upwards, mostly very obtuse.

\* *Subpalmatifolice*. Petiole short or nearly wanting, bearing 3—6 crowded-pinnate or quasi-palmate leaflets. Stipules reduced to blackish glands. Peduncles 1—2-(rarely 3—4-) flowered: bract unifoliate, rarely 3-foliate. Flowers yellow, turning purple. Vexillum tapering to the base, but hardly unguiculate, not distant from the other petals; keel very much shorter than the wings, straightish, narrowish; claws not exerted out of the calyx. Stems branching, from a perennial root, rigid.

t Peduncles elongated, all exceeding the leaves.

11. *H. RIGIDA*, Benth. Pl. Hartw. p. 305. Silky or cinereous-pubescent, a span to a foot high. Leaflets 3—5, crowded on a very short petiole, cuneate-oblong or obovate. Teeth of the calyx shorter than the tube. Monterey, California, Coulter. I have seen no Californian specimen of this. But I now refer to it some plants which I formerly took for varieties of the next species, especially Dr. Bigelow's from Williams' River, a tributary of the Colorado on the eastern or New Mexican side, (in Bot. Whipple's Exped.

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p. (79) 23,) one of Dr. Newberry's collection from Sitgreaves' Pass, also Thurber's, 243 and 307, from New Mexico, and perhaps Wright's, 1357; but the last is doubtful.

12. *H. PUBERULA*, Benth. l. c.; Gray, PL Wright, 1, p. 50; Torr. in Pacif. R. R. Surv. 7, t. 4 (bot.) Minutely appressed-puberulent. Leaflets 3—6, on a more developed petiole or rhachis, linear, lanceolate, or the lowest oblong. Teeth of the calyx attenuate, as long as the tube. Mexico, Arizona to S. W. Texas.

ft Peduncles seldom as long as the leaf, often shorter than the solitary flower, some of them reduced to nothing; the short pedicel, with the pair of black glands at the articulation, arising directly from the axil.

13. *H. WRIGHTII*, Gray, PL Wright, 2, p. 42, Cinereous-puberulent, bushy-branched, very leafy, Aspalathus-like; the 3—5 leaflets (the lowest oblong, the rest filiform-linear) crowded upon the apex of a barely perceptible petiole, appearing therefore as if palmate and sessile. Teeth of the calyx setaceous-subulate, about the length of the tube. Flower pretty large. New Mexico.

\*\* *Verce*. Leaves obviously pinnate; the (5—21) leaflets distributed along a more or less elongated rhachis. Peduncles bearing a few many-flowered umbel, which is usually subtended by a 1—5-foliolate bract: this, however is occasionally wanting or represented by a leaf low down on the peduncle. Vexillum on a slender claw, more or less distant from those of the other petals. Root perennial, except in one species.

+ Peduncles (elongated) 2—4-flowered, occasionally 1-flowered: pedicels very short. Stipules scarious, but small or minute. Claws of the (yellow) petals a little exerted out of the tube of the calyx: keel broadly dilated upwards, very obtuse.

14. *H. LATHIBODS*, Durand & Hilgard, in Pacif. R. R. Surv. 5, part 3, p. 6, t. 3. Low, cinereous-puberulent. Leaflets 5—7, not crowded, linear-lanceolate, acute at both ends. Bract unifoliolate or sometimes wanting. Teeth of the calyx broadly subulate, shorter than the tube. California: San Joaquin River, Heermann; Los Angeles, Wallaoe.

15. *H. ANGUSTIFOLIA*, G. Don. ex Benth. *H. Mexicana*, Benth., in Linn. Trans. *H. longipes*, Nutt. ined. Slender. Leaflets 5—9, obovate or linear, short, often canescent beneath. Bract trifoliolate at the apex of the 1—2-flowered peduncle. Teeth of the calyx slender, nearly as long as the tube. Mexico.

ft Peduncles umbellately many-flowered, mostly shorter than the leaf, bearing the bract below its apex, or a leaf lower down which represents the bract. Stipules scarious or in one species foliaceous. Flowers rather small, dull-colored, greenish-white or yellowish with purple, the keel slightly incurved, very obtuse, moderately shorter than the wings. Calyx-teeth not half the length of the tube. Leaflets 9-21, oval or oblong.

16. *H. INCANA*, Torr. in Bot. Whipl. Exped. Pacif. R. R. Surv., 4, p. 79, f23 it 4. Low, canescently very villous throughout; the bract near the apex of the peduncle, mostly 5-foliolate. Yuba, California, Dr. Bigelow.

17. *H. STIPDLARIS*, Benth. *H. macrophylla*, Kellogg, in Proc. Calif. Acad., 2, p. 123 and 126, fig. 40. Rather tall and stout, the upper part of the stem, petioles, peduncles, &c. villous, the leaflets glabrate. Stipules large and foliaceous, or the upper sometimes, smaller and almost scarious. Peduncle bearing a 3—9-foliolate leaf in place of a bract, much below the umbel. California.

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18. *H. CRASSIFOLIA*, Benth. in Linn. Trans. *H. stolonifera*, Lindl. Bot. Reg. t. 1977. *B. platycarpa*, Nutt. in Torr. and Gray Fl., in fruit only. Tall and stout; the stems nearly glabrous; the leaflets (9—15, thickish) minutely pubescent or soon glabrous. Bract or floral leaf mostly tri-foliolate and mostly above the middle of the peduncle. Calyx-teeth very short. A pubescent variety (*H. stolonifera*, var. *pubescens*, Torr., 1. c.) not only retains considerable down on the leaves, &c, but even the calyx and pedicels are pubescent. Oregon and California.

Iff Peduncles usually equalling or exceeding the leaves, bearing a 4—12-flowered umbel (or the lowest sometimes only 1—3-flowered), the bract at its apex, or wanting. Stipules scarious. Flowers yellow, and partly white or rose-purple, half an inch or more long; the keel abruptly inflexed at the apex, acutish, a little shorter than the wings. Calyx-teeth at least nearly half the length of the tube. Leaflets 5—9, rarely 11.

19. *H. OBLONGIFOLIA*, Benth. PI. Hartw. p. 305; Torr. 1. c, which is appressed-pubescent, with 9—11 narrowly oblong and acute leaflets, a unifoliolate bract, the calyx-teeth a little shorter than the tube, I do not possess; but it is said to be otherwise much like the next species. California; Coulter, Parry.

20. *H. BIGOLOR*, Dougl. in Bot. Reg. t. 1257. *Lotus pinnatus*, Hook., Bot. Mag. t. 2913. Glabrous, rather tall, with 5—9 obovate or oblong leaflets and no bract, or rarely a small unifoliolate one; the calyx-teeth about half the length of the tube. Corolla yellow, the keel often white. The bract certainly does now and then occur, as, for instance, even in my specimen of Hartweg's, No. 1698. Oregon and California.

21. *H. GRACILIS*, Benth. ; Torr. Bot. Mex. Bound., t. 15. Equally glabrous and more slender than the foregoing, a span to a foot high, weak and spreading, with large stipules, 5—7-leaflet, those of the lower leaves often 3 and obovate-ovate; the umbel subtended by a petioled 3-foliolate bract; the calyx-tube scarcely longer than the teeth. Corolla with the keel and wings purple or tinged with rose-color. California.

Iff Peduncles several-flowered (or the lowest sometimes 1—3-flowered), the 1—3-foliolate bract at its apex, or sometimes wanting. Stipules reduced to blackish points or glands, often deciduous. Claws of the petals slightly, if at all, exerted from the tube of the calyx: keel straightish, dilated upwards. Legumes glabrous. Leaflets not exceeding 7.

Xt Flowers large, keel small, very much shorter than the ample wings.

22. *H. GRANDIFLORA*, Benth. 1. c. *H. ochroleuca*, Nutt. in Torr. and Gray, Fl. Tall (1—5 feet high), softly, more or less pubescent. Leaflets 5—7, oval or oblong. Peduncles elongated. Flowers 7—11 lines long; teeth of the calyx subulate from a broadish base, shorter than or about as long as the tube; corolla yellowish or greenish white often tinged with purple. California.—Originals of Nuttall's *H. ochroleuca* and Bentham's *H. grandiflora* now before me, are identical, both being of the less pubescent forms, with moderate-sized flowers, and the calyx-teeth about as long as the tube. The specimens which best exemplify the specific name have flowers almost an inch long, and a short and soft pubescence.

Var. ? *ANTHYLLOIDES*, Gray, in Proceed. Calif. Acad. ined. Low, a foot high or less, velvety-pubescent. Leaflets of the upper leaves acute or pointed. Peduncles scarcely exceeding the leaves. Calyx-teeth attenuate, about as long as the tube. Corolla (7 lines long) white and purplish-red. Island of Catalina, Mr. Wallace; an intermediate form. Sta. Lucia Mountains, Dr. Brewer. A remarkable form, but in which I cannot detect characters warranting a specific distinction.

tt Flowers rather small, 4 or 5 lines long: keel broad, about the length of the wings. Root annual: rhachis of the leaves somewhat dilated. (A transition to the next division.)

23. *H. MARITIMA*, Nutt. in Torr. and Gray, Fl. Diffusely spreading from an annual root, minutely strigose-puberulent or almost glabrous; stems from a span to nearly a foot long. Leaflets mostly 5, succulent, oval or obovate (4-6 lines long). Peduncles about equalling the leaves, 3—5-flowered, or the earliest 1—2-flowered. Bract, 1—3-foliolate, or sometimes none. Calyx-teeth linear-subulate, rather longer than the tube. Corolla bright yellow. Santa Barbara and Los Angeles, California.—Not having any original specimens, I have before taken specimens of *H. strigosa*, Nutt. for *maritima* - But the original of the latter proves to be identical with a plant which I have received from Mr. Wallace, and recently from Dr. Brewer, which is clearly of this rather than the succeeding section, having a 4-5-flowered umbel in well-developed specimens, and the vexillum on a slender claw, remote from the wings, as in typical *Hosackia*.

\*\*\* *Uniflorae*. Leaves obviously pinnate or pinnately trifoliolate; the rhachis more or less dilated. Stipules reduced to blackish glands. Peduncles 1-flowered, (rarely 2-flowered). Claws of the petals not exerted, that of the vexillum short, and approximate to the others. Small and diffuse annual\* ; the flowerB small, yellow, often turning rose-purple or reddish.

t Pubescent, 4—9-foliolate. Keel broad, and almost straight, very blunt much shorter than the wings. Vexillum tapering into a short claw.

24. *H. BIRIGOSA*, Nutt. *H. microphylla*, *nudiflora*, *strigosa*, and *rubella* Nutt. in Torr. and Gray, Fl. Diffusely spreading or ascending, strigosely' pubescent. Leaflets linear-oblong, or obovate (1—5 lines long). Peduncles equalling or exceeding the leaves; the bract of the apex 1—5-foliolate or sometimes wanting. A very variable little annual, the forms of which I can divide into three sets; one with the flowers 4 or 5 lines long and the peduncle bracteolate (*H. strigosa*, Nutt.); another with the flowers 3 or 4 lines long and the bract wanting or minute (*H. nudiflora*, Nutt.) ; and a third with the flowers (occasionally in pairs) two lines long, the bract 1-3-foliolate or often wanting (*H. rubella* and *H. microphylla*, Nutt., in herb. Durand under the name of *H. (Psychopsis) micrantha*, Nutt.). Some forms have been mistaken for *H. maritima*. California, along and near the coast and rivers.

ft Glabrous throughout, 3—6-foliolate. Keel somewhat narrowed at the inflexed apex, acutish, nearly equalling the wings. Vexillum subcoadate.

25. *H. PARVIFLORA*, Benth. in Bot. Reg. *Lotus micranthus*, Benth. in Linn. Trans. Pale, well marked by its perfect smoothness (or a slight pubescence on nascent parts), and the minute flowers (barely 2 lines long), scarcely surpassing the 1—3-foliolate bract. Peduncle 2 to 8 lines long. The form of the keel is nearly that of *H. bicolor* and *H. gracilis*. Oregon and California.

§ MICROLOTUS, Benth., excl. ap. Legume of § 2, sometimes barely oblong. Keel of the corolla attenuated upwards, or as it were rostrate, falcate, mostly acute, equalling or exceeding the wings. Vexillum on a short claw, not distant from those of the other petals, which, moreover, are not exerted. Annuals. Leaves 1—5-foliolate, the lower leaflets scattered on a more or less dilated rhachis. Stipules reduced to minute dark glands. Flowers small, (yellow, sometimes changing to orange or purple) not umbellate.

Of these following species only it is a question whether they should not be referred to *Lotus*.

t Peduncles longer than the leaves, bearing a single flower accompanied by 1863.]

a unifoliolate bract. Calyx-teeth much longer than the tube, almost equaling than the corolla. Leaves subsessile, pinnately trifoliolate or the upper sometimes unifoliolate. (*Ptychopsis*, Nutt. in Torr. and Gray, Fl.

26. HOBACKIA PUBSHIANA, Benth. in Bot. Reg. *Lotus sericeus*, Pursh. *Trigonella Americana*, Nutt. Oen. *Eosackia unifoliolata*, Hook. *H. data*, *flo-Tibunda*, *pilora*, and *mollis*, Nutt. in Torr. and Gray, Fl. A wide-spread and variable species, from a few inches to a foot or more high, smoothish, or even glabrous, pubescent, or soft-villous; the leaflets varying from ovate to lanceolate. North Carolina to Nebraska, Oregon, and California.

Flowers subsessile and mostly solitary in the axils of the leaves, ebracteate. Corolla exceeding the calyx. Leaves 3—5-foliolate; the leaflets obovate or oblong, mostly attenuate or scattered on the wing-dilated rhachis. Small, procumbent or depressed annuals.

27. H. SUBPINNATA, Torr. and Gray, Fl. *Lotus subpinnatus*, Lag.; Hook, and Am. Bot. Beech, t. 8. *L. JMacrcei*, Benth., forma subglabra. *L. Wrangelianus*, Fisch. and Mey. *H. Wrangeliana*, Torr. and Gray, l. c, forma glabrata. Villous-hirsute or glabrate. Teeth of the calyx about the length of the tube, or scarcely longer. Legume linear-oblong, 4—7-seeded, as in foregoing species, very much exceeding the calyx. The smoothish variety, with a glabrous legume (*Lotus Macrcei*, Benth.), appears different enough from the very hairy form, which is less common in California. But intermediate states abound. *Anisolotus anthylloides*, Bernh., of the gardens, appears to be a slender and procumbent form. Chili, California, and Oregon.

28. H. BBACHYABFA, Benth. Pl. Hartw. p. 306, No. 1073. Softly villos with long and whitish hairs, -very much branched from the base, diffuse or procumbent; the flowers rather larger than in the last; the attenuated teeth of the calyx very much longer than its tube, and equalling or fully half the length of the oblong or linear-oblong very obtuse villous 4-seeded legume. California, on the Sacramento, and in that region. Dr. Brewer has collected greener and luxuriant specimens of this species, approaching if. *subpinnata*, having flattish pods which exceed the calyx; but the species still appears to hold good.

\*\*\* *Obscure Specie\**.

H. BALBAMIFERA, Kellogg, in Proceed. Calif. Acad. ii. p. 125, said to be very viscid and villous, and to have pedunculate umbels, is wholly unknown to me.

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Synopsis of the ECHINOIDS collected by Dr. W. Stimpson on the North Pacific Exploring Expedition, under the command of Captains Bingham and Bodgots.

BT ALEX. AGASSIZ.

The collection of Echinoids brought home by Dr. Stimpson was at first placed in the hands of Mr. James M. Barnard for identification. Other occupations having prevented him from finishing the task he had undertaken, the collection was sent to Cambridge, where it was arranged while I was engaged in cataloguing the Echinoids of the Museum of Comparative Zoology. The specimens have thus been compared with the greater part of the originals of the Catalogue Raisonné\* of Prof. Agassiz, which are in the collection at Cambridge. Dr. Stimpson has collected so largely that the species which had not been described before, and which are here briefly noticed, form a large addition to the number of Echinoids previously known to science. He has visited several of the localities from which the French explorers had brought to the Jardin des Plantes many of the species mentioned in the Catalogue Rai-

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sonnl of Agassiz. The collection made at the Bonin Islands was particularly valuable in a historical point of view, as it enabled me to obtain precise knowledge concerning the species of Echinoids which Mertens had collected there, and which, though described by Brandt in his Prodomus, had never been compared with the species described by Prof. Agassiz about the same time. The annexed list is intended simply as a catalogue to give an idea of the value of the collection, and the author hopes to return to this collection on another occasion, and to give more lengthy descriptions, and figures of the most interesting species. The notes of Dr. Stimpson, of the colors, and of the depth at which the Echinoids were found, have been added in quotation marks. These notes correspond to numbers attached to the specimens at the time they were collected.

PHYLLACANTHUS Brandt, Prod.

Syn. *Leiocidarit* Des., Syn. Echin. Foss.

PHYLLACANTHUS DUBIA Brandt, Prod.

This species is, at first glance, so closely related to *P. imperialism* that unquestionably many of the errors which have been made in referring to *P. imperialis* this species, which is found in the Northern part of the Pacific Ocean, arose from this close resemblance. The spines of *P. dubia* are more slender than those of the *imperialis*. The longitudinal furrows are deep, equally well marked along the whole length of the spine. It can at once be distinguished from its congener by the narrowness of the median ambulacral zone, which does not equal in width the poriferous zone; the latter is somewhat depressed.

" Found among madrepores in one fathom, Port Lloyd, Bonin Islands. Secondary spines of a deep purple; primary spines ash color."—(W. Stimpson.)

PHYLLACANTHUS FUSTIGERA B&A. MS.

Small species, having one row of small tubercles round the scrobicular circle of the ambulacral plates. Furrow joining the ambulacral pores very deep. The spines are slightly plicated at the extremity the whole surface minutely granulated. They are of a dark violet color, with two yellowish rings placed about one-sixth of an inch apart, below the point where the plications commence.

Taken at Puloe Leat Island, Gaspar Straits, Gapt. Stevens.

GARELIA Gray. Proc. Lond. Soc, 1855.

GABGLIA crATA A. Ag., Bull. Mus. Gomp. Zool., 1863. Sya. *Echinothrix Turcarum* Pet??

" Spines of a purplish black color. Fine blue semicircular rays on the body, among the bases of the spines, may be often noticed."<sup>11</sup>

" Hilo Hawaii. Found in rock crevices and under flat corals in the 4th f ubregion of the littoral zone. Port Lloyd, Bonin Islands."—(W. Stimpson.)

DIADEMA (Peters emend.) Seeig. v. Mossamb.

DIADEMA PAUCISPINUA A. Ag., Bull. Mus. Gomp. Zool., 1863.

" Hilo Hawaii."—(W. Stimpson.)

DIADEMA NUDUM A. Ag.

Under the name of *Diadma turcarum* no less than three different species have been confounded. According to Peters, who had a specimen of what he calls *D. turcarum*, it is an *Echinothrix*, entirely different from the *D. utown* of Rum ph., which he says is a true *Diadema*. Having examined in the collection of the Museum at Cambridge, a remarkable sea urchin, received from the Sandwich and Kingsmill Islands from Mr. Garrett, which agrees suffi-  
1863.]

ciently with the figure of Bumphius of *D. aetosum*, PL 14, fig. 5, to show that they belong to the same genus, I find that it is an entirely different genus, which have I named *Echinostrephus*, Bull. Mus. Comp. Zool., 1863. The figure of Leske, Pl. 37, figs. 1, 2, which is also always quoted as *D. turcarum*, is a true *Jiadema*, probably identical with the species which I have called *D. nudum*. The *D. turcarum*, or the *Echinothrix turcarum* of Peters, is a *Garelia*, and not *Echinothrix*, Peters having included in his genus *Echinothrix*, several species which had already been separated by Gray as a distinct genus from *Diadema*, *Garelia*. The *Echinothrix turcarum* Pet. may prove identical with the *Garelia cincta*, mentioned above, but as I have no specimens, and only the figure of Ruraphius, I am unable to decide this point.

"Body everywhere, spines included, of a purplish black color. Soft parts bluish grey. Anus margined with light blue."<sup>1</sup>

"Hong Kong, China, in crevices of rocks, 1 fathom."

"Island of Ousima, below 1. w. m."—(W. Stimpson.)

#### THRICHODIADEMA A. Ag.

Ambulacra of a true *Diadema*; pores arranged in irregular vertical arcs of three pairs of pores; not spreading near the actinal region. Two rows of large tubercles in the ambulacral space. Interambulacral area with two vertical rows of large tubercles extending from the mouth to the abactinal region; on each side of these rows tubercles smaller than the ambulacral, arranged in vertical rows and not in oblique rows, as is usual in the *Diadematidae*. Abactinal system almost circular, which distinguishes this genus at once from all other known genera of this family. Shell thick; tubercles crenulated; spines resembling those of *Echinothrix*, but stouter and more tapering.

#### THRICHODIADEMA RODOERSII A. Ag.

Tubercles of ambulacra crowded together with a double zig-zag row of small miliary tubercles. Tubercles of interambulacral area arranged in eight vertical rows. Anal membrane small, covered with minute elliptical plates. The verticillations of the spines very close; whorls arranged in such a way that the surface of the spines appear longitudinally striated. Outline seen from above perfectly circular, regularly arched when seen in profile.

"Taken in clefts of rock at 1. w. m. in Port Jackson, N. S. W. Color of a deep reddish purple."—(W. Stimpson.)

#### HBTEROCENTROTUS MAMMILLATUS Br., Prod.

Dr. Stimpson had the good fortune to find at the Bonin Islands a number of specimens of a species of *Heterocentrotus*, which are undoubtedly the *H. Pottellii* of Brandt. After carefully comparing the specimens with the originals of *Acrocladia hastifera* Ag., *A. mammillata* Ag., I have satisfied myself that the different species which have been distinguished principally by means of the great differences in the spines, are simply individual differences. The peculiar mode of growth of the spines by concentric longitudinal layers, giving rise in different specimens to bat-shaped, triangular, cylindrical or club-shaped spines. In specimens in which the spines have been broken and have grown out again afterwards, we find the best proof of the identity of these different modes of growth.

"Bonin Islands and Hilo, Hawaii."—(W. Stimpson.)

#### PODOPHORA QUOTI A. Ag., Bull. Mus. Comp. Zool. 1863.

"Hilo, Hawaii."—(W. Stimpson.)

#### COLOBOCENTROTUS LESKEI Br. Prod.

"Black\* above, dark reddish brown below; a circle of bright red around the mouth. On surf-washed rocks in 4th l., Port Lloyd, Bonin Islands."—(W. Stimpson.)



When specimens have remained some time in alcohol the spines become ash colored.

*Colobocentrotus* can readily be distinguished from *Podophora* by its peculiar ambulacra, the tubercles of which are arranged in four vertical rows, the median space raised above the poriferous zone; there is a strong depression between the tubercles of consecutive plates. The interambulacral plates are separated by a well marked suture on the abactinal side.

PARASALBNA OBATIOSA A. Ag., Bull. Mug. Gomp. Zool., 1863.

"Body everywhere black; spines dark olive, with a ring of white at base of each.

"Among madrepores in 1 f. Port Lloyd, Bonin Islands."—(W. Stimpson.)

ECHINOMETRA BRUNEA A. Ag.

Differs from *E. lucunter* by the great height of the polar diameter of the test, as well as the uniform size of the tubercles and spines.

"Among coral at 1. w. m., Bonin Islands."—(W. Stimpson.)

ECHINOMETRA LUOUNTEE Lamk.

"Hilo, Hawaii."

« On the coral reefs of Tahiti."

"Body always dark purple; spine greenish; mouth red. Bonin Islands, in crevices of rocks and coral in 4th 1."—(W. Stimpson.)

"Loo Choc Islands.

«Ousima."—(W. Stimpson.)

These specimens have been examined side by side with specimens compared to the originals of Lamarck sent to the Museum at Cambridge, through the kindness of Prof. Valenciennes. This species has been so often quoted by different explorers as occurring at localities as far apart as the West Indies, the Gape of Good Hope, Mauritius, East India Islands, in the Pacific Ocean, at the Low Isl., the Sandwich Isl., Ac, that it became an interesting question carefully to compare specimens from these different localities. It became at once apparent that we had one species in the West India Islands, (*E. Michelini* Des.,) one species at Mauritius, Zanzibar, (*E. acufera*,) associated with *E. lucunter* Lamk., so that the true *E. lucunter* of Lamarck is not confined to the Pacific Ocean, and seems to enjoy a very extensive range of distribution, Besides the localities here mentioned there are specimens in the Museum of Comparative Zoology at Cambridge from the Kingsmill Islands, the Society Islands and the Navigators Islands, and also from Tor in the Red Sea, which have been received from the Imperial Museum at Vienna.

*Helero-centrotus mammillatus* Br., appears almost always associated with *E. lucunter*. These two Echinoids are particularly characteristic of the great Belt which extends on both sides of the Equator from the east coast of Africa to the Sandwich Isls. *Eipponoe sardica* Gray, which is also quoted as occurring with these two species, may prove identical with *Hipponoe violacea* A. Ag., but the materials on hand at present are not sufficient to decide this point, as it is extremely difficult to ascertain what are specific differences in this family of Hipponoids, owing to the great difference between the young and the adult. Young specimens of the common *Tripneustea ventricosum*, from Florida, having even been placed into a new genus, *Heliechinus*, by Girard, (*Heliechinus Gouldii*, Gir.) Supposing, formerly, that this species (*E. lucunter*) had not been described, and many specimens having found their way into other Museums from the collection at Cambridge under the name of *Echinometra picta* A. Ag., I take this opportunity to correct my mistake.

ARBACIA AEQUITUBEROULATA Gray, Proc. Zool. Soc, 1855.

"Madeira."

"Porto Praya, Cape de Verde Islands."—(W. Stimpson.)

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## GLYPTOCIDARIS A. Ag.

. Pores arranged as in *ffeliocidaris*, in narrow, irregular rows; do not spread near actinostome. Tubercles crenulated; spines tapering, long. Two principal rows of interambulacral and ambulacral tubercles; miliaries not numerous.

## GLYPTOCIDARIS CRBNULARIS A. Ag.

Median interambulacral space bare; tubercles increasing very gradually towards the lower edge, where they are large. Four short rows of small tubercles on lower surface. Spines long and stout, longitudinally striated, resemble those of the genus *Acrocidari*\*.

"Light brown or pale reddish brown. One specimen was greenish brown; another cream colored."<sup>1</sup>

"In 6 f. shelly bottom, comparatively rare. Hakodadi Bay, Isl. of Jesso."—(W. Stimpson.)

## TOXOCIDARIS DELALANDI A. Ag., Bull. Mus. Gomp. Zool., 1863.

"Color reddish or purplish, sometimes brownish. Common about 1. w. m. and in 4th l., under stones. Port Jackson, N. S. W."—(W. Stimpson.)

## TOXOCIDARIS NUDA A. Ag.

Great size of the actinostome; cuts not as deep as in other species of this genus; pores arranged in arcs of 5—7 pairs; tubercles of interambulacral space far apart, two rows very prominent, far exceeding in size the others; miliaries few and small; secondary tubercles small, equal in size to the ambulacral tubercles, which are arranged in two rows; spines of dried specimens of a bluish color.

"Hilo, Hawaii."—(W. Stimpson.)

"N. E. end of Nippon."—(W. Stimpson.)

## TOXOCIDARXB CBABBISPINA A. Ag.

Miliaries few in number; ambulacral and interambulacral tubercles of equal size; spines long, equalling in length the diameter of the test; coronal plates high; pores arranged in regular arches from 9 to 10 pairs, diminish in number on lower surface.

"Color entirely black, except a little reddish below the mouth. Not uncommon under stones and in crevices of rocks in 4th l., Ly-ee-moon Passage, near Hong Kong, China."—(W. Stimpson.)

"Yellowish, spines dark olive. In 25 f., among clean stones and nllli-pores off the headland of Hakodadi, Isl. of Jesso, and N. E. end of Nippon."—(W. Stimpson.)

## TOXOCIDARIS OLOBULOSA A. Ag.

Primary and secondary tubercles of the same size; outline globular; miliaries numerous; poriferous zone broad, increasing in breadth; pores arranged in arcs of 8 or 9 pairs, near the mouth; spines of dried specimens dark violet, short and slender.

"Keelung, Formosa."—(W. Stimpson.)

## TOXOCIDARIS DBPRESSA A. Ag.

Remarkable for its extreme flatness on the lower surface and the great depression of the polar diameter. Tubercles numerous, uniform in size; coronal plates long; spines slender, rather short, scarcely equalling in length one quarter of the diameter. Poriferous zone broad, as broad as the median ambulacral space; pores arranged in very slightly arched arcs of 6 to 7 pairs of pores.

"N. E. end of Nippon."—(W. Stimpson.)

## PSAMXECHINUS SUBANGULOSUB Ag., Cat. Rais.

"Color reddish and brownish red of various shades. Very common in 4th l. and at 1. w. m. on rocks, chiefly in crevices. Simon's Bay, Cape of Good Hope."—(W. Stimpson.)

## PBAMMECHINUS INTER MEDIUS Barn. MS.

Coronal plates high; tubercles of interambulacral area of uniform size, arranged in ten vertical rows; in ambulacral space in four. Two vertical rows of small tubercles in poriferous zone. The third outside vertical row of pores very irregular, forming small arcs of two to three pairs of pores. Spines short and stout; ovarian openings large. Outline somewhat depressed; mouth opening small.

" Hakodadi Bay."

« Ousima."—(W. Stimpson.)

## PSAMMECHINUS PULCHERRIMUS Bam. MS.

The tubercles are quite small, closely packed together, of uniform size, arranged in slightly bent horizontal rows, four to eight in each interambulacral plate, according to the position; large miliaries fill up the intermediate space between the horizontal rows. In the ambulacra there are three small tubercles on each plate, making thus horizontal rows of sixteen tubercles in the interambulacra and six in the ambulacra. The spines are very minute slender and sharp. The test is thick; pores are arranged in oblique lines of four, and the rows are separated by small tubercles. Notches round the mouth very marked and deep for this genus.

" Color light olive, greenish above, brownish below. Found among stones and Laminariae in 4 f. Hakodadi Bay."—(W. Stimpson.)

## TOXOPNEUSTES DROBACHIENSIS Ag., Cat. Raïs.

"Very common in 10 fathoms, gravel and muddy gravel. Seniavine Straits, W. shore of Behring's Straits."—(W. Stimpson.)

" Very common in 2 f. mud, off shingle beaches in Avatscha Bay, Kamtschatka."—(W. Stimpson.)

See my remarks about the geographical distribution of this species in Proc. Bost. Soc. N. H., vol. ix., p. 191.

## TOXOPNEUSTES CARNOSUS Barn. MS.

This species is closely allied to *T. drobachiensis*\*, from which it is easily distinguished by the flesh color of its test and pink color of its spines. The pairs of pores are placed very close together, so that each arc is narrow containing from 5 to 6 pairs. Two principal rows of tubercles with miliaries not numerous, but prominent, arranged in a circle round the primary tubercle. The spines are short and slender; the notches of the actinostome scarcely perceptible.

Dredged in Behring's Straits. Capt. Rodgers. Gulf of Penginsk, Ochotsk Sea; Capt. Stevens.

## LOXECHINDS PURPURATUS A. Ag., Bull. Mus. Comp. Zool., 1863.

" Taken among rocks at 1. w. m. near San Francisco, Cal., (Sir Francis Drake's Bay;) occasionally brought to market."—(W. Stimpson.)

## SPHAERECHINUS BREVISPIVOBUS Des. Syn., Echin. Foss.

" Taken by the natives by diving, in 2 f. rocks. Funchal Bay, Madeira."—(W. Stimpson.)

" A young specimen, probably. In 20 f. among nullipores. Porto Praya, Cape de Verdes Ids."—(W. Stimpson.) \*

## MICROCYPHUS ELEGANS A. Ag.

Remarkable for the great number of small tubercles scattered irregularly round the two principal vertical rows of interambulacral tubercles. Depressions at junctions of plates, with a tendency of running into one another, both in the ambulacral and interambulacral spaces. The space free from spines quite small, hardly more marked than in *GoniocidarU* in the interambulacral region; comparatively broad in the ambulacral region.

"In 25 f., coarse gravel and nullipores off the headland of Hakodadi, Island, Jesso, Japan."—(W. Stimpson.)

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TOREUMATICA CONCAVA Gray, Proc. Zool. Soc. Lond. 1855.

" Common ; found covering the bottom in some spots off the Coast of China, near Hong Kong, in 15—20 f., mud. Also found sparingly in the inner bays in 4 to 6 f."

" Cream colored, with five broad rays of purplish above."—(W. Stimpson.)

TEMNOPLBURUS RBBVBSII A. Ag., Bull. Mus. Comp. Zool., 1863.

" In 8 f., shelly ground, channel of Hong Kong harbor, China. Color pale yellowish or greenish yellow; spines annulated with dark violet."—(W. Stimpson.)

#### ANTHECHINUS A. Ag.

Small pentagonal sea-urchins, with prominent abactinal system and openings at angles of plates. The ambulacra convex, projecting beyond the level of interambulacral space, which is quite depressed. Median ambulacral and interambulacral space free from spines. The bare space follows the line of plates and is not sunken, as in *Microcyphua* and *Tevmopleurus*, but slopes gradually to the edge of the plate. Tubercles very minute, somewhat larger round the mouth, where they are arranged in diverging rows, extending about half way to the abactinal area, while they are scattered irregularly on the portion of the plates, which they cover partially. Pores arranged in single pairs in a vertical row.

ANTHECHINUS ROSBDS A. Ag.

Genital plates perfectly smooth, with a large opening, like a notch, in the edge of the plate. Anal plates numerous, covered with minute spines. The bare space is violet in dry specimens and the spines are greenish. The spines are exceedingly slender and sharp, resembling those of *Salmacis*, though much smaller in proportion to the size of the sea-urchin. Polar diameter, as great as the transverse. " Japan."—(W. Stimpson.)

#### TEMNOTREMA A. Ag.

Small sea-urchin, almost globular, with marked grooves at the sutures of the plates, as in *Salmacis*. Two principal vertical rows of tubercles; smaller tubercles crowded irregularly over the rest of the plate. Abactinal system pentagonal, with prominent angles, the anal system consisting of four plates as in *Echinocidarii*. Spines like those of *Salmacis*, though finer in proportion and more deeply grooved. Pairs of pores arranged in a single vertical row.

TBMNOTREMA SCULPTA A. Ag.

Test, mottled with white, violet and patches of brown, has a greenish tinge; spines of lower surface, near the mouth, much larger than those of the abactinal part of the test. Actinal system smooth, with the exception often large plates round the opening of the mouth; spines ringed with white and violet.

"Kagosima Bay, Japan."—(W. Stimpson.)

HIPPONOE VIOLACEA A. Ag., Bull. Mus. Comp. Zool., 1863.

" Taken by the natives by diving at Hilo, Hawaii."—(W. Stimpson.)

Found under stones on gravelly bottom below 1. w. m., especially among sea-weeds.

" Eatawaisima Straits, Island of Ousima. Body purplish red; spines white."—(W. Stimpson.)

" Loo Choo Islands."—(W. Stimpson.) Fragments only.

HBSPILIA GLOBULUS Ag., Cat. Rais.

"Ousima, Japan."—(W. Stimpson.)

Two species of *Fibularia*, one from Kagosima and the other from the Chin\* Seas, too imperfect for description.

KOHINOCYAMUS TARENINUS Ag., Cat. Rais.

" Taken in 16 f. sand. Funchal Bay, Madeira."—(W. Stimpson.)

Also a species of *Echinocyamus*; " taken in abundance in 5 f. sand. Kago-sima Bay, Japan. Color waxen white."—W. Stimpson.)

"Ousima."—(W. Stimpson.)

ECHINOCYAMUS AUSTRALIS Ag., Cat. Rais.

" Coral Sea of Australia, Groper Shoal."—(W. Stimpson.)

A species of *Laganum* from the Loo Choo Islands, too imperfect for accurate description.

LAGANUM PUTNAMI Barn. MS.

Resembles *Lag. depressum*, Ag., in its general outline, but has, like *Lag. Peroni*, the genital opening far outside the rosette. The ambulacral rosettes are very pointed and slender. Anus nearer the edge than in other species of this genus; lower surface deeply grooved by the straight ambulacral furrows; mouth not sunken as in *Peroni*.

" Ousima."—(W. Stimpson.)

RUMPHIA LESUEURIA Ag., Bull. Mus. Comp. Zool., 1863.

" Color pale red above, with five curves of paler color near edge of interambulacral spaces. Below, pale yellowish green. Abundant in 6—10 f. sandy mud among the Islands near Hong Kong, China."—(W. Stimpson.)

ECHINARACHNIUS ASIATICUS Mich., Rev. et Mag. Zool., 1859.

" Covers the coarse, black, sandy floor of the sea off the coast of Kamtgchatka, near Petropaulski. Found at various depths from 30 to 70 fathoms; color reddish brown when alive."—(W. Stimpson.)

SCAPHOBCHINUS Barn. MS.

This genus is closely allied to *Echinarachnius*. It has, however, remarkable points of difference in the small number and great thickness of the walls joining the two floors, as well as in the mode of branching of the grooves on the lower surface, which is exactly that of the fossil genus *Scutella*. It has the ambulacral rosette of *Echinarachnius* and the depression of the interambulacral space on the upper surface of *Arachnoidex*.

SCAPHOBCHINUS MIRABILIS Barn. MS.

Test depressed in interambulacral spaces; outline somewhat scalloped • genital openings outside of the pentagon of the centre of the rosette.

"Seined on sandy shores. The sandy bottom of Hakodadi Bay, (north side,) from 1. w. m. to 1—2 f., is covered so closely with this species that no space of a square foot can be found free of them. In some places a boat-hook can not be thrust to the bottom without striking one. Color above deep purplish crimson, below light "olive. The deep crimson pigment comes off easily and stains the hand. Hakodadi, Island of Jesso."—(W. Stimpson.)

Fragments of a new species of *Mellita* from the China Seas, in lat. 23°.

LOBOPHORA TBZTA A. Ag.

Resembles in outline the *L. truncata*, and would readily be referred to that genus from its general appearance. The position of the anus is also somewhat more marginal than in *L. bifissa*, being placed about opposite the middle of the lunule. On opening it we find that the lower floor is covered with a delicate grooved work, as in *Lobophora*, the grooves being mainly arranged on both sides of the ambulacral tubes, forming a beautifully carved elongated rosette round the mouth. We find nothing of this arrangement in *L. bifissa*. Lunules small, entirely closed, placed some distance from the margin. Teeth are much larger in proportion to the size of disk than in *Lobophora bifissa*.

" Dredged in 12 f. clean sand at Tanegasima, (Isl. south of Japan,) also in 10 f. sand off the east coast of Ousima. Color dark red, darkest below."—(W. Stimpson.)

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A young specimen? was dredged in the China Sea in lat. 23°, in 20 f. sand.  
 ROTULA RUMPHII Kl.

A young specimen? "Taken in 20 f. nullipore bottom, Porto Praya, Cap\* de Verdes."—(W. Stimpson.)

A species of *Echinoneus*, not sufficiently well preserved to admit of determination, was taken at the Loo Choo Islands.

Fragments of a large *Spatangus* allied to *Sp. purpureus*, taken in 50 f. in the Straits of Sangar, on the steamer Hancock, Capt. Stevens.

If ABBTIA ALTA A. Ag.

Differs from the *M. planulata* Gray, by the great convexity of the abactinal region. The large spines are more slender and much less numerous on the abactinal portion of the test. The whole of this is covered with quite minute silk like bristles, while in the *M. planulata* many of the bristles are stout and nearly as long as the diameter of the test. The large tubercles are all limited to the lower portion of the interambulacral space except one or two, while in *M. planulata* the whole interambulacral space is covered with large tubercles.

"Of a light buff color, above radiated with rows of flesh-colored patches. Taken commonly in 5 f, black sand, in Kagosima Bay."<sup>1</sup>—(W. Stimpson.)

LOVBNIA BUBCARINATA Gray, Proc. Zool. Soc, Lond., 1855.

"In 10 f. mud off Tamtu Island, Coast of China, near Hong Kong. Small ones common in 5 f. mud in the inner bays; young of a pinkish and fawn color; adult clear dark brown."—(W. Stimpson.)

It seems to me very doubtful whether this species is a true *Lovenia*. It has characters which place it close to *Breynia*, while the pouches at the base of the large spineB are similar to those of *Lovenia*. The pouches are much more limited in their position than in *Lovenia hyttrix*.

LOVBNIA TRIANOULARIS A. Ag.

This species is at once distinguished from either the *hyttrix* or the California species of this same genus, by the great width of the anterior region &nd the position of the large tubercles crowded together close to the anterior ambulacra. The position of the mouth is more central than in other species of this genus.

"Dark reddish above, sometimes purplish; longer spines annulated with white and red; below, color much lighter. Dredged in 5 f, black sand, Kagosima Bay."<sup>1</sup>—(W. Stimpson.)

LBSKIA MIRABILIS Gray. Cat. Brit. Mus.

A single broken specimen of this interesting species. The posterior part, containing the pentagonal pyramid covering the opening of the anus, quite well preserved.

"In 20 f, mud near Gr. Lema, off Coast of China, near Hong Kong. Dead specimens show that it grows to a length of three inches. Of a pale straw color; feet blood-red, palish."—(W. Stimpson.)

SCHINOCARDIUM STIMPSONII A. Ag.

More elongated than *E. cordatum*, to which it is closely allied; easily recognized by the great slope of the anterior ambulacral region; tubercles of the oral surface distant, position of the genital openings nearer the centre than in the *JSrteritatim* Gray; the posterior interambulacrum is not prominent.

"Taken in 10 f. aandy mud in Kagosima Bay, Japan. Color somewhat yellowish,—hay color."—(W. Stimpson.)

Another species of this genus, resembling *E. gibbomm*, was brought from the Cape of Good Hope; the specimens were probably only young,

[Deo.

**Bond** as an astronomer, said that he saw around him so many of his friends and neighbors, that it was hardly necessary to speak of his personal qualities as witnessed by them in private intercourse. To them, indeed, it is not necessary. They anticipate at once all that\*can be said on this point. But, Sir, Mr. Bond was for so long a time obliged to consecrate whatever of time and health his physical infirmity left at his disposal to the study of the heavens, that his earthly relations were comparatively contracted; and many who have been high dwellers have had to regret that they could not, with a true regard for him, seek to be neighbors. I happen\* to be one of the few persons present who began to know him, in social and domestic life, long before he came to the University; and we know, that, to the last, in his domestic and social relations he manifested the spirit of the heaven of heavens, — there is but one word for it, — love. It was his very nature.

"President Quincy has informed us how the professional astronomer was superinduced on the devoted father of a family. Mr. Bond was also the staff of his own venerable father, to be again, in his turn, blessed during his public scientific career with the support — the cooperation of mind, heart, and hand — of one who has been to him at the same time a son and as a brother. Allusion has been made, Sir, to the beautiful blending of these relations in the case of the deceased friend whom the Academy has just commemorated. The parallel occurred to me when the parties were all living;\* and I trust that the mention of it now is not out of keeping in a meeting like this. I heartily second the resolutions."

The resolutions were then unanimously adopted.

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Four hundred and sixty-first meeting.

February 22, 1859.— SUPPLEMENTARY MEETING.

The PRESIDENT in the chair.

Professor Gray resumed the subject of his communication to the meeting on January 11, upon the distribution of plants • in the northern temperate zone, and especially in North America and Eastern Asia, and undertook to indicate some of the vicissitudes to which our extant vegetation must have been exposed in earlier times, and which must have influenced the geographical distribution of the species.

He remarked that, for obvious reasons, the remains of plants are not so likely to be found in recent terrestrial formations, as the bones of animals; but when they do occur, they furnish most important data. Researches into vegetable fossils of the tertiary and quaternary formations have recently been commenced in this country by Mr. Leo Lesquereux, who has already shown, in the very beginning of these investigations, that some of our species of plants were in existence anterior to the drift or glacial epoch, and even in the later tertiary period. For instance, in the chalky banks of the Mississippi River, near Columbus, Kentucky, regarded by Mr. Lesquereux as anterior to the drift, this accurate botanist had identified fossilized leaves of our Live-Oak, Honey-Locust, Pecan, Planer-tree, Chinquapin Chestnut, and *Prinos lucidus*, besides those of an Elm and of a *Ceanotlms*, which were only doubtfully referable to existing species. The position of the strata bearing these fossil leaves had been indicated by Professor D. D. Owen " as about one hundred and twenty feet lower than the ferruginous sand in which the bones of the *Megalonyx Jeffer&onii* were found"; so that if not anterior, they must have been immediately subsequent to the glacial period;—most likely the latter, since all the vegetable remains of this deposit, which were in a determinable condition, were either positively or probably referred to existing species of the North American flora, although most of them now inhabited a region a few degrees farther south. Again, in a deposit, certainly older than the drift, near Somerville, Tennessee, which Mr. Lesquereux regarded as belonging to the lower or middle pliocene, among fossil leaves all apparently referable to genera of the present flora, two fifths of the species were identified by Mr. Lesquereux with existing species; those of which the identification was undoubted, viz. *Persea Carolinensis* *Prunus Caroliniana*, and *Quercus myrtijplia*^ now belonging to the warm sea-coast and islands of the Southern States.

Professor Gray remarked that this coincided with other



evidence, which conspired to render it in the highest degree probable, as he thought, that at least a considerable portion of our temperate flora was in existence in the early post-tertiary, and even in the later tertiary times. Also, that this early temperate flora then ranged much farther north than now. This he thought clear, both from the species identified in these deposits, and especially from the character of the land animals which in those days roamed over the plains of the Nebraska, consisting of Camels, Horses, an Elephant, a Mastodon, a Rhinoceros, &c.; these herbivorous animals most probably feeding in great part upon herbage like that of the present period, since herbaceous plants and grasses are likely to be more ancient than trees. And, since these animals must have had a truly warm-temperate climate, Professor Gray would positively infer that, in lat.  $40^{\circ}$ - $43^{\circ}$ , they were not living anywhere near the northern limit of the temperate flora; so that the temperate flora, which now crosses the sixtieth parallel in Western Europe, must have then extended to at least as high latitudes in Western North America; and this would make the temperate floras of North America and of Northeastern Asia essentially conterminous, and therefore commingle a certain number of species.

Subsequently, the glacial epoch, coming slowly on, did not destroy the species, or at least did not destroy those species which Mr. Lesquereux has identified with existing ones, so that the same may be inferred of similar species. Those which did survive through a period which brought an arctic climate down to the northern part of the Southern United States, it appeared certain to Professor Gray, must have been pushed on still farther south, and between them and the ice there must have been a band of cold-temperate and of arctic vegetation, perhaps as broad as that now interposed between Live-Oaks, Chinquapin Chestnuts, or Pecan-trees, and the present ice. The existence at that period of an arctic flora, of species identical with the present, was demonstrated by the arctic species which, retreating up our

mountains as the climate gradually grew milder, still exist scantily upon the highest peaks of the Alleghanies, and in greater numbers upon the cooler mountain-summits of New England and New York.

As thrice receded northward at the close of the glacial period, the temperate flora would naturally follow it; and Professor Gray insisted, as a most important point in the present discussion, that the temperate vegetation must have again advanced, after the glacial epoch, much farther north, and especially northwest, than it now does; so far north, indeed, that the temperate floras of North America and of Eastern Asia — before conterminous, and then most widely separated — must have again become conterminous. However it may have been in the ante-glacial period, — although it appears certain that some, and probably that many, of our species of plants then existed, — Professor Gray thought it could not be doubted that most of our present species were in existence immediately after the glacial period, and therefore liable to interchange with Eastern Asia at a time when the temperate floras of the two regions were contiguous.

The evidence of such contiguity during what Professor Dana terms the *fluvial epoch*, which succeeded the glacial, Professor Gray remarked, was that a milder climate than the present then supervened, — perhaps not so much higher in the mean temperature of the year at the North, as more equable, — a more oceanic climate, such as would naturally result from the extensive submergence of northern, or at least of northeastern land, when the sea stood five hundred feet above its present level in the basin of the St. Lawrence, and our great alluvial plains, from fifty to three hundred feet above the present bed of the rivers, were flooded. Professor Gray alluded to the character of the herbivorous animals of that period, and their high northern range, as demonstrating that our temperate flora then reached northward far beyond the arctic circle; for that was the era of the *Megatherium*, *Megalonyx*, *Mylodon*, *Mastodon*, a *Dicotyles*, a wild horse,

&c. in the United States; when the *Elephas Americanus* ranged north to Canada, and the Siberian *Elephas primigenius* from Canada to the Arctic Sea, as well as in Europe and Asia from lat. 40° to the shores of the Arctic Ocean,— in the Old World accompanied by a *Rhinoceros*, which in Siberia ranged as far north as the Elephant. Taking this as proof that the temperate floras on both sides extended fully up to Behring's Straits, — if, indeed, these straits then existed, — Professor Gray was unable to suppose that species of plants did not come or go when the Siberian Elephant did.

This warm or mild period was followed by the *terrace epoch*, as Dana terms it, — a time of transition towards the present condition, bringing the northern part of this continent up to its present level and down to its present cool temperature, so giving to the arctic flora its present extent, and again separating the temperate floras of the New and of the Old World to the extent they are now separated.

Professor Gray observed, that he could not appreciate the objection that the admission of such vicissitudes militated against the idea of a plan in creation, and in " the adaptation of organic types to similar corresponding physical features," unless the objection goes to the extreme of implying that the present state of things so strictly represents the primitive condition as to exclude second causes, and to deny that physical influences, known to have been in operation, should have produced their natural effects in former times as well as now. Looking at the long and eventful history of vegetable species, Professor Gray was not inclined to think that the *Eriocaulon septangulare* of our Atlantic border was separately created also in the Isle of Skye and a few of the neighboring Hebrides, and in a local station on the western coast of Ireland, while it occurs nowhere else in the Old World, and has not a single generic or ordinal representative in Europe,—nor that the Ginseng was created in three widely-separated parts of the world, viz. in Eastern North America, in Japan and Mantchuria, and

in Nepaul, — any more than that patches of Alpine vegetation, wholly of Labradorian species, were separately created on Mount Katahdin in Maine, the White Mountains of New Hampshire, and a few summits of the Green Mountains and Adirondacks.

As respects the vegetation of former epochs, so far was Professor Gray from conceding " that the present distribution [of *plants*] was linked with that of earlier periods in a manner which excluded the assumption of extensive migrations, or of a shifting of the flora from one area to another," that he was, on the contrary, struck with the remarkable dissimilarity between the early tertiary and the more ancient floras of Europe and America and that now existing; for example, the miocene flora of the coast of Oregon being very like that of Switzerland of the same period, and in both a tropical flora of predominant Australasian types; the eocene flora of at least some parts of Europe being prominently Australian; the flora of Europe, even since the creation of some existing species, possessing numerous North American types of which there are now no representatives whatever on that continent, &c.

In conclusion Professor Gray remarked, that, when we speculate about the *origin* of species, we launch out beyond the region of induction, and have only analogies or probabilities to guide us, which we have to weigh one against another as well as we can. And he 'deemed it very important to the progress of science that different investigators should start from independent and opposite preconceptions or lines of thought. His preconception was that of the local origination of species; not origination in single individuals or single pairs, — which might or might not be the case in different species. The improbability of single origin appeared to him to be great in the lower grades of animals; the probability of it greater and greater as we rise in the scale of being. But the local origination of each species appeared to him not only the natural hypothesis to begin with, as he had before

remarked, but also the one which, on applying it to the case in hand, he thought best adapted to explain the actual distribution of plants. Although not inclined to defer too much to *a priori* reasoning, he thought it was suggested by philosophical considerations, as well as by the induction of observations ; being a natural inference from Maupertuis's principle of *least action*, viz. " that it is inconsistent with our idea of Divine Wisdom to suppose that God would use more power than was necessary to accomplish a given end." According to Professor Peirce, this principle is strictly verified in all the mechanical arrangements of the universe ; so that we cannot but think it applicable to the organic world also ; — in which there would appear to be a vast waste of power, if, in the case of beings endowed with such immense multiplying power as plants, as many individuals were created *ab initio* as there were ever subsequently to be.

The discussion was continued by Professor Agassiz, who remarked that Professor Gray had fairly represented his view of the origin of animals. Botanists, he said, have considered the distribution of plants mainly in connection with the influence of physical agents, whereas zoölogists had regarded the distribution of animals from a paleontological point of view, and from this latter point of view he had himself been led to the opinion that animals were primarily distributed about as they are at the present time.

Professor Agassiz argued that climate has very little to do with the distribution or specific characters of animals, from the facts observable at the present time. Near the poles, he remarked, the conditions of existence are quite uniform, and in the tropics they are the same so far as climate is concerned. In the arctic regions we find many animals absolutely identical in both hemispheres, and many very closely related to each other; in the regions of the tropics, on the other hand, there is no similarity in the animal life of the two hemispheres, although the climate is the same. It is evident, therefore, that the peculiar characters of the Faunae of these regions cannot

be ascribed to the influence of climate. In passing from the arctic to the tropical regions, the uniformity of animal life in the former passes gradually into the extreme diversity of that in the latter, and in the causes of difference in the tropics Professor Agassiz said he saw the reasons for all differences, wherever observed. How far back, he asked, does this state of things go? In the tertiary times of Australia the peculiar types of animal life existed which give at the present time the distinctive character to its Fauna, and the same is true of the tertiary Fauna of South America. These facts, and others like them, have led him to believe that animals were primarily distributed over the surface according to a plan hardly intelligible as yet to us, but independent of climatic influences. This plan he believed included the preparation for the earth's surface and the various external conditions of their existence for its inhabitants, before they were created, very much as a householder lays his foundation and builds the superstructure and arranges the furniture of the interior for his residence before occupying it.

Professor Gray had quoted a number of plants as identical in the tertiary and the present period. Des Hayes and Lyell had admitted the same with regard to the animals of these periods. Professor Agassiz said he had doubted the fact in the case of animals, and had therefore early in his scientific career collected many specimens to settle the question, and in every instance where he had sufficient materials he had found that the species of the two epochs supposed to be identical by Des Hayes and Lyell were in reality distinct, although closely allied species. He was therefore inclined to ask whether it might not be possible that the same is the case with the plants of the tertiary period and those of the present-day? He could not but believe that, if Professor Gray were, to exercise the same critical judgment upon the fossil Flora which he does with reference to the existing Flora, he would find differences between the species of the two epochs similar to those found in the animal world. There is not, at the

present time, he added, an equal knowledge of all the facts in Botany and Zoology.

Professor Agassiz referred to his former statements with regard to the similarity of the turtles of Eastern Asia and Eastern North America, and of those of Western North America and Europe, and showed how these differences seemed to be related to the geological age of these respective regions, and were at variance with the supposition of an interchange of species, such as Professor Gray believes to have occurred in the vegetable world: in the instance quoted, there is an alternation of two fields of animal life of entirely different types. In conclusion Professor Agassiz reiterated his statement, that he believed that the present races of animals were originally created on the earth in about the same proportionate numbers as they are found to have at the present time, and in about the same localities as those they now\* occupy.

Professor Peirce "spoke of the changes of temperature which had been referred to as having influenced the distribution of plants and animals, and said he thought it an important inquiry, to discover how such a change could have taken place. With regard to the supposed cooling down of the earth, he showed that the conditions under which it could have taken place were inconsistent with the existence of plants and animals on its surface, and the time when it must have occurred must have been long before they were created. The sun's temperature, he said, might have undergone changes from time to time, but there was no proof that such had been the case; and if it had been so, the effect on the earth would have been uniform. The change of the area of the land, and the elevation of portions of the earth's surface, would account for the glacial period, and climatic and meteorological changes might have resulted from changes in the amount of the earth's at\*mosphere.

Four hundred and sixty-second-meeting.

March 8, 1859. — MONTHLY MEETING.

The Academy met at the house of Dr. N. L. Frothingham.  
The PRESIDENT in the chair.

The Corresponding Secretary read a letter from Mr. G\* P. J. Sond, in acknowledgment of one from himself communicating the resolutions passed by the Academy on the occasion of his father's decease ; and one from Mr. W. W. Goodwin, accepting fellowship.

Professor C. C. Felton made the following communication on Greek Pronunciation: —

" In the fourth volume of the Memoirs of the American Academy, published in 1818, there is an elaborate paper on the Modern Greek Language, by the late John Pickering of Boston. The materials for this learned contribution were partly gathered from conversations with a well-educated Greek, a native of Navarino, — the sandy Pylos of old Nestor, — Mr. Ciclitira,\* the mate of a Greek ship then lying in the harbor of Boston. This gentleman had received a fair school education in his youth: he could read Homer well; and the letter addressed by him to Mr. Pickering does credit to his acquirements, both in chirography and style. It is an interesting illustration of the effects of what the Greek patriots have done, in the latter half of the last century and the opening of the present, to improve the intellectual condition of their oppressed countrymen. Mr. Pickering, with characteristic zeal for knowledge, seized this opportunity to investigate the actual condition of the Modern Greek language. By comparing the present pronunciation of the spoken language with the statements of the old grammarians, he came to the conclusion that it is, in all essential particulars, nearly identical with that which prevailed in the period immediately following the Christian era.

\* Since Mr. Pickering's time, the Modern Greek has been more studied, and it is now understood by a larger circle of scholars. But to him belongs the honor of having, earliest among the scholars of our day, given the subject a thorough investigation, and of having published



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**STATISTICS**

**OF THE**

**FLORA OF THE NORTHERN UNITED STATES,**

**BY ASA GRAY.**

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EXTRACTED FROM THE AMERICAN JOURNAL OF SCIENCE AND ARTS, VOLUME XXII, SECOND  
SERIES, SEPT., 1866.

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STATISTICS OF THE FLORA OF THE NORTHERN  
UNITED STATES.

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"WHILE engaged in the preparation of a second edition of the *Manual of the Botany of the Northern United States*, I was requested by an esteemed correspondent, upon whose judgment I place great reliance, to exhibit, in a compendious and convenient form, the elements of the flora I was occupied with. I accede to this request only because I may be presumed to possess considerable facilities for collecting and correcting a portion of the required data. But I cannot command the time needed for a proper elaboration and discussion of these materials, nor have I any special aptitude for this kind of research. I may, however, collect and arrange the principal data; for the use of those better qualified to discuss them, and to indicate their bearings upon many questions of the highest scientific interest, respecting the geographical distribution, the mutual relations, the nature, and the origin of the existing species of plants;—questions some of them so speculative or so difficult that they are not likely to be conclusively answered in our day; others more nearly within our reach; but all perhaps capable of some elucidation from the critical comparison of the flora of any one considerable region with the vegetation of other parts of the world.

The work,\* which forms the basis of the following statistics of the botany of the Northern United States, has now been extended in geographical area beyond the limits of the Northern States, politically so called; inasmuch as this area includes Virginia and Kentucky, and stretches westward to the Mississippi River. The southern boundary of  $36^{\circ} 30'$  has been adopted (instead of Mason and Dixon's line) because it coincides better than any other direct geographical line with the natural division between the cooler-temperate and the warm-temperate vegetation,—between the flora of the northern and of the southern Atlantic states. Few characteristically southern plants advance to the north of it, and those chiefly on the coast of the low southeastern corner of Virginia, in the Dismal Swamp, and the environs of Norfolk. Could we vary the line where it intersects the longitude of Washington, carrying it north until it reaches James River, and thence due east again, the small quadrangle thus excluded would exclude nearly all the properly southern iridige-

\* *Manual of the Botany of the Northern United States*; second edition; including Virginia, Kentucky, and all east of the Mississippi: arranged according to the Natural System; by ASA GRAY, (the Mosses and Liverworts by WM. S. SULLIVANT). With 14 plates, illustrating the Genera of the Cryptogamia. New York: George P. Putnam & Co., 1853.

nous plants now comprised in the volume,\* and mark the true division eastward between our southern and our northern botanical regions, namely, at the northern limit of the Live Oak, the Long-leaved Pine, and the Black Moss (*Tillandsia usneoides*), which grows pendent from their boughs.

On the Mississippi, the plant most southern in character which crosses the parallel is *Jussicea repens*. This sparingly extends up the Ohio to lat. 38°, where also the *Taxodium* reaches about as far north as on the Atlantic coast.

In the elevated region through which the middle of our southern boundary passes, great numbers of northern plants are of course found to extend much farther southward.

Our western boundary, the Mississippi River, while it takes in a considerable prairie-region, excludes nearly all the plants peculiar to the wide western woodless plains, which stretch from the Saskatchewan to Texas and New Mexico, and approach our borders in Minnesota and Iowa. A list of the plants which we may be said to have derived from this region will be given hereafter.

The northern boundary, being that between the United States and British America, varies through about five degrees of latitude, and nearly embraces Canada proper on the east and on the

\* It would apparently exclude from the flora of the Northern States the following species:—

Gordonia Lasianthus.	Benzoin melisscefolium.
Stuartia Virginica.	Tetranthera geniculata.
Zanthoxylum Carolinianum.	Stillingia sylvatica.
Berchemia volubilis.	Quercus virens.
Viburnum obovatum.	" cinerea.
Mitreola petiolata.	Sagittaria falcata.
Liatris odoratissima.	Burmannia biflora.
" paniculata.	Tillandsia usneoides.
Sericocarpus tortifolius.	Smilax Walteri.
Chrysopsis gossypina.	" lanceolata.
Baccharis glomeruliflora.	Zygadenia glaberrimus.
Kalmia hirsuta.	Mayaca Michauxii.
<i>Ilex</i> Cassine.	PaspalaDthus flavidus.
" myrtifolia.	Lachnocaulon Michauxii.
" Dahoon.	"Vilfa Virginica.
Gelaemium sempervirens.	Ctenium Americanum.
Forsteronia difformis.	Uniola paniculata.
Olea Americana.	Paspalum distirhum.
Fraxinus platycarpa.	" Digitaria.

Probably a good many more southern species inhabit this corner of Virginia, of which I have as yet no indications. There is little doubt that the long-leaved Pine crosses the line, and perhaps an arborescent *Yucca* grows on the sea-shore.—Of characteristically southern trees that have found their way still farther northward on the coast, even beyond Virginia, I can only mention two, namely, the Red Bay (*Persea Carolinensis*) and the Bald Cypress (*Taxodium distichum*), both found in Delaware, a little beyond lat. 38° 30'. Two other characteristic trees, viz., the Palmetto and *Magnolia grandiflora*, stop about as far short of our line as the two former pass beyond it.

west; so that the volume in question probably contains nearly all the plants of Canada East, south of the St. Lawrence and of lat. 47°, and of Canada West, south of lat 46°, or perhaps 45°. Our northern boundary rises highest at its western extremity, even to lat. 49°. But the botany of the district beyond Fond du Lac, lat. 47°, is little known. Probably many plants of the northwestern plains are to be found there, which are otherwise strangers to our region, as well as all or most of the species known to occur on the northern but not on the southern shore of Lake Superior.\*

A list of the additional Canadian species, as far as **now** known, is appended.f

The simplicity of our flora, as a purely northern temperate one, is preserved by the absence throughout our limits of high mountains and of any considerable extent of elevated land, es-

\* The following Phsenogamous plants, contained in Prof. Agassiz's published list of the plants gathered on the north shore of Lake Superior, in his expedition made in 1848, are not included in the Botany of the Northern States, viz :

Ribes oxyacanthoidea.	Tofieldia calyculata vel palustris.
Lonicera involucrata.	Carex Vahlil.
Corispermum hyssopifolium.	

To which I may add, that obscure and ambiguous Grass, the *Aira melir.oides*, Michx.<sub>f</sub> (*Graphephorum*, *Beauv.*). The last two, viz., *Tofieldia palustris* and *Garex Vahlil*, with an interesting Fern, *Allosorus acrostich aides*, are in Prof. Whitney's list (in Messrs. Foster and Whitney's Report on the Geology of the Lake Superior Land District, 1851), and having been gathered on Isle Royale, strictly claim admission into our Flora. But I was not aware in time that Isle Royale fell within the limits of the United States; and, seeing that in any case it geographically and botanically pertains to the northern shore, where the vegetation begins to display a subalpine character, which it does not upon the south Side, I determined to take the southern shore of the lake for our boundary.

f This list includes the few just enumerated as found on the immediate coast of Lake Superior, although only one of the seven, viz., *Ribes oxyacanthoides*, w truly Canadian. Three of them come from the northwest and west, and three from the Hudson's Bay country. I exclude the introduced species, reckoning among these *ffexperi*\* *matronaliu*, *Sisymbrium Sophia*, <f>c: also all those mentioned as Canadian by Pursh, which have not been confirmed by later observers.

Aquilegia vulgaris (A. brevistyla, <i>Hook.</i> ).	Aster Cornuti.
Turritis patula.	Gentiana acuta.
" retrofracta.	Polemonium cteruleum.
Thlaspi alpestre (?)	Corispermum hyssopifolium.
Linum perenne.	Etoaguus argentea.
Oxytropis Lamberti (?)—the plant of	Tofieldia palustris.
Quebec, so-called.	Goodyera ( <i>Spiranthes</i> , <i>Hook</i> ) <i>decipiens</i>
Ribes oxyacanthoides.	Carex Vahlil.
Lonicera involucrata.	Graphephorum melicoides. ( <i>Pose sp. i</i> )
Hieracium vulgatum.	Elymus EuropBus, <i>ex Hook.</i>
Nardosmia frigida.	Allosorus acrostichoides.
Matricaria inodora.	

So far as we know at present, therefore, only 22 indigenous Phsenogamous species and Ferns (of which 12 are also European) would therefore be added, by comprising Canada proper, that is, the country bordering the north of the St. Lawrence and of the Great Lakes.

pecially at the north, and the consequent paucity of truly alpine or even subalpine species. We have an alpine region indeed ; but it is restricted to a few isolated mountain-tops in the northern part of New England and New York, between or near lat. 44° and 45°. The White Mountains of New Hampshire furnish far the larger part, viz., the range strictly so called, with six or seven square miles (taken horizontally) of alpine region, of which the highest point slightly exceeds 6200 feet in elevation, and its lower limit is about 4500 feet above the level of the sea, and Mount Lafayette (reaching to 5200 feet) along with other smaller patches, together making up almost as much more. Mount Katahdin in Maine (about 5300 feet high) may furnish a square mile or so of alpine region. The Green Mountains of Vermont (with a maximum elevation of 4360 feet) present mere vestiges of alpine vegetation in one or two places; and two or three summits of the Adirondack Mountains of northeastern New York (with a maximum elevation said to exceed 5400) are of a more decidedly alpine character, but apparently of small extent and far from rich in species.

The southern shore of Lake Superior affords no alpine and perhaps no strictly subalpine species; nor do any occur in the Allegheny Mountains, although they rise to above 5000 feet at one point in the south of Virginia,\* and to 6000 and about 6300 in North Carolina. *Scirpus cespitosus*, *Lycopodium selago*, *Andrcea petrophila*, and *Cetraria Islandica*, are the most nearly alpine species known in the Alleghany Mountains. As will be seen by the list on a following page, the number of our truly alpine species does not equal that of the southern plants which have extended into the low southeastern corner of Virginia.

After that of Europe, no northern temperate flora of equal extent, and perhaps no flora of any large region, is so well known as that of the Northern United States, at least as to its Phanerogamia and highest Cryptogamia: and although very much still remains to be done, yet we are now in condition profitably to compare our vegetation with that of Europe, and also, though\* less critically, with that of other parts of the northern temperate zone.

The following tables exhibit the principal elements of our flora, and some of its relations to the European, &c.

\* The White Top Mountain in Virginia, just within its southern boundary, is commonly said to be about 6000 feet in elevation; but, this is probably an exaggeration.

List of the Natural Orders of the Flora of the Northern United States, with the number of Genera and Species comprised in them,—distinguishing the introduced and the indigenous Species,—and of the indigenous Species common to this district and to Europe,

## CLASS I. DICOTYLEDONS S. EXOGENÆ.

Orders.	Whole No. of Genera.	No. of Genera with Indigenous Species.	No. of Introduced (naturalized and adventive) Species.	Whole No. of Species.	No. of Indigenous Species.	No. of our Indigenous Species common to Europe*
SUBCLASS. I.						
ANGIOSPERMJS.						
Ranunculaceae,	21	20	6	55	49	10
Magnoliaceae,	2	2		6	6	
Anonaceae,	1	1		1	1	
Menispermaceae,	3	3		3	3	
Berberidaceae,	5	5	1	6	5	
Nelumbiaceae,	1	1		1	1	
Cabombaceae,	1	1		1	1	
Nymphaeaceae,	2	2		3	3	1
Sarraceniaceae,	1	1		2	2	
Papaveraceae,	6	2	5	7	2	
Fumariaceae,	4	3	1	7	6	
Cruciferae,	20	16	14	60	46	11
Capparidaceae,	1	1		1	1	
Resedaceae,	1		1	1		
Violaceae,	2	2	1	19	18	1
Cistaceae,	3	3		7	7	
Droseraceae,	1	1		4	4	2
Parnassiaceae,	1	1		3	3	1
Hypericaceae,	3	3	1	19	18	
Elatinaceae,	1	1		1	1	
Caryophyllaceae,	19	11	17	47	30	13
Portulacaceae,	4	3	1	5	4	
Malvaceae,	9	7	6	15	9	
Tiliaceae,	1	1		2	2	
Camel iaceae,	2	2		2	2	
Linaceae,	1	1		2	2	
Oxalidaceae,	1	1		3	3	2
Geraniaceae,	2	1	2	5	3	1
Balsam inaceae,	1	1		2	2	
Limnanthaceae,	1	1		1	1	
Rutaceae,	2	2		3	3	
Anacardiaceae,	1	1		6	6	
Vitaceae,	2	2		7	7	
Rhamnaceae,	4	4	1	7	6	
Celastraceae,	2	2		3	3	
Sapindaceae,	4	4	1	11	10	
Polygalaceae,	1	1		13	13	
Leguminosae,	36	33	14	105	91	4
Rosaceae,	18	17	5	76	71	16

CLASS I—continued.

Orders.	Whole No. of Genera.	No. of Genera with Indigenous Species	No. of Introduced (naturalized and adventive) Species.	Whole No of Species.	No. of Indigenous Species.	No of our Indigenous Species common to Europe.
Calyanthaceae,	1	1		3	3	
Melastomaceae,	1	1		3	3	
Lythraceae,	4	4	1	8	7	1
Onagraceae,	9	9		36	36	10
Loasaceae,	1	1		1	1	
Cactaceae,	1	1		1	1	
Grossulaceae,	1	1		7	7	1
Passifloraceae,	1	1		2	2	
Cucurbitaceae,	3	3		3	3	
Crassulaceae,	3	3	1	6	5	
Saxifragaceae,	11	11		22	22	5
Hamamelaceae,	3	3		3	3	
Umbelliferae,	26	21	6	42	37	2
Araliaceae,	1	1		6	6	
Comaceae,	2	2		11	11	
Caprifoliaceae,	7	7		27	27	3
Rubiaceae,	9	9	1	24	23	4
Valerianaceae,	2	2	1	8	7	
Dipsacaceae,	1	1	1	1	1	
Compositae,	83	67	27	300	273	9
Lobeliaceae,	1	1		12	12	1
Campanulaceae,	2	2		5	5	1
Ericaceae,	27	27		62	62	19
Galacineae,	1	1		1	1	
Aquifoliaceae,	2	2		10	10	
Styracaceae,	3	3		5	5	
Ebenaceae,	1	1		1	1	
Sapotaceae,	1	1		2	2	
Plantaginaceae,	1	1	2	8	6	1
Plurabaginaceae,	1	1		1	1	1
Primulaceae,	11	10	1	17	16	6
Lentibulaceae,	2	2		12	12	4
Bignoniaceae,	4	2	2	4	2	
Orobanchaceae,	4	4		5	5	
Scrophulariaceae,	26	24	11	65	54	10
Acanthaceae,	2	2		3	3	
Verbenaceae,	4	2	3	10	7	
Labiatae,	33	21	22	71	49	4
Borraginaceae,	11	5	9	25	16	3
Hydrophyllaceae,	4	4		11	11	
Polemoniaceae,	4	4		12	12	1
Convolvulaceae,	7	5	5	20	15	1
Solanaceae,	6	2	6	10	4	
Geitaniaceae,	9	8	3	27	24	2
Apocynaceae,	3	3		4	4	
Asclepiadaceae,	5	4	1	22	21	

## CLASS II—continued.

Orders.	Whole No. of Genera.	No. of Genera with Indigenous Species.	No. of Introduced (naturalized and adventive) Species.	Whole No of Species	No. of Indigenous Species.	No. of our Indigenous Spemes common to Europe.
Oleaceae,	5	4	1	10	9	
Aristolochiaceae,	2	2		6	6	
Nyctaginaceae,	1	1		1	1	
Phytolaceae,	1	1		1	1	
Cbenopodiaceae,	9	7	11	21	10	6
Amarantaceae,	6	5	9	14	5	
Polygonaceae,	4	3	10	32	22	6
Lauraciae,	4	4		5	5	
Thymeleaceae?,	1	1		1	1	
Elaeagnaceae,	1	1		1	1	
Santalac*©,	2	2		3	3	
Loranthaceae,	1	1		1	1	
Saururaceae,	1	1		1	1	
Ceratophyllaceae,	1	1		1	1	1
Callitricaceae,	1	1		3	3	3
Podostemaceae,	1	1		1	1	
Euphorbiaceae,	9	9	5	33	28	
Empetraceae,	2	2		2	2	1
Urticaceae,	11	10	4	19	15	1
Platanaceae,	1	1		1	1	
Juglandaceae,	2	2		9	9	
Cupuliferae,	6	6		25	25	1
Myriophyllaceae,	2	2		3	3	1
Betulaceae,	2	2		10	10	4
Salicaceae,	2	2	4	28	24	3
<b>Subcl. II.</b>						
Gymnosperms.						
Coniferae,	8	8		20	20	2
Total,	622	522	223	1713	1490	180

## CLASS II. MONOCOTYLEDONEAE seu ENDOGENAE.

Araceae,	6	6		7	7	2
Typhaceae,	2	2		7	7	6
Lemnaceae,	1	1		5	5	4
Naiadaceae,	5	5		16	16	12
Alismaceae,	5	5		12	12	4
Hydrocharitaceae,	3	3		3	3	2
Burmanniaceae,	1	1		1	1	
Orchidaceae,	17	17		51	51	10
Amaryllidaceae,	4	4		4	4	
Haemodorumaceae,	3	3		4	4	
Bromeliaceae,	1	1		1	1	
Iridaceae,	2	2		6	6	
Dioscoreaceae,	1	1		1	1	
Smilacaceae,	3	3		18	18	



CLASS I—continued.

Orden.	Whole No. of Genera.	No. of Genera with Indigenous Species.	No of Introduced (naturalized and adventive) Species.	Whole No. of Specie*.	No. of Indigenous Species.	So. of our Indigenous Species common to Europe.
Liliacere,	12	9	4	28	24	5
Melanthaceae,	12	12		21	21	1
Juncaceae,	3	3		26	26	14
Pontederiacere,	3	3		4	4	
Commelynaceae,	2	2		6	6	
Xyridaceae,	2	2		4	4	
Eriocaulonaceae,	3	3		5	5	1
Cyperaceae,	16	16	1	214	213	48
Grammes,	65	55	32	194	162	32
	172	159	37	638	601	141
Total Phaenogamous Plants. }	794	681	260"	2351	2091	321

CLASS III. ACROGENAE.

Equisetaceae,	1	1		10	10	8
Filices,	20	20		49	49	20
Lycopodiaceae,	2	2		12	12	6
Hydropterides (Marsileaceae), }	2	2		4	4	1
	25	25	0	75	75	35

CLASS IV. ANOPHYTA.

Musci,	80	80	0	394	394	255
Hepaticae,	38	38	0	108	108	65
Total,	118	118	0	502	502	320
Total Cryptogamia, Cl. 3 and 4, }	143	143	0	577	577	355
Total of the 4 Classes }	937	824	260	2928	2668	676

It is plain enough that the numbers in this tabular view must be essentially influenced throughout by one's views as to the limitation of species and genera. In the hands of a few botanists, the flora of the Northern States might exhibit a somewhat smaller number of species than it here does; but with most, there would undoubtedly be a stronger tendency in the opposite direction. As it is obviously impossible at present to reduce the various ideas and shades of difference that prevail respecting species to one common standard, all that can be done is to indicate the bias, or what astronomers call the *personal equation*, of each author, which must be duly considered when different

floras are to be compared. This is not the place to discuss *the* principles involved in the general question, nor to explain or defend any conclusions to which I may have arrived;—except to say that my determination of species in each particular case has been based on the evidence before me as irrespective of all theoretical considerations as possibly could be. It is necessary to state, however, that, so far as I can judge, the authors of the principal and most esteemed recent European Floras, if in my place, would be likely to increase the present number of our Phaenogamous plants and Ferns about five per cent. One school, indeed, would doubtless add at least ten or twelve per cent, to the species here received, and give results quite incommensurable with my own. I can only say, on my own part, that an enlarged experience certainly inclines one to take broader views of species than those which prevail among the generality of European botanists.

The numerical comparison of our Phaenogamous with our Cryptogamous species, however interesting it might become in a complete flora, is here of little moment; only the higher Cryptogamia being included. Moreover, it should be noted that the *Musci* and *Hepaticce* enumerated in the above table are those of a geographical area about twice that of the higher or Acrogenous Cryptogamia and the Phaenogamia. For the distinguished American muscologist who elaborated these two orders for our 'Botany of the Northern States,'<sup>7</sup> anxious to afford facilities for the study of our mosses throughout the country, has included all known to him within the whole United States east of the Mississippi, and even some as yet found only to the north and west of these limits. It is evident, also, that the number of forms admitted as species is proportionally larger in these two orders than in the rest of the work. On the other hand it is to be considered how little our mosses have as yet been collected and studied, and how likely it is, in view of their general wide range, that most of these outlying species may yet be detected within the Northern States, including Virginia and Kentucky.

We naturally restrict our attention mainly to the Phaenogamous vegetation, as best known in all countries and affording the most precise data for comparison. And we exclude at once the 260 *introduced* species, most if not all of which have become denizens of our country since its settlement by Europeans, and in consequence of that settlement;—leaving the question of their origin, introduction, &c, for future consideration. Their admission into the account in the comparing our flora with that of Europe, as has been done, seriously vitiates our conclusions.\*

\* Thus Mr. Watson, as cited by Alph. DeCandolle (*Geogr. Bot* p. 511) enumerates 602, out of 1428 phaenogamous British plants, as common to Great Britain and America. I count only 321 out of 2091 phaenogamous species *indigenous* to the Northern United States as indigenous also to Europe.

The numerical elements of our Phsenogamous flora, considered as to classes, are, as the tabular view shows:

Dicotyledonose or Exogense,	1490 species in	522 genera.
Monocotyledonose or Endogense,	601 "	159 "
Total Phaenogamous indigenous plants,	2091 "	681 "

Or about 2½ Dicotyledonous to one Monocotyledonous species.

Their distribution among the 132 Natural Orders represented in our flora (*Resedacee* and *Di'psacee* of the above table being excluded, as having no indigenous representatives), is shown in the following:

*List of the principal Phcmogamous Natural Orders represented in the flora of Northern United States, arranged according to the number of indigenous species they severally comprise.*

	Species	J	Species.
Composite,	273		24
about ith of the 2091 Phanerogamia.			23
Cyperaceaj, about T ^ th, "	233		22
Gramineae, about - ^ th, "	162		22
Leguminosra, about ^ th, "	91		21
Rosaceas, about j ^ th, "	71		21
Ericacea,	62		20
Scrophulariacee,	54		18
Orchidace®,	51		18
Ranunculaceae,	49		16
Labiata?,	49		16
Crucifere,	46		11
UmbellifersB,	37		35
Onagrace®,	36		13
Caryophyllacea?,	30		12
EuphorbiaceaB,	28		12
Caprifoliaceae,	27		11
Juncacpaj,	26		11
Cupulifene,	25		10
Salicacee,	24		10
Gentianaceae,	24		10

Only 46 of our orders have 10 or more indigenous species: 63 orders have from 2 to 9 species, and 23 orders are represented each by a single species. The average allows 15\*09 species to an order.

Alphonse De Candolle and others have remarked that in almost every flora of the temperate zone which is pretty thoroughly known, the eight or nine largest families comprise half of its Phsenogamous plants. In the present case the first nine families, having 1026 species, lack nineteen of making half; the sum of ten families exceeds the moiety by thirty. The result is nearly the same as that brought out by De dandolle from a similar schedule, tabulated by him from Beck's Botany of the Northern

and Middle States, north of Virginia, 1833, although the elements are considerably different and the ten largest orders are not the same throughout.\*

Moreover, our ten predominant families do not properly correspond with the ten mentioned by De Candolle as generally predominant in the temperate regions of the northern hemisphere: viz. " of the first rank, *Composite*, *Gramineae*, *Cyperaceae*, *Leguminosae*; then the *Cruciferae*, *Umbelliferae*, and *Caryophyllaceae*, and then, though less decidedly, the *Labiatae*, *Rosaceae*, and *Scrophulariaceae*.<sup>f</sup> Nor would they do so if, by dividing the *Ericaceae* into smaller orders, we were to exclude that family from the list of those (eleven in number) which severally comprise not less than two per cent of our phaenogamous species. The three most predominant families accord indeed with De Candolle's conclusion, only the *Cyperaceae* with us are remarkable for surpassing the *Gramineae*. But the next three in our list are quite different, even if we omit *Ericaceae*, being *Rosaceae*, *Scrophulariaceae*, and *Orchidaceae*; and all three of De Candolle's second rank fall below our first ten; and one of them, the order *Caryophyllaceae* would fall still lower, if it were not reinforced by the *Illecebreae*, so generally regarded as a distinct family.

It is easy to see that these differences are owing to the unusual richness of our flora in *Cyperaceae* (chiefly in *Carices*), and to our poverty in *Cruciferae*, *Umbelliferae*, *Caryophyllaceae*, and *Labiatae*, especially in the second and fourth, at least as compared with corresponding parts of Europe.

\* The schedule drawn from Beck's Botany is as follows:

Composite,	265	} = 1066 species out of 2125 Phaenogamous plants.
Gramineae,	169	
Cyperaceae,	157	
Rosaceae,	97	
Amentaceae,	94	
Leguminosae,	80	
Labiatae,	59	
Ranunculaceae,	50	
Scrophulariaceae?,	48	
Orchidaceae,	47	

The differences are readily to be accounted for. 1. The substitution of *Amentaceae* in this list for *Ericaceae* in the other, results from the former Jussian order having been pre-empted entire by Beck, but distributed into several in the present work; while I have admitted the order *Ericaceae* in its most extensive sense. 2. The precedence of *Cyperaceae* to *Gramineae* in my list,—which appears not to be the case in corresponding floras of the Old World.—is wholly owing to the great increase in the number of *Carices*, in which the Northern United States are absolutely very rich; which increase has resulted from the remarkable attention and repeated elaboration this genus has received since Dr. Beck's time, from several hands, and perhaps also from a minuter discrimination of the species than in other families. 3. The order *Rosaceae*, which strangely takes precedence of the *Leguminosae* is unduly expanded by a crowd of nominal or traditional species, and has four times as many introduced species as the latter family. 4. The naturalized plants being included, alters the proper proportion of most of these orders, and swells the number of the Phaenogamous plants to 2125, while we count only 2091 truly indigenous species within an area about one-half larger and now much more thoroughly known.

<sup>f</sup> Alph. D. Candolle: Geogr. Bot., p. 1245.

I must not stop here to compare our flora with that of Europe as respects the proportions of the *predominant* families. The data on our part for such comparison are recorded above. I pass on to notice some *characteristic* features which depend upon positive differences in the families.

The orders represented in the N'. European flora and not in ours are the *Besedacee*, *Frankeniaceoe*, *Tamariscinece*, *Zygophylhcece*, *Dipsacece*, *Globulariacece*, and *Butomacece*;—all very small orders; five of the seven are not represented at all by indigenous species in North America; two of them are represented on our continent in what answers to the Mediterranean region.

Of our 132 orders none is peculiar to our district, and only two are restricted to the United States; namely, *Lirnnanthacece*, of one species in the Northern States and one or two in California, and *Galacinece*, of one genus and species,—a *genus incertce sedis*, rather than an order.

Our orders peculiar to America are the following:—

Sarraceniaceae,	Cactaceae,	Hydrophyllaceae,
Limnanthaceae,	Galacinese,	Bromeliaceae;
Loasaceae,		

all of which, except *Galacinees* and perhaps *BromeliacecB*, are also represented on the western side of our continent. Besides these the following 19 orders are extra-European. Those which have known representatives in western North America, that is, in Oregon and California, are repeated in the second column; those known in corresponding parts of eastern Asia, i. e. in Japan, China, and the Himalayas, in the third column.

*Extra-European Orders not peculiar to America.*

Extra-European Orders of the Flora of the Northern States.	Also represented in Western N. America.	Represented in Japan, China, or Himalaya*.
Magnoliaceae.		Magnoliaceae.
Anonaceae.		Anonaceae.
Menispermaceae.		Menispermaceae.
Nelumbiaceae.		Nelumbiaceae.
Cabombaceae.		Cabombaceae.
Calycanthaceae.		Calycanthaceae.
Melastomaceae.		Melastomaceae.
Passifloraceae.		Passifloraceae.
Hamamelaceae.		Hamamelaceae.
Sapotaceae.		Sapotaceae.
Bignoniaceae.	Bignoniaceae (Martynia) ?	Bignoniaceae.
Nyctaginaceae.	Nyctaginaceae.	Nyctaginaceae?
Phytolaccaceae.	Phytolaccaceae.	Phytolaccaceae.
Saururaceae.	Saururaceae.	Saururaceae.
Podostemaceae.		Podostemaceae.
Burmanniaceae.		Burmanniaceae.
Commelinaceae.		Commelinaceae.
Xyridaceae.		Xyridaceae.

Thus it appears, 1, that, of our 19 extra-European orders not peculiarly American, only 3 or 4 are represented on the western or Pacific side of the United States, while all but one are represented in the corresponding parts of Eastern Asia;—indicating a curious analogy in the vegetation of the eastern sides of the two great continental masses in the northern hemisphere, which is also borne out, though not so strikingly, in a comparison of the genera.

2. That the flora of the Northern United States is remarkably rich in ordinal types, as compared with Europe, which, (exclusive of the Mediterranean region, furnished with two or three), has only seven orders that we have not, while we have 26 that are wholly unknown to the European flora.

3. And it is worth noticing that our additional or characteristic orders are all of warm-temperature or sub-tropical general character (which is the more remarkable when the lower mean temperature of the year as compared with that of Western Europe is considered): all of these 26 orders have their principal development in the tropical regions, excepting six of the smaller ones; and three of these have tropical or sub-tropical representatives.

4. But the peculiar and extra-European families do not predominate, nor overcome the general European aspect of our vegetation, on account of the fewness of their species. Of the largest in our flora (*Hydrophyllaece*) we count only 11 species; and the whole 26 orders give us only 64, or barely three per cent of our phsenogamous species.

Our Phaenogamous genera, 681 in number, average three species apiece. Far the largest genus is *Carex*, with 132 species. On the other hand one half of our genera are represented by single species; and about 92 of these are *monotypic*, having only a single known species.

The genera which are strictly confined within the geographical limits of this work are only three, namely, *Napcsa*, *SuUivantia*, and *Hemianthus* (the last a dubious genus); and all three are monotypic.

The number of our genera which have no indigenous representatives in Europe appears to be 353, or twelve more than half of our whole number, (the naturalized plants being of course excluded), belonging to 95 families. In the following table (which is hastily prepared, and likely to contain not a few errors), our extra-European Phsenogamous genera are enumerated, under their respective families, and their distribution in longitude is attempted to be given in the two parallel columns.

*Phamogamous Genera of the Flora of the Northern United States not common to Europe, with indications of their distribution westward, and in Eastern Temperate Asia.*

Orders.	Extra-European Genera of Eastern N. America.	Also occurring in W. N. America, i. e., in Oregon and Californiu.	Occurring in E. Asia) i. e., in Japan, China, or Himalayns.
<i>JRanunculacece.</i>	Trautvetteria. Zanthorhiza. Hydrastis. Cimicifuga.	Trautvetteria.   (Cimicifuga.	Trautvetteria.   (Cimicifuga.
<i>Magnoliacece.</i>	Magnolia. Liriodendron.		Magnolia.
<i>Anonacece.</i>	Asimina.		
<i>Menispermacece.</i>	Menispermum. Cocculus. Calycocarpum.		Cocculus.
<i>Berberidacece.</i>	Caulophyllum. Diphylleia. Jeffersonia. Podophyllum.		Podophyllum.
<i>Nelumbiacece.</i>	Nelumbium.		Nelumbium.
<i>Cabombacece.</i>	Brasenia.		Brasenia.
<i>Sarraceniacece.</i>	Sarracenia.		
<i>Papaveracece.</i>	Stylophorum. Sanguinaria.		Stylophorum.
<i>FumariaceceB.</i>	Adlumia. Dicentra.	Dicentra.	Dicentra.
<i>Cruciferce.</i>	Iodanthus. Leaven worthia.		
<i>Capparidacece.</i>	Polanisia.		Polanisia.
<i>Violacece.</i>	Solea.		
<i>Cistaceoe.</i>	Hudsonia. Lechea.		
<i>Hypericacece.</i>	Ascyrum. Elodea.		
<i>Caryophyllacece.</i>	Anychia. Mollugo.	Mollugo.	Mollugo.
<i>Portulaccacece.</i>	Sesuvium. Talinum. Claytonia.	Sesuvium. Talinum. Claytonia.	
<i>Malvaceae.</i>	Oallirrhde. Napaea. Sida. Kosteletzkya.	Sida. Kosteletzkya.	Sida.
<i>Camelliacece.</i>	Gordonia. Stuartia.		Gordonia. Stuartia.
<i>Limnanthacece.</i>	Floerkea.		
<i>Mutacece.</i>	Zanthoxylum. Ptelea.		Zanthooylum.

Table continued.

Orden.	Extra-European Genera. AIHO occurring in W. N. of Eastern N. America	AIHO occurring in W. N. America, i. e. in Oregon and California.	Occurring in E. A. *ia, i. e. in Japan, China, or Himalayas.
<i>Vitaceae.</i>	Ampelopsis.		Ampelopsis?
<i>Mhamnaceae.</i>	Berberchemia.		Berberchemia.
	Ceanothus.	Ceanothus.	
<i>Sajrindctceob.</i>	^Esculus.	^Esculus.	^Esculus.
	Negundo.	Negundo.	Negundo.
<i>Leguminosce.</i>	Crotalaria.		Crotalaria.
	Dalea.	Dalea.	
	Petalostemon.	Petalostemon.	
	Amorpha.	Amorpha.	
	Robinia.		
	Wistaria.		Wistaria.
	Tephrosia.		Tephrosia.
	^Eschynomene.		^Eschynomene.
	Desmodium.		Desmodium.
	Lespedeza.		Lespedeza.
	Stylosanthes.		
	Apios.		
	Rhynchosia.		Rhynchosia.
	Galactia.		
	Amphicarpeea.		
	Clitoria.		Clitoria.
	Centrosema.		
	Baptisia.		
	Cladrastis.		
	Cassia.		Cassia.
	Gymnocladus.		
	Gleditschia.		Gleditschia.
	Desmanthus.	Desmanthus.	Desmanthus.
	Schrankia.		
<i>Rosaceae.</i>	Gillenia.		
	Dalibarda.		
<i>Calycarthaceae.</i>	Calycanthus.	Calycanthus.	
<i>Meiastornaceae.</i>	Rhexia.		
<i>LythraceaeB.</i>	Ammannia.	Ammannia.	Ammannia.
	Nessea.		
	Cuphea.		
<i>Onagraceae.</i>	^Enothera.	^Enothera.	
	Gaura.	Gaura.	
	Jussiaea.		Jussiaea.
	Proserpinaca.		
<i>Loasaceae.</i>	Mentzelia.	Mentzelia.	
<i>Cactaceae.</i>	Opuntia.	Opuntia.	
<i>Cucurbitaceae.</i>	Sicyos.	Sicyos.	Sicyos.
	Echinosystis.		
	Melothria.		
<i>Crassulaceae.</i>	Penthorum.		Penthorum.
<i>SaxifragaceaeB.</i>	Astilbe.		Astilbe.



Table continued.

Orders.	Extra-European Genera of Eastern N. America.	Also occurring in W. M. America, i. e. in Oregon and California.	Occurring in E. A. m., i. e. in Japan, China, or Himalayan. ^ ^ ^ ^
	Boykinia.	Boykinia.	
	Sullivantia.		
	Heuchera.	Heuchera.	
	Mitella.	Mitella.	Mitella.
	Tiarella.	Tiarella.	Tiarella.
	Itea.		
	Hydrangea.		Hydrangea.
<i>Hamamelaceae</i>	Philadelphus.	Philadelphus.	Philadelphus.
	Hamamelis.		Hamamelis.
	Fothergilla.		
<i>Umbelliferae</i>	Liquidambar.		Liquidambar.
	Crantzia.		
	Polytsenia.		
	Archemora.		Archemora.
	Tiedemannia.		
	Thaspium.	Thaspium.	
	Zizia.		
	Discopleura.		
	Cryptotaenia.		Cryptotaenia.
	Osmorhiza.	Osmorhiza.	Osmorhiza.
	Eulophus.		
<i>Cornaceae.</i>	Erigenia.		
<i>Caprifoliaceae.</i>	Nyssa.		
	Symphoricarpus.	Symphoricarpus.	
	Diervilla.		Diervilla(Weigela).
<i>Rubiaceae.</i>	Triosteura.		
	Spermacoce.		
	Diodia.		
	Cephalanthus.	Cephalanthus.	
	Mitchella.		Mitchella.
	Oldenlandia.		Oldenlandia.
	Mitreola.		Mitreola.
	Spigelia.		
<i>Composite.</i>	Polypremum.		
	Vernonia.		Vernonia.
	Elephantopus.		Elephantopus.
	Sclerolepis.		
	Liatris.		
	Kuhnia.		
	Mikania.		
	Conoclinium.		
	Adenocaulon.	Adenocaulon.	
	Sericocarpus.	Sericocarpus.	
	Diplopappus.	Diplopappus.	Diplopappus.
	Boltonia.		
	Brachychseta.		
	Bigelovia.		

Table continued.

Oiden.	Extra-European Genera of Eastern N. Amer- ica.	AHO occurring in W. N. America, i. e. in Ore- gon and California.	Occurring in E. Asia, i. e. in Jnpin, China, or Himalayas.
	Chrysopsis.	Chrysopsis.	
	]Pluchea.		Pluchea.
	]Baccharis.	]Baccharis.	
	]Polymnia.		
	{Chrysogonum.		
	{Silphium.		
	]Parthenium.		
	]va.		
	Tetragonotheca.		
	]Eclipta.		Eclipta.
	]Borrichia.		
	Heliopsis.		
	]Echinacea.		
	Rudbeckia.	]Rudbeckia.	
	Lepachys.		
	Eelanthus.	]Selianthus.	
	Actinomeris.		
	Coreopsis.	Coreopsis.	
	Verbesina.		
	Dysodia.		
	Hymenopappus.	Hymenopappus.	
	Helenium.	Helenium.	
	Leptopoda.		
	Baldwinia.		
	Marshallia.		
	Erechthites.		
	Cacalia.		Cacalia.
	Krigia.	.	
	Cynthia.		
	Nabalus.		
	Troximon.	Troximon.	
	Pyrrhopappus.		
<i>JBriaceae.</i>	Gaylussacia.		
	Chiogenes.		
	Epigaea.		
	Gaultheria.	Gaultheria.	
	Leucothoë.		
	Oxydendrum.		
	Clethra.		Clethra.
	Kalmia.	Kalmia.	
	Menziesia.	Menziesia.	
	Khodora.		
	Leiopyllum.		
	Pterospora.	Pterospora.	
	Schweinitzia.		
<i>GalacineaeB.</i>	Galax.		
<i>Aquifoliaceae.</i>	Nemopanthes.		

Table continued.

Orders.	Extra-European Genera of Eastern N. America.	Also occurring in W. N. America, i. e. in Oregon or California.	Occurring in E. Asia, i. e. in Japan, China, or Himalayas
<i>Styracacea.</i>	Halesia.		
	Symplocos.		Symplocos.
<i>Sapotaceae.</i>	Bumelia.		
<i>Primulaceae.</i>	Dodecatheon.	Dodecatheon.	
<i>Bignoniaceae.</i>	Tecoma (also Oatalpa.)		Tecoma (also Oatalpa.)
	Bignonia.		
<i>Orobanchaceae.</i>	Epiphegus.		
	Conopholis.		
	Aphyllon.	Aphyllon.	
<i>Scrophulariaceae.</i>	Collinsia.	Collinsia.	
	Chelone.	Chelone.	
	Pentstemon.	Pentstemon.	
	Mimulus.	Mimulus.	
	Conobea.		
	Herpestis.	Herpestis.	Herpestis.
	lysianthes.		Lysianthes.
	Hemianthus.		
	Synthyris.	Synthyris.	
	Buchnera.		Buchnera.
	Seymeria.		
	Gerardia.		
	Schwalbea.		
	Gelsemium.		Gelsemium.
<i>Acanthaceae.</i>	Dianthera.		
	Dipteracanthus.		Dipteracanthus.
<i>Verbenaceae.</i>	Lippia.		
	Callicarpa.		Callicarpa.
	Phryma.		Phryma.
<i>Labiates.</i>	Trichostema.	Trichostema.	
	Isanthus.		
	Cunila.		
	Pycnanthemum.	Pycnanthemum.	
	Hedeoma.		Hedeoma.
	Oollinsonia.		
	Monarda.		
	Blephilia.		
	Lophanthus.	Lophanthus.	Lophanthus.
	Cedronella.		
	Synandra.		
	Physostegia.	Physostegia.	
<i>Borraginacea.</i>	Onosmodium.		
<i>Hydrophyllaceae.</i>	Hydrophyllum.	Hydrophyllum.	
	Nemophila.	Nemophila.	
	Ellisia.	Ellisia.	
	Phacelia.	Phacelia.	
<i>Polemoniaceae.</i>	Phlox.	Phlox.	Phlox.

Table continued.

Orders.	Extnt-European Genera of Euatern N. America.	AIHO occurring in W. N. America, i. e. in Oregon and California.	Occurring in E. Asia, i. e. in Japan, China, or Himalaya!
	Pyxidantbera.		
<i>Convolvulaceae</i> B.	Stylisma.		
	Dicbondra.	.	
<i>Gentianaceae</i> B.	Sabbatia.		
	Frasera.	Frasera.	
	Halenia.		Halenia.
	Bartonia.		
	Obolaria.		
<i>Apocynaceae.</i>	Amsonia.		Amsonia.
	Forsteronia.		
<i>Asclepiadaceae.</i>	Asclepias.	Asclepias.	
	Acerates.	.	
	Enslenia,		
	Gonolobus.		
<i>Oleaceae.</i>	Cbionantbus.		
	Forrestiera.		
<i>Nyctaginaceae</i> B.	Oxybaphus.	Oxybaphus.	Oxybaphus.
<i>Phytolaccaceae.</i>	Phytolacca.		
<i>Chenopodiaceae,</i>	Cycloloma.		
<i>Amarantaceae.</i>	Montelia.		
	Acnida.		
	Iresine.		
	Froelichbia.		
<i>Lauraceae.</i>	Persea.		
	Sassafras.		
	Benzoin,		Benzoin.
	Tetranthera.	Tetranthera.	Tetranthera,
<i>Thymeleaceae</i> B.	Dirca.		
<i>Xlceganacem.</i>	Shepberdia.		
<i>Santalaeae.</i>	Comandra.	Comandra.	
	Hamiltonia.		
<i>Zoranthaceae.</i>	Pboradendron.	Phoradendron.	
<i>Siururaceae</i> B.	Saururus.		Saururus.
<i>Pcdostemaceae.</i>	Podostemon.		
<i>Eitphorbiaceae.</i>	Cnidoscolus.		
	Acalypha.	Acalypha.	Acalypha.
	Tragia.		
	Stillingia.		Stillingia.
	Croton.	Croton.	Croton.
	Crotonopsis.		
	Pbyllantbus.		Phyllanthus.
	Pachysandra.		Pachysandra.
<i>Urticaceae.</i>	Laportea.		
	Pilea.		
	Boehmeria.		Boehmeria.
	Planera.		
<i>Juglandaceae.</i>	Carya.		

Table continued.

Orders.	Extra-European Genera of Eastern N. America.	Also occurring in W. N. America, i. e. in Oregon and California.	Occurring in E. Asia, i. e. in Japan, China, or Himalaya!
<i>Myricaceae</i>	<i>Comptonia.</i>		
<i>Coniferae.</i>	<i>Taxodium.</i>		
	<i>Thuja.</i>	<i>Thuja.</i>	<i>Thuja.</i>
<i>Araceae.</i>	<i>Arisaema.</i>		<i>Arisaema.</i>
	<i>Peltandra.</i>		
	<i>Symplocarpus.</i>	<i>Symplocarpus.</i>	<i>Symplocarpus.</i>
	<i>Orontium.</i>		
<i>Alismaceae.</i>	<i>Echinodorus.</i>		
<i>Hydrocharitaceae</i>	<i>Limnium.</i>		
<i>Burmanniaceae.</i>	<i>Burmannia.</i>		<i>Burmannia.</i>
<i>Orchidaceae.</i>	<i>Arethusa.</i>		
	<i>Pogonia.</i>		*
	<i>Omalopogon.</i>		
	<i>Tipularia.</i>		
	<i>Bletia.</i>		
	<i>Aplectrum.</i>		
<i>Amaryllidaceae.</i>	<i>Pancratium.</i>		
	<i>Agave.</i>		
	<i>Hypoxys.</i>		
<i>Heemodoraceae.</i>	<i>Lachnanthes.</i>		
	<i>Lophiola.</i>		
	<i>Aletris.</i>		
<i>Bromeliaceae.</i>	<i>Tillandsia.</i>		
<i>Iridaceae</i>	<i>Sisyrinchium.</i>	<i>Sisyrinchium.</i>	
<i>Smiliaceae.</i>	<i>Trillium.</i>	<i>Trillium.</i>	<i>Trillium.</i>
	<i>Medeola.</i>		
<i>Liliaceae.</i>	<i>Clintonia.</i>	<i>Clintonia.</i>	<i>Clintonia.</i>
	<i>Yucca.</i>	<i>Yucca.</i>	
<i>Melanthaceae.</i>	<i>Uvularia.</i>		<i>Uvularia ?</i>
	<i>Prosartes.</i>	<i>Prosartes.</i>	
	<i>Melanthium.</i>		
	<i>Zygadenus.</i>		<i>Zygadenus.</i>
	<i>Stenanthium.</i>		
	<i>Amianthium.</i>		
	<i>Xerophyllum.</i>	<i>Xerophyllum.</i>	
	<i>Helonias.</i>		
	<i>Chamaelirium.</i>		
<i>Pontederiaceae.</i>	<i>Pontederia.</i>		
	<i>Heteranthera.</i>		
	<i>Schollera.</i>		
<i>Commelynaceae.</i>	<i>Commelina.</i>		<i>Commelina.</i>
	<i>Tradescantia.</i>		<i>Tradescantia.</i>
<i>Xyridaceae.</i>	<i>Mayaca.</i>		
	<i>Xyris.</i>		<i>Xyris.</i>
<i>Ericaulonaceae.</i>	<i>Paepalanthus.</i>		
	<i>Lachnocaulon.</i>		

Table continued.

Orders.	Extra-European Genera of Eastern N. America.	Also occurring in W. N. America, i.e. in Oregon and California.	Occurring in E. Asia, i.e. in Japan, China, or Himalayas	
<i>Cyperaceae.</i>	Kyllingia.		Kyllingia.	
	Dulichium.			
	Hemicarpha.			
	Fuirena.		Fuirena.	
	Psilocarya.			
	Dichromena.			
	Ceratoschaenus.			
	Scleria.		Scleria.	
	<i>Gramineae.</i>	Zizania.		
		Vilfa.	Vilfa.	Vilfa.
Sporobolus.		Sporobolus.	Sporobolus.	
Muhlenbergia.		Muhlenbergia.		
Brachyelytrum.				
Aristida.			Aristida.	
Otenium.				
Bouteloua.		Bouteloua.		
Gymnopogon.				
Leptochloa.			Leptochloa.	
Tricuspis.				
Diarrhena.				
Eatonia.				
Bryzopyrftn.		Brizopyrum.		
Uniola.				
Arundinaria.			Arundinaria.	
Gymnosticbum.				
Amphicarpum.				
Paspalum.		Paspalum.		
Cenchrus.	Cenchrus.	Cenchrus.		
Tripsacum.				
Sorghum.		Sorghum.		
	353	87	101	

That is, 87 of our 353 extra-European phaenogamous genera, or 24 per cent are common to Western North America, and 101, or 28 per cent to Eastern temperate Asia. Four per cent more of our characteristic genera are shared with an antipodal region than with the neighboring district of W. N. America. And the number is likely to increase; for we know far less of the flora of Japan and China than of California and Oregon. Drs. Hooker and Thomson's large Himalayan collections, now in the course of distribution and publication, will probably add several more to the list. Twenty-nine of these genera, or 8 per cent, are common to all three of these regions.

Our 194 genera which are neither European, N. W. American, nor E. Asiatic in temperate regions, require further discussion to show which are characteristic of Eastern North America. We will here barely notice that:

3 Belong also to Western temperate Asia, viz., *Menispermum*, *Planeraj* and *Zizania*; two of these being peculiar to that district and to ours.

73 Extend southward beyond the limits' of the United States and into tropical regions, or recur in the southern hemisphere.

120 Are characteristic Eastern United States genera.

As already stated, only three genera are actually restricted, to the geographical area comprised in our ' Botany of the Northern United States'. If, however, we allow our area to embrace Canada, which naturally belongs to it, and also include those plants which extend southward much beyond lat. 36° 30' only in the Alleghanies or cool upper country of the Southern States, we may enumerate 37 genera peculiar to this flora; viz.—

Zanthorhiza.	Echinocystis.	Pyxidantha.
Hydrastis.	Sullivantia.	Dirca.
Caulophyllum.	Zizia.	Hamiltonia,
Diphylleia.	Erigenia.	Comptonia.
Jeffersonia.	Brachychaeta.	Arethusa.
Adlumia.	Chiocnes.	Tipularia.
SoJea.	Oxydendrum.	Aplectrum.
Huds § ia.	Rhodora.	Medeola.
Napsea. ^	Leiophyllum.	Helonias.
Cladrastis.	Schweinitzia.	Chamselirium.
Gymnocladus.	Galax.	Amphicarpum.
Oillenia.	Nemopantes.	
Dalibarda.	Hemianthus.	

To show, however, how slight an influence, after all, these 37 characteristic genera exert upon our flora, we have only to remark that they comprise altogether only 39 of our species:—that is, they have only one species apiece, except *Hudsonia* and *Gillenia*, which have two each. The characteristics of our flora of the Northern States merge in those of the flora of Eastern North America, and these again into those of the North American flora generally; and no idea can be formed of the real features of a Flora like ours from such a dissection, and piecemeal presentation, or from an exhibition of what is strictly peculiar to each part, rather than what is predominant,—at least as respects generic forms.

Returning now to the species,—the real exponents of vegetation;—these have already been considered as regards their numerical proportions in the several classes and orders of the flora of the Northern States: it remains to note some facts respecting their geographical distribution.

As appears from the tabular view commencing on p. 208, there are common to Europe,

- 180 Dicotyledonous species out of 1490, or 12 per cent.
- 141 Monocotyledonous species out of 601, or 23\*4 "
- 321 Phcenogamous Species out of 2001 or 15\*3 "
- 35 Acrogenous Cryptogamia out of 75 or 46\*6 "
- 320 Musci and Hepaticae out of 502 or 63\*7 "
- 355 Cryptogamous species out of 577 or 61\*5 "

in accordance with the general fact that the lower the class the wider the geographical area occupied by the species.

In the following table I have attempted to exhibit the particular range of our indigenous phaBnogamous species of each natural order in longitude, through the northern temperate zone. The table has been hastily prepared, and must be often erroneous in details; but the general results are probably very near the truth.

*The Indigenous Phcenogamous Species of the Northern United States, viewed as to their geographical distribution around the northern temperate zone.*

1 nal Orders.	Whole number of specif's in the north- ein United States.	East'n N. America: not extending west- ward beyond the Rocky' MounHs.	Extending westward to the Pacific coast or near it.	Inhabiting Asia, not in W. Amer- a.	Inhabiting Asia, not in Europe.	Extending into E- rope.	Inhabiting but not in Asia.
<b>Class I.</b>							
DICOTYLEDONEIE, seu EXOGENJE.							
Ramunculaceae,	49	26	20	13	1	5	10
Magnoliaceae, *	6	6					
Anonaceae,	1	1					
Menispermaceae,	3	3					
Berberidaceae,	5	5					
Nelumbiaceae,	1	1					
Cabombaceae,	1			1		1	
Nymphaeew,	3	1	2	1			1
Sarraceniactse,	2	2					
Papaveraceae,	2	2					
Fumariaceae,	6	5	1				
Cruciferae,	46	31	13	11	2		11
Capparidaceae,	1	1					
Violace@,	18	15	3	1			1
Cistacefe,	1	7					
Droseraceee,	4	2	1	1			2
Parnassiaceae,	3	2	1	1			1
Hypericaceae,	18	18					



CLASS I—continued.

6 — 7	Number of Species 11 12 13	East'n N. America: not extending westward beyond Rocky Moun- tains	Extending westward to the Pacific near Rocky Moun- tains	Extending into Asia.	Extending into Asia, Korea, Japan, &c.	but not found in China	Extending to Europe.	Inhabiting Europe, but not in Eastern Asia.
Elatinaceae,	1	1						
Caryophyllaceae,	30	14	15	12			13	1
Portulacaceae,	4	4						
Malvaceae,	9	9						
Tiliaceae,	2	2						
Camelidaceae,	2	2						
Linaceae,	2	2						
Oxalidaceae,	3	1	2	2			2	
Geraniaceae,	3	1	1	1			1	
Balsaminaceae,	2	2						
Limnathactae,	1	1						
Rutaceae,	3	3						
Anacardiaceae,	6	5	1					
Vitaceae,	7	7						
Rhamnaceae,	6	6						
Celastraceae,	3	2	1					
Sapindaceae,	10	10						
Polygalaceae,	13	13						
Leguminosae,	91	84	7	4			4	
Rosaceae,	71	43	23	17	3	2	16	1
Calycanthaceae,	3	3						
Melastomaceae,	3	3						
Lythraceae,	7	5	1	1	1		1	
Onagraceae,	36	26	10	10			10	
Loasaceae,	1	1						
Cactaceae,	1	1						
Grossulaceae,	7	5	2	1			1	
Passifloraceae,	2	2						
Cucurbitaceae,	3	3						
Crassulaceae,	5	5						
Saxifragaceae,	22	15	4	4	2	2	5	3
Hamamelaceae,	3	3						
Umbelliferae,	37	28	9	4	3	2	2	
Araliaceae,	6	5		1	1	1		
Cornaceae,	11	10	1					
Caprifoliaceae,	27	19	7	3	1		3	
Rubiaceae,	22	18	4	3	1		4	1
Valerianaceae,	7	6	1					
Compositae,	273	233	29	11		2	9	
Lobeliaceae,	12	11					1	1
Campanulaceae,	5	3	2	1			1	
Ericaceae,	62	35	21	18	2	1	19	2

## CLASS I—continued.

Natural Orders.	Whole number of species in the northern United States.	East'n N. American: not extending westward beyond the Rocky Mountains.	Extending westward to the Pacific coast or near it.	Extending into Asia.	Inhabiting Asia, but not in N.W. America.	Inhabiting Asia, but not in Europe.	Extending into Europe.	Inhabiting Europe, but not in Eastern Asia.
Galacineae,	1	1						
Aquifoliaceae,	10	10						
Styracaceae,	5	5						
Ebenaceae,	1	1						
Sapotaceae,	2	2						
Plantaginaceae,	6	4	2	1			1	
Plumbaginaceae,	1		1	1			1	
Primulaceae,	16	8	8	6			6	
Lentibulaceae,	12	8	2	4			4	
Bignoniaceae,	2	2						
Orobanchiaceae,	5	2	3					
Scrophulariaceae,	54	38	15	10	1		10	
Aoanthaceae,	3	3						
Verbenaceae,	7	5	1	1	1	1		
Labiatae,	49	42	7	4			4	
Borraginaceae,	16	12	4	3			3	
Hydrophyllaceae,	11	9	2					
Polemoniaceae,	12	11	1	1			1	
Convolvulaceae,	15	14	1	1			1	
Solanaceae,	4	4						
Gentianaceae,	24	22	2	2			2	
Apocynaceae,	4	3	1					
Asclepiadaceae,	21	21						
Oleaceae,	9	9						
Aristolochiaceae,	6	6						
Nyctaginaceae,	1	1						
Phytolaccaceae,	1	1						
Chenopodiaceae,	10	4	5	5	1		6	6
Amarantaceae,	5	5						
Polygonaceae,	22	14	7	6	1		6	
Lauraceae,	5	5						
Thymelaeaceae,	1	1						
Ericaceae,	1		1					
Santalaceae,	3	2	1					
Loranthaceae,	1	1						
Saururaceae,	1	1						
Ceratophyllaceae,	1		1	1			1	
Oallitrichaceae,	3		3	3			3	
Podostemaceae,	1	1						
Euphorbiaceae,	28	25	3					
Empetraceae,	2	1	1	1			1	
Urticaceae,	15	13	2	1			1	



The data are not at hand for extending this table through the higher Cryptogamia, except for the highest class, and that imperfectly. The four orders of *Vascular* or *Acrogenous Oryptogamia* give the following results; the columns being homologous with those of the last table.

Equisetactse,	10	2	8	8		8	
Filices,	49	26	13	23	8	3	20
Lycopodiaceae,	12	4	6	7	1	2	6
Hydropterides,	4	2	1	1	1		1
	75	34	28	39	10	5	35
							1

These tables necessarily include the species of our small alpine region, which, being chiefly Arctic, might properly be regarded rather as intruded members of the Arctic flora. Being mostly diffused all round the world, they increase somewhat unduly the numbers of our species common to Europe and to Asia; but they are not sufficiently numerous with us to require to be formally eliminated. The following are all the Phasnogamous species which, within our limits, are found *only* in our small alpine region, namely, on the summits of the White Mountains of New Hampshire, of Mount Katahdin, Maine, and the highest peaks of the Green Mountains, Vermont<sup>^</sup> and the Adirondack Mountains in Northern New York:—

Cardamine bellidifolia.	Oxyria reniformis.
Viola palustris.	Betula nana.
Silene acaulis.	Salix phylicifolia.
Sibbaldia procumbens.	Salix Uva-Ursi.
Dryas integrifolia, (fide Pursh).	Salix repens.
Potentilla frigida.	Salix herbacea.
Epilobium alpinum, var. majus.	Luzula arcuata.
Saxifraga rivularis.	Luzula spicata.
Gnaphalium supinum.	JUDCUS trifidus.
Nabalus Boottii.	Carex capitata.
Nabalus nanus.	Garex atrata.
Vaccinium cespitosum.	Phleum alpinum.
Arctostaphylos alpina.	Calamagrostis Pickeringii.
Phyllodoce taxifolia.	Poa laxa.
Rhododendron Lapponicum.	Aira atropurpurea.
Veronica alpina.	Hierochloa alpina.
Diapensia Lapponica.	

Of these 33 species, two (*Nabalus Boottii* and *Calamagrostis Pickeringii*) are peculiar to our own alpine region, so far as is now known, but they are most likely to occur further north; and two (*Nabalus nanus* and *Vaccinium cespitosum*) are peculiarly North American. All the rest are European, and with two or three exceptions also Asiatic. No one of our vascular Cryptogamous species is wholly alpine, *Lycopodium Selago* comes the nearest to being so.

The following are with us subalpine species; they OCCUR in our alpine region (to which most of them properly belong), but also out of it, at least in one or two places.

Alsine Greenlandica.	Empetrura nigrum.
Geum radiatum.	Platanthera obtusata.
Arnica mollis.	Scirpus caespitosus.
Vaccinium uliginosum.	Carex scirpoidea.
Euphrasia officinalis.	Carex capillaris.
Polygonum viviparum.	Trisetum subspicatum.

All of these except *Geum radlatum*, *Arnica mollis*, and *Carex scirpoidea*, are also European. The last grows in Greenland.

The following European species have not been detected in any properly alpine habitat with us (where they might be expected to occur), but elsewhere, three of them (*Saxifraga aizoides* and *Carex gynocrates*) in stations not even subalpine:

Saxifraga oppositifolia.	Artemisia borealis.
Saxifraga aizoides.	Juncus Stygius.
Saxifraga Aizoon.	Carex gynocrates.

Two Ferns might be added to the subalpine list, viz:—*Wood-sia glabella* and *Aspidiumjragrans*.

The Phsenogamous species whose range, so far as is now known, falls wholly within the limits of the 'Manual of the Botany of the Northern United States' are the following:

DICOTYLEDONOUS.	MONOCOTYLEDONOUS.
Dentaria maxima.	Lemna perpusilla.
Vesicaria Shortii.	Potamogeton Robbinsii.
Napaea dioica.	" Tuckermani.
Sida Napaea.	Trillium nivale.
Psoralea stipulata.	Veratrura Woodii.
Astragalus Robbinsii ?	Helonias bullata.
Ludwigia polycarpa.	Narthecium Americanum.
Tillgea simplex.	Juncus Greenii.
Sullivantia Ohionis.	Cyperus Grayii.
Galium concinnum.	Eleocharis rostellata.
Fedia Fagopyrum.	" compressa.
" umbilicata.	" Robbinsii.
" patellaria.	Psilocarya scirpoides. •
Eupatorium pubescens.	Shynchospora capillacea.
" resinosum.	Carex exilis.
Solidago Ohioënsis.	" Sartwellii.
" Houghtonii.	" sychnocephala.
" neglecta.	" Crawei?
" Muhlenbergii.	<sup>M</sup> formosa.
" linoides.	" Careyana.
" Shortii.	" retrocurva.
" rupestris.	" Sullivantii.

## DICOTYLEDONOUS.

Rudbeckia speciosa.  
 Coreopsis bidentoides.  
 Cirsium pumilum,  
 Nabalus Boottii.  
 Gaylussada brachycera.  
 Utricularia clandestina.  
 " resupinata.  
 Hemianthis micranthemoides.  
 Pycnanthemum dinopodioides.  
 " Torreyi.  
 Asclepias Sullivantii.  
 M<sup>e</sup> Meadii.  
 Blitum maritimum.  
 Polygonura Cureyi.  
 Ulmus racemosa.  
 37 species.

## MONOCOTYLEDONOUS.

Carex mirata.  
 " Grayii  
 Sporobolus compressus.  
 " serotinus.  
 Calamagrostis confinis,  
 " Pickeringii.  
 " brevipilis.  
 Dupontia Cooleyi.  
 Glyceria acutiflora.  
 Poa alsodes.  
 " debilis.  
 Amphicarpum Purshii.

34 species = 71.



**BOTANICAL CONTRIBUTIONS.**

**BY ASA GRAY.**

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**CONSPECTUS OF THE NORTH AMERICAN  
HYDROPHYLLACEJE.**

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Extracted from Proceedings of the American Academy of Arts and Sciences,  
Vol. X.

[ISSUED APRIL, 1875.]

CONSPECTUS

OF THE

**NORTH AMERICAN HYDROPHYLACEAE.**



## IX.

A CONSPECTUS OF THE NORTH AMERICAN  
HYDROPHYLLACEAE.

BY ASA GRAY.

Presented, March 9, 1875.

TRIBUS I. HYDROPHYLLACEAE. Ovarium uniloculare: placenta? dilatatae primum succulentas loculum fere implentes, demum membranaceo capsulam totam intus vestientes et liberae, facie interiore seminiferae. Corolla aestivatione saepius convolutiva. Stylus biiidus. Seminis albumen corneum.

\* Genitalia exserta. Perennes, nunc biennes, foliis alternis.

## 1. HYDROPHYLLUM Tourn.

\* \* Stamina corolla breviora: calyx post anthesin accrescens. Annuum, foliis aut infimis aut omnibus oppositis.

2. NEMOPHYLLA Nutt. Calycis sinus dentibus reflexis appendiculati. Corolla calyce longior. Semina saepius quasi carunculata.

3. ELLISIA Linn. Calyx exappendiculatus, corollam superans vel subaequans. Semina nuda, pauca (quandoque 1-2 inter placentam et valvam abscondita!).

TRIBUS II. PHACELIACEAE Benth. Ovarium 1-2-loculare. Capsula loculicida: valva? medio (aut stricte aut mediante semiseptorum) placentifera. - Placentas angustae. Stylus bifidus, rarissime indivisus. Corolla aestivatione imbricata.

\* Folia omnia opposita, integerrima: cymae scorpioideae: stylus apice bifidus; placentae breves, 2-spermae, tenues, a semiseptis plerumque secedentes!

## 4. DRAPERIA.

\* \* Folia praeter infima alterna: stylus p. m. bifidus. Caulis scentes.

\*- Sepala vel calycis segmenta conformia.

5. PHACELIA. Corolla decidua (*P. sericea* excepta), nee flava. Stamina aequaliter basi corollae inserta. Cymae vel quasi-racemi spiroeae plus minus scorpioideae.

6. EMMENANTHE. Corolla (flava vel ochroleuca, campanulata) subscarioso- vel marcescenti-persistens. Cact. *Phaclice*.

7. CONANTHIUS. Stamina inaequalia tubo corollae longe infundibuliformis inaequaliter inserta. Florae terminales et alares, sessiles.

+ Sepala dimorpha; 3 exteriora a maxima, cordata, reticulata; 2 interiora parva linearia. Cact. *Phacelia*.

## 8. TBICARDIA.

- \* \* \* Folia alterna, reniformi-rotundata, palmatiloba: stylus indivisus: ovarium glabrum. Inflorescentia racemiiformis subscappa.
9. ROMANZOFFIA.
- \* \* \* \* Folia (alterna, integerrima) omnia radicalia, scapos unifloros fulcrantia: stylus apice bifidus.
10. HESPEROCHIRON.
- TRIDUS III. NAMEJE Benth. Ovarium pi. m. biloculare. Capsula loculicida: placentae divisae per semisepta valvis integris raro bisectis adnatae. Styli 2. Corolla\* aestivatione imbricata. — A precedent e sty Us discretis corolla plicis semper destituta aegre distincta.
11. NAMA. Corolla infundibuliformis vel fere hyprocraterimorpha. Genitalia inclusa. Capsula niembramea, valvis integris, semiseptis placentas pluri-polyspermas auferentibus. Herbae vel suffruticuli, foliis integerrimis.
12. EHIOCTYON. Corolla infundibuliformis vel subcanipanulata. Genitalia subinclusa. Capsula crustacea, loculicide deum septicide in semi-valvas seu cocca 4 uno latere aperta oligosperma fissa.—Frutices vel suffrutices, foliis rigidis dentatis.
- Tmuus IV. HYDROLEJE Benth. Ovarium biloculare: placentae magnae fungosae, multiovulatae. Capsula inarginicide softifraga, pi. m. bivalvis, nunc irregulariter rupta; valvis nudis placentis crassis prorsus in imicam septo tenui bimarginatam connatis axi relinquentibus. Corolla fere rotata, aestivatione imbricata. Styli 2. Seminis albumen carnosum.
13. HYDROLEA.

## 1. HYDROPHYLLUM Tourn.

§ 1. EUHYDROPHYLLUM. Rhizomatibus horizontalibus perennans: calyx immutatus, sinubus (no. 5 subexcepta) nudis.

\* Folia pinnatifida vel pinnatisecta: calyx hispidus. •

H- Pedunculus petiolo saepissime glomerulo brevior: antherae brevior-oblongae.

1. II. CAPITATUM Dougl. — Var. ALPINUM Watson, Bot/King, p. 249. Caespitoso-subacaule; cymis magis evolutis quasi radicalibus.

+ 4- Pedunculus petiolo saepius folio longior: antherae oblongo-lineares.

• H- Folia caulina circumscriptione elongato-oblonga, 7-15-partita: cymas densae.

2. II. MACROPHYLLUM Nutt. Hispidum, validum; calyce albo-hispido profunde 5-fido, lobis e basi lata subulatis; corolla albida serni-pollicari. — Atlantic United States, chiefly west of the Alleghany Mountains.

3. *H. OCCIDENTALS*. Pubescens, nunc parce hispidum, 1-2-pedal; segmentis foliorum oblongis incisus vel paucilobatis obtusis; pedunculis gracilioribus; calyce 5-partito, lobis lanceolatis obtusiusculis; corolla 3-pollicari.— *H. capitulum* Hook. & Arn. Bot. Beech, p. 371; Torr. Bot. Whipp. p. 69, non Dougl. — Pacific States.

Var. *WATSONI*. Humile, pube molliore nunc cinerea; calyce parce hispido; cyma minus densa. — *H. macrophyllum* var. *occidentale* Wats. I.e. pro part. — Utah, California.

Var. *FENDLERI*. Pube magis hirsuta vel hispida nee cinerea; segmentis foliorum ovato-lanceolatis acutis vel acuminatis inciso-ser-ratis; pedunculo brevioribus; cyma laxiuscula.— Colorado, New Mexico.

++ ++ Folia caulina circumscriptione ovata, 3-5-partita vel secta.

4. *H. VIRGINICUM* Linn. — Atlantic United States to Alaska.

\* \* Folia palmati- (5-7-) lobata: calycis sinus dentibus inconspicuis erectis quandoque appendiculati.

5. *H. CANADENSE* Linn. — Atlantic United States and Canada.

§ 2. *DECEMIUM* Raf. Bienne: calycis post anthesin modice accrescentis sinus dentibus reflexis appendiculati: stamina ultra corollam rotato-campanulatam minus exserta.

6. *H. APPENDICULATUM* Michx.

## 2. NEMOPHILA Nutt

Ovula 8-24: semina 5-15: folia pleraque opposita, pedunculo elongato superata. Californice.

\*- Semina subglobosa, laevia, caruncula papillifera: corolla alba violaceo maculata.

1. *N. MACULATA* Benth.

•i- H Semina oblongo-ovalia, demum corrugata vel tuberculato-rugosa, caruncula decidua.

2. *N. INSIGNIS* Dougl. Foliis 7-9-partitis: corolla; laete caeruleaB plicis internis brevibus rotundatis apice liberis breviter hirsutis.

3. *N. MENZIESII* Hook. & Arn. Minor; foliis 3-9-fidis; corollaB dilute caeruleaB seu albae fundo saepe punctatas vel maculate plicis angustis adnatis hirsuto-ciliatis. — *N. Menziesii* Hook. & Arn. Bot. Beech, p. 152 & 372, forma *a.* *liniflora* Fisch. & Meyer, Sert. Petrop. t. 8, forma\* majora flore caeruleo. *N. pedunculata* Benth.

Hydroph., forma parviflora. *Ni atomariq* Fisch. & Meyer; Bot Reg. t. 1940 : forma corolla pallida brunneo-punctata. *N. discoidalis* Hortul.; Fl. Serres, 2, t. 75, forma corolla aut fundo aut fere tota brunneo-purpurea.

\* \* Ovula 4, i. e. placentae biovulatae.

4- Alternifoliae, plerumque grandiflorae: plicae corollae ad basim filamentorum latissimae: semiua globosa fere ecarunculata.

4. *N. PHACELIOIDES* Nutt. Semina vix punctata. — Arkansas and Texas.

5. *N. AURITA* Lindl. Semina reticulata subfavosa. Caules setis retrorsis aculeolato-hispidi. Folia basi vel petiolo alato auriculato-amplexicaulia. — California.

6. *N. RACEMOSA* Nutt. iu herb. Præcedenti affinis, minor, debilis; foliis brevioribus circumscriptione ovatis vel oblongis 5-7-fidis, petiolo nudo; floribus. plerisque racemosis parvulis; corolla calyce paullo longiore lin. 4-5 diametro. — California; San Diego, Nuttall. Island of Catalina, Dall and Baker.

+--i-Parviflora!, tenellae: corolla campanulata calyce longior, plicis exiguis vel evanidis: folia inferiora opposita, superiora saepius alterna, pedunculo longiora.

7. *N. PARVIFLORA* Dougl. *N. heterophylla* Fisch. & Meyer, 1. c. — California to British Columbia.

8. *N. MICROCALYX* Fisch. & Meyer, 1. c. *N\*. evanescens* Darby, S. Bot. *N. parviflora* A. DC, quoad pi. Louisianae. *Ellisia microcalyx* & *E. ranunculacea* Nutt. — Virginia to Texas.

•i- ➤- +- Breviflorae, alternifoliae, corollae plicis manifestis.

9. *N. BREVIFLORA*. Spithamaea, diffusa, debilis; foliis fere omnibus alternis pinnatipartitis, segmentis 3-5 approximatis oblongo-lanceolatis acutis integerrimis; pedunculis petiolum vix aequantibus; calycis hirsuto-ciliati appendicibus segmentis dimidio brevioribus; corolla late campanulata calyce brevior, plicis cuneatis apice lato libero fimbriato-inciso; stylo apice tantum bifido; semine unico globoso. — *N. parviflora* Wats. Bot. King, p. 249, excl. char., non Dougl. — Mountains of Utah, S. Watson. A young plant of the same is in Tolmie's Snake Country collection from the same district.

### 3. ELLISIA Linn.

§ 1. EUELLISIA. Ovula tribus, i. e. omnia ventralia, gemina: semina globosa, testa alveolato-reticulata: folia pinnatipartita.

1. E. NTCTELEA L. *E. ambigua* Nutt, forma *tenella*. — Eastern N. America.

2. E. MEMBRANACEA Benth. — California. Corolla with one lobe external in aestivation. Ovary not wholly "glabrous." The apex bears a few very stout bristles.

§ 2. EUCRYPTA. Placentae utrinque ovuliferae, heterospermse, nempe facie ventrali biovulata, dorsali 1-2-ovulata monosperma: semina ovalia; normalia rugoso-tuberculata, teretia; posticum meniscoideum laeve inter valvam et placentam persistentem absconditum! Folia 2-3-pinnatifida: flores quasi-racemosi.—*Eucrypta* Nutt. Pl. Gamb. p. 159.

3. E. CHRYSANTHEMIFOLIA Benth. *Eucrypta paniculata* & *E. foliosa* Nutt. I.e. *Phacelia micrantha?* var. *pinnatifida* Torr. in Ives, *Colorad. Exp. Bot.* p. 21. — California.

#### 4. DRAPERIA Torr.

1. D.SYSTILA Torr. in Gray Proc. Am. Acad. 7, p. 401. *Narna systyla* Gray, l. c. 6, p. 37. — I have nothing of importance to add to what is known of this interesting Californian plant, except that the deliisence is somewhat 'peculiar. The thin dissepiment is complete; the semisepta meeting in the centre, but without any placental enlargement; the ovules, two in each cell, are pendulous from near its summit: in deliisence a thin central portion, or placenta, usually separates neatly from the semisepta and remains between the four seeds, falling with them, so that when the capsule is closed again a central foramen is left.

#### 5. PHACELIA Juss.

This comprehensive genus is certainly polymorphous, but no more so than *Eutoca* R. Br. would be, if the two genera were retained as proposed by Brown. Most of the true quadriovulate Phacelias are nearly represented by species of *Eutoca*, — as *P. circinata*, *Breweri*, *humilis*, and *brachyantha*, by *P. (Eutoca) circiiformis*, *divaricata*, and *curvipes*, and *P. malvifolia* by *P. (Eutoca) Bolanderi* and *lascefolia*; while the set of which *P. tanacetifolia* and *congesta* are the type is imitated in foliage and inflorescence by *P. infundibuliformis*; and *P. bipinnatifida* and the section *Cosmanthus* are related to *P. (Cosmanthoides) pamiflora*, *glabra*, *patuliflora*, &c. Indeed Brown's *Eutoca parviflora* and the closely allied species, generally with 3-4-ovulate placenta?, occasionally show a reduction to a single pair. It is still less practicable to keep

up *Cosmanthus* and *Microgenetes* as genera. • That the internal plicae or appendages of the corolla are not available for generic distinctions was early seen by Bentham. If absent in the Chilian *Microgepetes*, they are conspicuous in nearly related North American species, the group being well marked by the transversely corrugated seeds. I have arranged the about fifty species known to me under seven subgenera, characterized by the ovules, seeds, and in part by the presence or absence of the corolline plicae.

§ 1. EUPHACELIA. Placentae 2-ovulatae: semina verticalia, testa areolata vel alveolata: corollas lobi haud fimbriati, tubo plicis lamelliformibus per paria juxta basim staminum.

Folia inferiora ramisque opposita: spicae laxae, parum secundae vel circinatae: pubes nunquam hispida.

1. *P. NAMATOIDES*. Annua, subspithamaea, tenuis, inferne glaberrima, superne glanduloso-pubescentis; ramis brachiatis; foliis lineari-lanceolatis integerrimis subpetiolatis spicas cymasve primum superantibus; sepalis spathulato-linearibus corolla anguste campauulata brevioribus capsulam globosam minime hirsutam superantibus; staminibus styloque demum bipartite Inclusis; plicis basi staminum subadnatis brevibus; seminibus alveolato-reticulatis.—*Nama racemosa* Kellogg in Proc. Acad. Calif. 5, p. 51. — In the higher Sierra Nevada, California, Bolander, Kellogg. It is not surprising that this anomalous little plant was described as a *Nama*. Its aspect is very unlike any other *JEuphacelia*, but is somewhat like *JSmmanthe glaberrima*, \*The geminate ovules and seeds are those of *Euphacelia*.

\* \* Folia (generis) alterna: flores scorpioideo-spicati: pubes pi. m. hispida vel hirsuta: plicae corollas latae, saepissime basi staminum utrinque adnatae.

4- Folia aut integerrima aut pinnati-3-5-partita segmentis integerrimis: capsula ovata, acuta.

++ Perennes vel biennes: genitalia longe exserta.

2. *P. CIRCINATA* Jacq. f.; A. DC, cum syn. *P. leucophylla* Ton\*, in Frem. Rep. 1, p. 93. *P. canescens* Nutt. PL Gamb.—Var. CALYCOSA: forma calycis lobis demum ampliatis oblongis vel obovato-spathulatis.

+\* ++ Annuas, minores.

3. *P. BBEWKRI*. Formas depauperatae praecedentis similis, gracilior; radice exili; corolla violacea lato-campanulata calycis lobis linearibus duplo longiore filamenta glabra parum superante. — On Monte .

Diablo, California, Brewer. A span high. Corolla barely 3 lines, long.

(3\*^ P: BRACHYANTHIA Benth. Chilensis, foliis latioribus subintegris, pube molliori, calyce longiore, corolla angusto-campanulata, staminibus longe inclusis a praecedente diversa.

4. *P. nummulus* Torr. & Gray, Pac. R. R. Exp. 2, p. 22, t. 7. Pubescens; foliis spathulato-oblongis vel oblanceolatis obtusis raro 1-3-lobalis, venis ramosis; spicis solitariis vel paniculatis laxiusculis; corolla caerulea campanulata calycis lobis saepius linearibus longiore; filamentis breviter exsertis. — Var. CALYCOSA: forma calyce accrescente, lobis spathulatis.

+ + Folia rotundato-cordata, petiolata, palmatiloba vel incisa, lobis serratis: herba setis urentibus hispida: genitalia longe exserta.

5. *P. MALVJEFOLIA* Cham, in *Linnaea*, 4, p. 494.

•i- H- H— Folia circumscriptione oblonga vel angustiora, pinnato-dentata ad pinnatisecta segmentis dentatis incisive: capsula globosa vel ovoidea, obtusa: semina facie ventrali excavata medio carinato: spicae scorpioidese saepius cymoso-congestae.

++ Calyces baud setoso-hispidi, capsulam parum superantes: seminum testa reticulata.

= Folia haud pinnatisecta, plerumque inciso-crenata: genitalia longe exserta: biennes?

6. *P. INTEGRIFOLIA* Torr. Ann. Lye. N. Y. 2, p. 222, t. 8. *Spithamea* ad bipedalem, stricta, viscido-pubescens; foliis crebris ovato-oblongis seu lanceolatis sessilibus vel inferioribus brevi-petiolatis basi subcordatis crenato-dentatis nunc incis; inflorescentia primum thyrsoides; corolla angusto-campanulata (albida vel subcaerulea); stylo semi-bilido; capsula brevi-ovoidea.—Var. PALMERI: forma hirsutior, thyrsoides primum virgato; foliis nunc acute dentatis.—*P. Palmeri* Torr. in Wats. Bot. King, p. 251.

7. *P. CRENULATA* Torr. in Wats. Bot. King, 1. c. *Spithamea* ad pedalem, a basi saepe ramosa, viscido-pubescens vel hirsuta; foliis perisque petiolatis spathulato-oblongis crenato-dentatis vel pinnatifidis raro lyratis, lobis crenulatis; spicis mox evolutis patentibus; corolla rotato-campanulata laete violacea, plicis internis latissimis; stylo ultra medium partito; capsula globosa.

— Folia 1-2-pinnatisecta vel partita, segmentis pinnatifidis vel incis: genitalia p. m. exserta: annuae.

8. *P. GLANDULOSA* Nutt. PI. Gamb. Viscido-pubescent, glandulosa, vix hirsuta; foliis bipinnatipartitis, lobis crebris parvis; calycis lobis oblongis spathulatisve; reti seminum laevi. — *P. Popei* Torr. & Gray, Pac. R. R. Exp. 2, p. 122, 1.10: forma minus pubescens, corollas lobis integerrimis. "*Eutoca glandulosa* Nutt.," Hook. Kew Jour. 3, p. 293.

Var. NEO-MEXICANA: corollas lobis aut tenuiter aut insigniter eroso-denticulatis. — *P. Neo-Mexicana*, Thurber in Bot. Mex. Bouud. p. 143.

9. *P. CONGESTA* Hook. Pubescens, ssepius cinerea, fere eglandulosa; foliis 3-7-sectis partitisve, segmentis paucis parvis inter majora oblonga seu ovalia inciso-lobata positis, infimis petiolatis, summis confluentibus; calycis lobis fere linearibus; stylo semibifido; seminibus reticulato-scabris. — *P. tanacetifolia* A. DC, quoad pi. Tex. Berland. — This species inhabits Texas; the following, California.

++ \*H> Calyces setoso-hispidi vel ciliati, capsulam locgius superantes, lobis saepe inaequalibus: stylus bipartitus: seminum testa alveolata, reti incrassato demum subrugosa.

= Genitalia exserta: folia pleraque 1-2-pinnatisecta.

10. *P. TANACETIFOLIA* Benth. Erecta, hispida vel hirsuta, haud vel superne parum glandulosa; foliis 9-17-sectis, segmentis 1-2-pinnatipartitis sessilibus, lobis saepius lineari-oblongis; spicis elongandis; calycis lobis linearibus seu lineari-spathulatis capsula ellipsoidea vix duplo longioribus; genitalibus maxime exsertis. — California, chiefly towards the coast.

11. *P. RAMOSISSIMA* Dougl. Divergenti-ramosa, superne glandulosa et viscida; foliis 5-9-sectis vel partitis. segmentis ssepius oblongis pinnatifido-incisis; spicis glomeratis vix elongandis, pedicellis demum horizontalibus; genitalibus modice exsertis; calycis lobis linearibus spathulatisve capsula globosa vel subova'a 3-4-plo longioribus. — California, and through the dry interior region from Arizona to Washington Territory. Passing apparently into the preceding and the following.

Var. HISPIDA. Setis longis albis barbata, saltern in calycis lobis elougatis (fructif. lin. 4-6 longis); spicis fructiferis apertis racemiformibus; foliis minus sectis. — Santa Barbara to San Diego, California.

= = Genitalia corolla rotato-campanulata haud longiora: spicae laxiusculae.

11. *P. CILIATA* Benth. This resembles depauperate forms of the two preceding; but the spikes are simple or merely geminate, and at



length loosely flowered, and the stamens do not surpass the corolla. As to the calyx-lobes, although ovate-oblong at maturity in the original specimens of Douglas, they are sometimes much narrower, even linear-lanceolate. They are about equally accrescent in all these species, and also variable. The seeds have broader pits and less thickened separating walls than the preceding species. More specimens are much wanted.

# # \* Folia alterna, membranacea: flores laxe racemosi: corollas rotato-campanulatae plicae elongate villosa-ciliatae per paria approximate a staminibus remotae: testa seminum subcarnosa parum areolata: biennes, glanduloso-viscidas, Alleghanienses.

13. *P. BIPINNATIFIDA* Michx., & var. *BREVISTYLIS* Gray, Man. *P. brevistylis* Buckley.

§ 2. *COSMANTHIUS*. Corolla subrotata, lobis fimbriatis, plicis nullis. Cetera *Euphacelice* subdiv. ultimas. Herbs annuae, parvulae, Am. Bor. Orientalis.—*Cosmanthus* Nolte. *Cosmanthus* § *IZucosmanthus* A. DC. pro parte.

14. *P. PURSHII* Buckley; Gray, Man. ed. 1, p. 342. *P. fimbriata* Auct.

15. *P. FIMBRIATA* Michx.; Gray, Man. ed. 2, p. 328. Perhaps only a smaller and mountain form of the other.

Var. ? *BOTKINI*. Suberecta, ramosa; racemis plurifloris demum strictis, pedicellis fructiferis erectis calyce haud longioribus; corollas lobis multo minus fimbriatis.—Upper part of Georgia, Boykin. Probably a state of *P. fimbriata* inhabiting a lower and drier region, perhaps a distinct species.

§ 3. *COSMANTHOIDES*. Placentas 3-8-ovulatae, rarissime 2-ovulatae: semina verticalia, testa reticulata: corolla rotato-campanulata, plicis nullis vel inconspicuis (perangustis) per paria approximatis a staminibus remotis: capsula subglobosa obtusissima. Herbas humiles vel tenellae Am. Bor. Or. et Mex., hirsuto-pubescentes, foliis pinnatifidis, floribus racemosis.

\* Herbas annuas, tenues, parce hirsutulas vel glabellas, foliis caulinis pinnatifidis sessilibus: ovula in placentis nunc 3-4, nunc 2!

16. *P. GLABRA* Nutt. Fl. Arkans. in Trans. Am. Phil. Soc. 5, p. 192. A subsequente peraffini glabritie, exiguitate, calycis lobis ovalibus oblongisve capsulam vix superavitibus nimis differt.

17. P. PARVIFLORA Pursh; Gray, Man. ed. 5, p. 369. *Polemonium dubium* Linn. *Eutoca parviflora* R. Br. *Cosmanthus parviflorus* A. DC. *Phacelia pusilla* Buckley, ex char.

Var. HIRSUTA. Forma vegetior, hirsutior.—*P. hirsuta* Nutt. in Trans. Am. Phil. Soc. 1. c.

\* \* Herba Mexicana diffusa, "radice perenni," foliis plerisque pinnatisectis, omnibus petiolatis.

(17°.) P. PIMPINELLOIDES.—*Eutoca pimpinelloides* & *brevifolia* Spreng. Syst. 1, p. 569. *E. Mexicana*, Benth. Hydrophyll. 1. c. *E. Andrieuxii* & *Cosmanthus Mexicanus* A. DC. 1. c. (Coll. Hex. Bourgeau, no. 493.)

\* \* # Herbae Texanae, annuae, foliis caulinis incisus vix pinnatifidis, floribus majoribus (6-12 lin. latis): placentae 7-9-ovulatae.

18. P. PATULIFLOBA.—*Eutoca patuliflora* Engelm. & Gray, PL Lindh. 1, p. 45.

19. P. STRICTIFLORA.—*Eutoca strictiflora* Engelm. & Gray, l.e. The seeds of this species, besides the minute reticulation or pitting, are coarsely and obscurely<sup>#</sup> rugose at maturity, in this respect approaching the *Microgenetes* section.

§ 4. GYMNOBYTHUS. Placentas diktats multiovalafce: semina parum descendencia, testa foveolata: corolla rotato-campanulata, intus cum filamentis subaequilongis prorsus inappendiculata: stylus bipartitus: capsula ovata, apice cuspidato-acuminata. Herbas annuae, Californicse, glanduloso-viscidissimae, foliis ovatis dentatis, racemis solitariis vel geminis laxifloris.—*Cosmanthus* § *Gymnobythus* A. DC.

20. P. VISCIDA Torr. Bot. Mex. Bound, p. 143.—*Eutoca viscida* Benth. *Cosmanthus viscidus* A. DC.—Var. ALDIFLOBA. *Eutoca albliflora* Nutt. Pl. Gamb. p. 158.

21. P. GRANDIFLORA.—*Eutoca grandiflora* Benfch. l.c. 22. *speciosa* Nutt. 1. c. *Cosmanthus grandiflorus* A. DC.

§ 5. WIIITLAVIA. Placentas multiovalatse, raro pauciovalatae: semina praecedentium: corolla plicis destituta: sed filamenta (capillaria exserta) ima basi intus squamula parva truncata vel emarginata adnata appendiculata ! Herbae annuae, Californicae, facie praecedentium, at minus glandulosae, pedicellis petiolisque longioribus, stylo parum semibifido.

\* Corolla cylindraco-campanulata, speciosa: ovula numerosissima placentacque *Gymnobythi*.—*Whitlavia* Harvey.

22. P. "WHITLAVIA. — *Whitlavia grandijlora* & *W. minor* Harvey in Lond. Jour. Bot. 5, p. 312, t. 11.

\* \* Corolla aperte brevi-campanulata, alte 5-fida: placentae angustae.

23. P. PARRYI Torr. Bot. Hex. Bound, p. 144. Placentae 20-30-ovulatae, 15-20-sperma. Corolla speciosa, filamenta subaequans.

24. P. LONGIPES Torr. in herb. Gracilis, diffusa, glandulosa, parum hispida; foliis caulinis ovalibus vel subcordatis grosse obtuseque 5-8-dentatis (semipollicaribus) petiolo filiformi brevioribus; racemo perlaxo, pedicellis filiformibus; staminibus styloque (ad medium fisso) corolla vix semipollicari (alba?) sat longioribus; placentis 8-10-ovulatis. — Santa Barbara Co., California, Torrey.

§ 6. EUTOCA. Placentae 6-multiovolatae: semina pendula vel descendencia, testa reticulata vel foveolata, nee rugosa: corollae plicae 10 verticales, lamelliformes: capsula ovata seu oblonga. Herbae plerumque occidentals, paucae boreales. — *Euloca* R. Br. excl. sp. *Eutoca* § *Ortheutoca* A. DC.

\* Perennes (*P. loasafolia* et *Bolanderi*? excepta), Californicae: genitalia exserta: corolla brevi-campanulata, plicis latissimis obliquis basi filamentis adnatis: flores cymoso-congesti: folia ovata, petiolata, inciso-pinnatifida.

-(-Placentae dilatatae 40-50-ovulatae: genitalia minus exserta.

25. P. BOLANDERI. Setis gracilibus hispida, superne viscido-pubes-?ens; caule valido e radice ut videtur perenni erecto bipedali ramo; foliis radicalibus caulisque infimis lyratis, segmentis lateralibus 1-2-jugis parvis incisis, terminali foliisque superioribus ovatis ovalibusve inciso-lobatis, basi truncata vel subcordata; cymis 1-3-chotomis mox apertis; corolla subrotata alba (fere pollicem diametro), plicis semi-ovovatis basi inter se connatis; filamentis parce barbatis styloque semibifido corollam paullo superantibus; antheris oblongis; capsula late ovata acuta polysperma. — Cottonaby Creek, twenty miles north of Noyo, Mendocino Co., California. Appendages of corolla connected in front of the base of the filament, forming a shallow sac behind it.

\*- -i- Placentae angustae 6-9-ovulatae: genitalia insigniter exserta.

++ Radix annua: folia (subpinnatifida, summa sessilia) rami calycisque setoso-hispidissimi more *P. malvcefolice*: corollae plicae semi-subcordatae, basi-auriculato-infiexae, apice parum libero cusplatae!

26. *P. L6ASJEFOLIA* Torr. — Still a little known species, collected near Monterey only by Douglas and Dr. Parry.

++ ++ *Radix*, perennis, crassa: pubes mollis: folia etiam suprema petiolata: spicae in pedunculo cymoso-glomeratae: corollas plicae obtusissimae.

27. *P. HTDROPHYLLOIDES* Torr. in Gray, Proc. Am. Acad. 7, p. 400. *Spithamaea* vel *subpedalis*, superne viz hispida, glandulosa; foliis subsericeo-pubescentibus ovatis seu rhomboideis' (1-2-pollicaribus) obtusis paucilobatis incisive longe petiolatis, imis nunc lyratis; cyma brevi glomerata; corollas violaceas vel albidae plicis semi-ovalibus; filamentis glabris; antheris brevi-linearibus; stylo fere bipartito; capsula calycem aequante 6-8-sperma.— Not rare in the high Sierra Nevada.

28. *P. PROCERA*. *Suborgyalis*, tenuiter pubescens, superne subglandulosa, pilis hispidis etiam calycis nullis; foliis viridibus (2-5-pollicaribus) ovato-lanceolatis ovatisque acutis laciniato-pinnatifidis, lobis 2-4-jugis acutis; spicis fructiferis cymas elongandis; corolla alba vel pal lid a, plicis semi-obcordatis; filamentis parce barbatis; antheris oblongis; stylo supra medium bifido; capsula globoso-ovata vix mucronata 10—18-sperma; seminibus immaturis alato-angulatis. — Mountain meadows of the Sierra Nevada, in Nevada and Sierra counties, Bolander, Lemmon, &c.

\* \* Perennis: genitalia longe exserta: corolla campanulata circa basim capsulae marcescenti-persistens (!), plicis majusculis oblongis a filamentis liberis: placentae pluriovulatae: semina longitudinaliter costata et reticulata: flores thyrsoido-congesti. Species borealialpina.

29. *P. SERICEA* Gray in Sill. Jour. (1862) 34, p. 254. *Eutoca sericca* Graham, Bot. Mag. t 3003.—Folia 1-3-pinnatipartita.—Var. LYALLI: forma nana, minus sericea; foliis subviridibus lobis latioribus; floribus thyrsoido-capitatis. Rocky Mountains, lat. 49, at 6-7000 feet, Lyall. Oregon forms approach it.—The persistence of the corolla is peculiar to this species. It was first noticed by Watson, in Bot. King, p. 252.

# \* \* Annuae: genitalia corollae rotato-campanulatae adasquantia: plicae corollas angustae a filamentis liberae: calycis lobi lineares: stylus apice bifidus: capsula ovata, acuminata vel acuta: spicas densiflorae thyrsoido-cymosae vel paniculatae.

H Folia 1-2-pinnatisecta: placentae 20-30-ovulatae: semina ovalia, lineatim subalveolatae.

30. P. FRANKLINII Gray, Man. Bot. ed. 2, p. 329, & 3, p. 370.  
*Eutoca Franklinii* R. Br.

H- K- Folia linearia seu lanceolata integerrima, vel 2-5-fida lobis  
lineari-lanceolatis: placentas 6-8-ovulatae: semina oblonga, grosse  
foveolata.

31. P. MENZIESII Torr. in Wats. Bot. King. *Hydrophyllum lineare*  
Pursh. *Eutoca Menziesii* R. Br. *E. multijlora* Dougl. *E. hetero-*  
*phylla* Torr. in Stansb. Rep.

\* \* \* # Annuas: stamina corolla breviora (in *P. divaricata* nunc fere  
aequilonga) : flores spicati vel racemosi.

+ Folia pinnatisecta, segmentis incisopinnatifidis: semina ventre ex-  
cavato medio carinato modo *Phacelice congesta*, etc.

32. P. INFUNDIBULIFORMIS Torr. Bot. Mex. Bound, p. 144. Foliis  
inflorescentia, etc., *P. glandulosce* similis; corolla infundibuliformi  
(purpurascens vel alba), lobis parum erosus tubo plus dimidio brevior-  
ibus, plicis angusto-oblongis a filamentis liberis; placentis sat dilatatis  
8-12-ovulatis; stylo apice bifido; capsula oblonga obtusissima mem-  
branacea pleiosperma sepalis angusto-spathulatis adnatis. — New  
Mexico.

+ -i- Folia tantum pinnatifida, lobis brevibus obtusis.

++ Spicis elongatis: corolla parva: placentae 6-ovulatae: capsula  
obtusissima.

33. P. BRACHYLOBA. *Eutoca brachyloba* Benth. I.e.—Monterey  
and Santa Barbara, California.

++ ++ Racemi laxiflori, pedicellis elongatis: corolla late campanulata,  
calyce duplo longior, plicis elongatis a filamentis parce barbatis fere  
liberis: plantae humiles, diffusae, Californicae.

34. P. DOUGLASII Torr. l. c. *Eutoca Douglasii* Benth. l. c. Pilis  
patulis hirsuto-pubescentibus. Folia pluripartita vel lobata. Sepala spathu-  
lata. Corolla ampla, semipollicaris. Stylus supra medium bifidus.  
Placentae 12-14-ovulatae.

35. P. DAVIDSONII. Depressa, pube striguloso-hirsuta canescens;  
foliis spathulato-lanceolatis parce pinnatifidis, lobis 1-2-jugis triangu-  
latis integerrimis cum terminali multo majore oblongo vel lanceolato  
venis fere parallelis percurso, folio summo saepe integro; racemis  
paucifloris; calycis lobis linearibus seu oblanceolatis; corolla violacea  
lin. 3 longa, plicis semi-ovalibus conspicuis; stylo ad medium usque  
bifido; placentis 8-10-ovulatis. — Kern Co., California, Davidson.

+• •«- -i- Folia integerrima, in nonnullis 1-2-dentata vel lobata, petiolata, nee crassiuscula nee cordata, venis subparallelis vel convergentibus, pube haud glandulosa: flores spicato-racemosi: calyx pilis longis patentibus hispidus vel hirsutus: corolla plieis basi latiore filamehtis adnatis: capsula ovata, acuta vel mucronata, 6-16-sperma, scpalis multo brevior: semina foveolata.

++ Corolla sat angusta (alba vel pallida), calyce parum staminibus longius superans.

•36. *P. CIRCINATIFORMIS*. *Eutoca phacelioides* Benth. 1. c. — Known only in the California collection of Douglas, probably from the vicinity of Monterey. Resembling small and entire-leaved specimens of *P. circinata* in foliage, &c. Corolla 2J to 3 lines long; fruiting calyx 5 lines long. Ovules 4 or rarely more to each placenta.

++ ++ Corolla lato-campanulata, violacea, genitalia parum aut vix superans.

37. *P. CURVIPES* Torr. in Wats. Bot. King, p. 252. Diffusa, 2-4-pollicaris, hirsuta et puberal a, subcilierea; foliis ovalibus lanceolatisque raro 1-2-lobatis petiolo plerumque brevioribus; racemis simplicibus; pedicellis infimis calyce sajpe longioribus; stylo semibifido; placentis 8-10-ovulatis. — Nevada and adjacent borders of California, Watson, Dr. Horn. Habit of *P. humilis*. Lower pedicels not always curved; so that the specific name is by no means appropriate.

38. *P. DIVABICATA*. *Eutoca divaricata* Benth. 1. c.; Bot. Reg. 1.1784; Bot. Mag. t.3706. *E. Wrangeliana* Fisch. & Meyer; Don, Brit. Fl. Gard. ser. 2, t. 362. — Common through the western part of California. Flowers rather large, the expanded corolla from two-thirds to three-quarters of an inch broad.

• h - h f - h Folia integerrima vel crenata, longe-petiolata, venis obsoletis vel divergentibus, pube viscida vel glandulosa: corolla angustocampanulata fere infundibuliformis, plieis linearibus oblongisve a filamentis inaequalibus fere discretis instructa: stylus apice bifidus. Species eremophile, nana vel pusillae.

++ Flores spicaeque capituliformes sessilia: folia sat crassa fere avenia.

39. *P. CEPHALOTES*. A basi divaricato-ramosa, demum fere prostrata, viscido-pubescent; internodiis primariis ramorum 2-4-pollicaribus; foliis oblongis spathulatisve integerrimis circ. semipollicaribus in petiolum saspe longiorem angustatis plerisque radicalibus et ad bifurcationes congestis spicis capitulisve densis longioribus; sepalis spathulato-linearibus pilis m. hirsutis corollae angustae fere infundibuliformi

adaequantibus capsula ovali obtusa 8-10-sperma duplo longioribus; seminibus pellicula reticulata laxa.—*P. curvipes* Parry in Am. Nat. 9, p. 16, non Torr. — S. Utah, Bishop, Mrs. Thompson, Parry. Corolla 2 lines long, white or yellowish, with the short lobes purplish or blue.

++ ++ Flores laxiores pi. m. racemosi: calyx corolla aperto-infundibuliformi vel campanulata brevior, capsula obtusa paullo longior: folia sat crassa, rotundata seu ovalia, venis obscuris.

40. *P. DEMISSA*. Subspithamoea, a basi ramosa, viscido-puberula, nec hirsuta; foliis obsolete reniformibus cordatisve integerrimis vel repandis (semipollicaribus); floribus in spicis brevi-pedunculatis; petiolis brevioribus pauciusculis; pedicellis brevibus erectis; corolla ut videtur alba (lin. 2 longa) sepalis linearibus duplo longiore; capsula brevi-ovalis obtusissima 10-sperma. — New Mexico, Dr. Palmer.

41. *P. PULCHIELLA*. Spithamaea, aperte ramosa, viscido-puberula; foliis rotundo-ovalibus obovatisve integerrimis seu crenato-dentatis (parum semipollicaribus), basi obtusa vel acutiuscula; racemis floribundis elongandis paniculatis; pedicellis calyce brevioribus; corolla laete purpurea (tubo flavida) majuscula (lin. 4-6-longa) sepalis spathulatis triplo longiore; capsula elongato-oblonga obtusissima circ. 30-sperma.—*P. crassifolia* Parry in Am. Nat. 1. c, non Torr.-r-S. Utah, Parry. A showy vernal species, abounding on gypseous clay knolls; the limb of the corolla ampler than in the related species.

42. *P. PUSILLA* Torr. Exigua, digitalis, demum laxè parce ramosa, glanduloso-pubescens; foliis ovalibus oblongisve integerrimis (lin. 3-6 longis); floribus in racemo laxo paucis; pedicellis filiformibus; corolla alba (vix lin. 2 longa) calyce subduplo longiore; capsula elongato-oblonga obtusa et mucronulata 18-24-sperma.—Wats. Bot. King, p. 253. — W. Nevada to the borders of California, Watson. Seeds somewhat pyriform. Pedicels from 1 to 5 lines long.

+++++ Flores laxè racemosi: calyx corolla campanulata (alba) brevior, capsula ovali-oblonga subito acutata 60-100-sperma parum longior: folia membranacea, cordato-rotunda, crenatodentata seu lobata, pi. m. palmativenia, petiolo longo breviora: stylus apice vix bifidus.

43. *P. ROTUNDIFOLIA* Torr. in Wats. Bot. King, l.c. — S. E. California to S. Utah, Cooper, Palmer, Parry.

§ 7. MICROGENETES. Semina oblonga transversim corrugata, vermiculiformia: caet. *Eutocce*. Annuae, humiles, foliis plerisque pinnatifidis: stamina inaequalia inclusa: stylus apice tantum bifidus.

\* HELMINTDOSPERMUM Torr. in herb. Corolla subrotata, plicis 10 faucialibus transversis subcallosis a staminibus longe remotis instructa!

44. P. MICRANTHA Torr. Bot. Mex. Bound, p. 144. Tenera, laxe ramosa, hirsutula, glandulosa; foliorum segraentis 5-9 obovatis oblongisve obtusissimis, imis petiolo raarginato, superioribus basi dilatata nunc auriculato-subamplexicaulibus; racemis paniculatis geminatisve peraxifloris; corolla (saepius caerulea) sepala accrescentia obovato-spatulata parum superante; capsula globosa 20-24-sperma. — New Mexico, from the Rio Grande, to Arizona and the eastern frontier of California, and S. Utah. The ordinary vertical plicae rising from the base of the tube of the corolla wholly wanting; but a pair of transverse obtuse folds, high up on the broad tube, stretch from each side of the midvein of the lobes nearly to the lateral vein sent off from its base. Seeds\* cylindraceous, incurved, very deeply corrugated and tuberculate. \*

\* \* MICROGENETES VERA. Corolla infundibuliformis vel cylindracea, saepius plicis verticalibus angustis basi filamentorum pi. m. adnatis instructa: stylus in nostris inferne pilosulus: semina praeter corrugationem minute-reticulata. Spec, omnes Am.-Occidentales, una Chilensis. — *Microgenetes* A. DC. *Phacelia* § *JEuglypta* Watson, 1. c.

+ Corolla (alba seu pallida) calyce parum longior: folia vix bipinnatifida: capsula oblonga 12-24-sperma.

(44<sup>fl.</sup>) P. CUMINGII. *Eutoca Cumingii* Benth. I.e.; Gay, Fl. Chil. t. 53. *Microgenetes Cumingii* A. DC. 1. c. p. 292. — Stylus glaber. Corolla plicis destituta. — Chili.

45. P. IVESIANA Torr. in Ives, 1. c.; Wats. Bot. King, p. 254. — Corolla plicis a filamentis fere liberis instructa. — Utah to Arizona and the border of California.

•H- -i- Corolla calyce 2-3-plo longior, tubo cum fauce albida vel flavida, limbo saepissime caeruleo seu violaceo.

++ Folia tantum pinnatifida: racemi spiciformi elongandi: plicae corolla filamentis longius adnatse : capsula 20-30-sperma. •

46. P. FREMONTU Torr. 1. c. — S. Utah and Arizona to California.

++ H Folia bipinnatifida: gemina paucibra, breviora, minus corrugata: plicae corollas elongatae angustae filamentis longissime tubulatim adnatse.

47. P. BICOLOR Torr. in Wats. 1. c.—Nevada and adjacent border of California. Corolla unusually long for the subgenus (from 5 to 7 lines):



the narrow adnate plicae produce a very slender tube behind each filament.

+++++ Folia dentata vel integerrima: capsula breviora.

48. P. GTMNOCLADA TOIT. 1 c. Subviscido-pubescens; ramis radicalibus decumbentibus, internodiis elpngatis; foliis obovatis oblongisve obtuse dentatis petiolo saepius brevioribus; spicis plurifloris\*; corolla breviter infundibuliformi sepalis linearibus hirsutis vix duplo longiore, plicis basi filamentis\* tubuloso-adnatis; capsula globoso-ovata 8-16-sperma. — W. Nevada, Watson.

40. P. CRASSIFOLIA Torr. I.e. Parvula, a basi diffusa, viscido-pubescens; foliis carnosulis scabridis (lin. 3-6 longis) oblongo-ovatis in petiolum breviusculum angustatis, infiniis pauci-dentatis, caeteris integerrimis; racemis laxiusculis paucifloris; corolla infundibuliformi sepalis linearibus duplo longiore, plicis brevibus parvis a filamentis fere liberis; capsula ovoidea 6-8-sperma. — Reese-River Valley, Nevada, •Watson.

## 6. EMMENANTHE Benth.

§ 1. MILTITZIA Gray. Annuac, parvulse, parviflorae: sepala sursum latiora: stylus persistens: semina minute reticulata et pi. m. transversim rugosa modo *Microgenetis* (a quo corolla flava marcescenti-persistente facile distincta). — Pac. R. R. Exp, 6, p. 85. *Miltitzia* A. DC.

\* Pubescens, saepissime viscida et glandulosa: corolla breviter 5-loba, plicis 10 angustis inconspicuis per paria Blamentis adproximatis basi eorum parum adnatis (in *E. glandulifera* fere evanidis) instructa.

1. E. PARVIFLORA Gray, I.e. t. 15. Depressa, densius pubescens, viscida; foliis profunde pinnatifidis; floribus confertis brevissime pedicellatis; corolla sepalis fere linearibus hand longiore; stylo ovario 20-40-ovulato vix longiore. — Shores of Klamath Lake, Newberry. So far as yet known, this is fairly distinguishable from the next; but the specimens are poor. \*

2. E. LUTEA Gray, 1 c. Diffusa vel decumbens, pube minuta vix glandulosa; fojiis oblongis seu obovatis inciso-pinnatifidis dentatisve; floribus conferte racemosis; corolla sepala spathulato-lineararia superante; stylo filiformi ovario circ. 12-ovulato multo longiore. — *Eutocaf lutea* Hook. & Am. Bot. Beech. & Ic. Pl. t. 354. *Miltitzia lutea* A. DC. 1 c. *Emmenanthe parviflora* Wats. Bot. King, p. 257. — S. E. borders of Oregon to the eastern borders of California. Hypogynous disk conspicuous, much larger and apparently more free than in the preceding.

3. «E. GLAND ULIFERA TOIT. in Wats. Bot. King, I.e. *Tenella, gracilis, pube minuta glandulosa et viscida; foliis parvis oblongis vel spathulatis parum incisus dentatisve, summis integerrimis; floribus in spicis racemisve elongandis numerosis; pedicellis plerumque brevissimis; corolla angusto-campanulata (lin. 2 longa) sepalis linearibus longiore; stylo filiformi; ovulis 6-12.* — W. borders of Nevada, Anderson, Watson.

\* \* *Glaberrima, eglandulosa: corolla profunde 5-fida, sepalis oblongo-spathulatis crassiusculis haud longior, plicis nullis: folia succulenta plerumque integerrima: capsula 8-10-sperma, styli basi indurata subulata.*

4. E: *GLABERRIMA* Torr. in Wats. I.e. — W. Nevada and N. Arizona.

§ 2. *EMMENANTHE VERA.* Major, racemis paniculatis laxis: corolla ampla, latissime campanulata, ochroleuca, plicis nullis: sepala ovato-lanceolata: stylus deciduus: placentas circiter 8-ovulatas dilatate: semina areolis grossis alveolato-reticulata.

5. E. *PENDULIFLORA* Benth. — California and S. Utah.

7. *CONANTHUS* S. Watson (*EUTOCA?* § *CONANTHUS* A. DC.)

1. C. *ARETIODES* Wats. 1. c. *Eutoca aretioides* Hook. & Am. 1. c.; Hook. Ic. t. 355. — Interior of Oregon to Arizona and eastern borders of California. This little plant is intermediate between *Phacelia* (*Eutoca*) and *Nama*, but nearer to the latter, from which it is excluded mainly by its united styles. The inequality in the insertion of the filaments is not rare in *Nama*, and *N. demissa* is readily mistaken for *Conanthus*. To the latter belongs part of the specimens (those of Anderson) from which I first described *Nama demissa*. *Conanthus* is the only plant of the order in which I have found manifest indications of dimorphism in the genitalia, being of two and perhaps three lengths; the style and stamens, however, not reciprocally long and short, but correspondent, as I have found them in certain *Polemoniaceae* and *Borraginaceae*\*

8. *TRICABDIA* Torr.

1. t. *WATSONI* Torr. in Wats. Bot. King, p. 258, t. 24. — W. Nevada, Watson. I have nothing to add to the characters of this genus, which is strikingly marked by its three cordate enlarged sepals, and of which the specimens extant are scanty.

## 9. ROMANZOFFIA Cham.

1. *R. UNALASCHKENSIS* Cham. Haud tuberifera? laxe pubescens vel glabrata; scapo firmiore erecto; pedicellis suberectis flore brevioribus; sepalis herbaceis corolla breviter-infundibuliformi parum brevioribus capsulam subsuperantibus; stylo brevi. — Unalaska and adjacent islands, Chamisso, Nelson, Harrington, Dall.

2. *R. SITCHENSIS* Bongard. Parum pubescens, glabrata; rhizomatibus filiformibus granulato-tuberiferis; scapo debili; pedicellis patentibus flore longioribus; sepalis glabris corolla longiuscule infundibuliformi multum capsula satis brevioribus; stylo filiformi longo. — Sitka to the Coast Range of California, as far south as the Redwoods grow.

## 10. HESPEROCHIRON S. Watson.

The suggestion that the genus belongs to the *Hydrophyllaceae* originated with Mr. Bentham. It falls into the *Phaceliæ*, where, however, it finds no near associates, and the inflorescence is anomalous.

1. *H. CALIFORNICUS* Wats. Bot. King, p. 281, t. 30. Foliis rosulatis e caudice subcrasso; corolla oblongo-campanulata, lobis tubo brevioribus. — *Ourisia Califomipa* Benth. PL Hartw. *Hesperochiron latifolius* Kellogg in Proc. Calif. Acad.: forma vegetior. — Sierra Nevada, California, to Utah, and Washington Territory.

2. *H. PUMILUS* Porter in Hayden, Rep. 1872, p. 768. Foliis paucioribus ex apice rhizomatis gracilioris; corolla fere rotata, lobis tubo intus crebre barbato longioribus. — *Villarsia pumila* Griseb. in Hook. Fl. Bor.-Am. 2, p. 70, t. 157. — Idaho, Northern Utah, and westward. The two species occupy in part the same tract of country, and it remains to be seen if the characters assigned will hold good.

## 11. NAMA Linn.

The generic name, both in Latin and Greek, is of the neuter gender. A few corrections of my recent synopsis of the species in Proc. Am. Acad. 8, p. 282, need to be made: otherwise there is nothing to add here. Only seven species are known within the limits of the United States. In distinguishing into two species the Berlandierian specimens which Choisy had referred to *N. undulatum*, I took the wrong species for the true *N. undulatum* HBK. The nomenclature and characters have to be rectified thus: —

*N. UNDULATUM* HBK. Suberectum, mox decumbens; capsula oblonga sepalis p. m. brevioribus; seminiibus ovalibus, testa tenui diaphana obsoletius striata et scrobiculata. — Var. *MACRANTIUM* Choisy. Hydrol.

p. 18, t. 2, f. 1 (i) *Berlandieri* Gray, Lea) : forma laxa; floribus nunc brevissime nunc longiuscule pedunculatis; sepalis corolla subdimidio brevioribus capsula saepius duplo longioribus. — To the true *N. undulatum* belongs no. 131 of Bourgeau's Mexican collection: it has not been met with in the United States; but the variety, found at Matamoras and Reynosa, probably occurs also on the other side of the Ilio Grande.

**N. STENOCARPUM.** Praecedenti simile; ovario angustiore; capsula fere lineari sepala subaequante; seminibus angulatis nunc fere cubicis, testa crassiore opaca brunnea eximie alveolato-reticulata. — *N. undulatum* Gray, Proc. 1. c, quoad pi. Tex.-N. Hex., non HBE. *N. undulatum* Chois. 1. c. pro parte. — Texas to Arizona and contiguous parts of Mexico. To this belongs fierlandier's no. 1095, 1435 and 175, 2111 and 694, 2195 and 775, 2328 and 898, and 2525. The seeds are nearly a quarter of a line long, considerably large\* than those of *N. undulatum*, and very different in appearance; they are usually angled by mutual pressure, while those of the latter are regularly oval. The styles not rarely cohere to the middle or more, but are separable without rupture.

## 12. ERIODICTYON Benth.

1. **E. TOMENTOSUM** Benth. Bot. Sulph. p. 35. — The corollas when well developed are nearly salverform, and twice the length-of the calyx. *E. crassifolium* Benth. 1. c. was doubtless rightly united with this by Dr: Torrey (in Bot. Mex. Bound, p. 48, &c), and this name should have been preferred; but the other is good and of the same date.

2. **E. GLUTINOSUM.** Benth. 1. c. — *Wigandia Californica* Hook. & Am. Bot. Beech, p. 364, t. 88. — The filaments are often irregularly and variably adnate to the corolla, sometimes for almost their whole length.

3. **E. ANGUSTIFOLIUM** Nutt. PL Gamb. p. 181. *E. glutinosum* var. *angustifolium* Torr. I.e. — Arizona and S. Nevada to New Mexico. Besides the very narrow and soon revolute leaves, this species has a short-funnelform corolla, only 2 or 3 lines long, sometimes almost campanulate.

## 13. HYDROLEA Linn.

1. **H. COEYMBOSA** Ell. Inermis, raro subspinorfa, gracilis; foliis lanceolatis brevibus glabris; floribus in cyma terminali corymbiformi; sepalis lineari-lanceolatis villosio-hispidis corolla longioribus; genitalibus longis filiformibus. — S. Carolina to Florida.

2. *H. AFFINIS* Gray, Man. ed. 5, p. 370. Spinosa, glabra; foliis lanceolatis elongates subpetiolatis; floribus in glomerulis axillaribus; sepalis ovatis corollas adoequantibus; stylis capsula brevioribus. — *H. leptocaulis* Featherman in Louisiana Univ. Rep. 1871.— S. Illinois to Texas.

3. *H. CAROLINIANA* Michx. Subspinosa, parce villosa-hispida; foliis fere glabris lanceolatis brevi-petiolaribus; floribus in axillis inferioribus glomerulatis vel in summis solitariis; sepalis linearibus vel sublanceolatis corollam subaequantibus; stylis capsula brevioribus. — *H. quadrivalvis* Walt. Car. p. 110, nomen falsum decipiens. — N. Carolina to Florida.

4. *H. OVATA* Nutt. in Trans. Am. Phil. Soc. n. ser. 5, p. 196; Chois. Hydrol. t. 1. Spinosa, superne ramosissima, pube undique molli breviter cum pilis longioribus nonnullis; foliis ovatis nunc ovato-lanceolatis brevissime petiolatis; floribus apice ramorum corymboso-congestis; sepalis lanceolatis villosa-hirsutis corolla brevioribus; filamentis stylisque praesertim longis filiformibus. — *H. Ludoviciana* Featherman, l.e.— Arkansas, Louisiana, and Texas. Said to be also South American.