

EXPLANATION OF PLATE 19.

- Fig. 1. *Nitella dictyosperma*, H. & J. Groves. Natural size.
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|-----|---|---|------------------------------------|--|
| 2. | " | " | Branchlet of young fruiting whorl. | Magnified. |
| 3. | " | " | Fruiting node of do. | × 30. |
| 4. | " | " | Plates of antheridium. | × 60. |
| 5. | " | " | Young fruit. | × 140. |
| 6. | " | " | Coronula. | × 140. |
| 7. | " | " | Nearly ripe fruit. | × 60. |
| 8. | " | " | Oospore, front view. | × 60. |
| 9. | " | " | The same, side view. | × 60. |
| 10. | " | " | Surface of oospore. | × 425. From a photomicrograph kindly taken for us by Mr. J. Guardia. |
| 11. | " | " | Apices of ultimate rays, young. | × 60. |
| 12. | " | " | The same, older. | × 60. |

A Revision of the genus *ARENARIA*, Linn.
By FREDERIC N. WILLIAMS, F.L.S.

[Read 17th February, 1898.]

I. INTRODUCTION.

THE first reference to *Arenaria* as the name of a genus is by Jean Bauhin*, who refers to it a plant sent to him by Sprenger from the neighbourhood of Ulm in Württemberg; but the plant therein figured, and afterwards more fully described under the name of 'Arenaria: Holostei forte genus' by Dominique Chabrey†, is the species now known as *Sagina nodosa*, Fenzl.

The genus *Arenaria* was defined and circumscribed by Linnæus‡ in the following terms:—

"*Calyx*. Perianthium 5-phyllum: foliolis oblongis, acuminatis, persistentibus.

Corolla. Petala 5, ovata, calyce ferme breviora, marcescentia.

Stamina. Filamenta 10, subulata, alterna interiora. Antheræ subrotundæ.

* 'Historia Plantarum Universalis,' iii. p. 723 (1651).

† 'Omnium Stirpium Sciagraphia et Icones,' p. 450 (1677).

‡ 'Genera Plantarum,' ed. I. p. 133, n. 374 (1737).

Pistillum. Germen ovatum. Styli 3, erecto-reflexi. Stigmata crassiuscula.

Pericarpium. Capsula ovata, tecta, unilocularis, apice 5-fariam dehiscens.

Semina. Plurima, reniformia.”

Linnaeus enumerated 25 species, of which 11 occur in the first edition of ‘Species Plantarum.’ The genus *Arenaria* even when thus circumscribed includes a number of species which can only be grouped by an association of characters, and cannot be marked off from allied genera by any single character taken separately. As Godron long ago pointed out, if *Lychnis* is to be considered as a genus distinct from *Silene*, then *Alsine* should be considered as distinct from *Arenaria*; since in each case a primary differential character is the number of the teeth of the capsule in relation to the number of the styles. The presence of a strophiole at the hilum of the seed is a constant character, and important enough to exclude a number of species included by some authors in *Mœhringia*; though this differential character is not mentioned in the Linnean diagnosis of the genus. In his recent Revision of the tribe *Naucleææ*, Mr. G. D. Haviland* says: “that a natural classification is one in which the characters chosen in each group are those most convenient for the group, the groups having been formed by noticing similarity in very many characters rather than in one or two of supposed importance. Whilst on this view a perfect classification is impossible, the object of classification is most easily defeated by the introduction of a number of different classifications, and most easily attained by using only one.” With this view of the handling of available characters I most cordially agree, and it is the only method of dealing with groups of species in genera such as those of which Boissier says,—“characteres ipsius generis non sat liquidi sunt, etiam characteres ad sectiones definiendas vel deficient vel non sat firmi sunt.” In such genera it is well to take specimens of a few well-marked and distinctive species, examine them critically, and note down in full detail their characters; taking care to select in the genus such species as are most diverse one from another. If around these distinctive species are grouped others in the genus which are most like them respectively, an objective classification results which is far better and

* Journ. Linn. Soc., Bot. xxxiii. p. 1 (1897).

more workable than one based on a combination of theoretic characters, which would either fail to include some species, or result in the overlapping of groups.

Most of the other proposed genera frequently included under *Arenaria*, in its comprehensive sense, are best considered as primary subdivisions of *Alsine*. The genus *Arenaria*, in this paper, is defined more in accordance with Fenzl's circumscription of the admitted species, and as propounded by him in Endlicher's 'Genera Plantarum.'

It is difficult, in the species of a genus like *Arenaria*, to select constant characters which may seem to define satisfactorily and in a natural manner the primary subdivisions of the genus. After examination of a large number of specimens, both in the herbarium and in the living state, I have decided to base the primary subdivisions of the genus on the association of two characters which seem fairly constant, viz., the structure of the disk, and the number of teeth formed by dehiscence of the ripe capsule. This latter character is generally dependent on and associated with a definite number of styles, but not invariably. For, though one of the important generic characters is that the capsular teeth are twice the number of the styles, it is found that the number of styles sometimes varies in specimens of the same species, or even in flowers of the same specimen, while the capsular teeth are not so liable to casual variation. In such cases, the furrows on the surface of the ovary, which are present in many species, and which correspond with the usual number of styles, are a more trustworthy character, though these furrows usually disappear with the distention of the ovary after fertilization. The structure of the disk is a character which few botanists besides Edmond Boissier have noticed in their descriptions of species, and the verification of this character has entailed a considerable examination of material. Plants belonging to *Arenaria* are of little horticultural interest, and it is difficult to obtain for examination an extensive series of living or fresh specimens. Several species grown and cultivated in the Herbaceous Ground at Kew, which have flowered in the course of the past few seasons, have afforded advantages for examining specimens of different groups side by side under favourable conditions. After carefully studying the delimitation of other genera of Caryophyllaceæ formed on the basis of analogous fruit-characters, and their association into groups, and taking into account

geographical distribution and systematic variation as shown in the large or small number of species circumscribed by the more important generic types, I propose to define the limits and scope of the genus more in accordance with the views expressed by Fenzl, rather than with those of botanists with a more synthetic bias.

No systematic account of the known species of *Arenaria* has hitherto been given. A conspectus of sections, preceded by a short historical introduction, was published in November 1895 as a preliminary instalment* of a detailed examination of the species. The indiscriminating list of the species by Persoon †, and the fragmentary and meagre descriptions of those enumerated by Seringe ‡, throw but little light on the affinities of the groups of species; and it is only the painstaking and critical investigations of Fenzl that have advanced in any way our knowledge of this widely-distributed genus. Some objection may be raised to the sinking of *Dolophragma*, Fenzl, and *Brachystemma*, Don, in *Arenaria*: but the limitation of genera, in natural groups like the order Caryophyllaceæ, requires a co-ordination of primary with secondary characters in an uniform manner in subordinate groups of genera, in order to preclude, as far as possible, the isolation of individual genera distributed sporadically in the guise of what are called (in some German systematic works) "Mittelgattungen"; and such that the connecting links in allied groups of genera should be in a radiating and peripheral series, rather than in a linear and dichotomous series. In a large natural order there are always a number of cycles of affinity which suggest groupings of genera, and the more uniform in coincidence their limitation the less excuse there will be for the definition of aberrant types.

The matter under the head of each species is arranged as follows. The name of the species is followed by the authority for the name and the work or memoir in which it was first published; the second reference is to a general work or important flora, in which several species of the genus are enumerated or described, such as the first volume of Boissier's 'Flora Orientalis,' or the third volume of Willkomm and Lange's 'Prodromus Floræ Hispanicæ.' Those species which were described before 1848

* Bull. Herb. Boiss. iii. p. 593.

† Syn. Plant. i. p. 502 (1805).

‡ DC. Prodr. i. p. 401 (1824).

are only mentioned by name in their place and are not described in the enumeration. In a few instances, however, where the original description is false, altogether misleading, or erroneous, and has been so copied into floras without correction, the species is described anew. By this exclusion of the description of species which have been long known, and which are therefore to be found in one or more general floras, the bulk of a systematic paper on a large genus is reduced. The species described are those of the last 50 years. After the citation or description, as the case may be, a few differential characters are given the more readily to distinguish the species from others in the same group, more particularly in subsidiary groups which include several species. Then are sometimes added a few critical or explanatory notes on the species and its varieties, where they may seem to be required. The geographical limits of the species are given, but not the full geographical distribution of each species, which would without advantage add considerably to the matter under the heading of each species; though for the less common ones the habitat is given in the usual way. The last item under each species is the iconography and synonymy. The iconography, verified by comparison with authentic specimens, is as full as possible, every plate with which I am acquainted being cited, excepting only those which are obviously bad or misleading. In every case the date of publication is added to the reference cited for the species: not, however, that priority of date in the currency of names is of so much importance as compared with the convenience of retaining long-established names, but for ready reference. The synonymy of *Alsine*, in so far as it does not concern *Arenaria* in its restricted sense, is not dealt with.

A few words of explanation as to the subdivision into subgenera may be necessary. Two-thirds of the number of the species, viz. 111, belong to the typical subgenus *Euarenaria*, which includes species in which disk-glands are not evident or are quite inconspicuous, and the capsule splits by six teeth or valves. In the subgenus *Eremogoneastrum* the disk is lobed, and the ten glands alternate with the stamens; all the species are narrow-leaved, with the basal leaves usually long and grass-like. In the subgenus *Pentadenaria* (so called in allusion to the five glands) the disk is expanded into five prominent glands, each bearing a stamen, so that the ten stamens are distinctly grouped in two series. The species of the subgenus *Dicranilla* are all

South American, and are collectively distinguished from all others in the genus by their habit. The leaves are densely crowded in an imbricate series on the short stems terminated by small solitary flowers; and the seeds are quite smooth, shining and black. In the small group of *Arenariastrum*, the capsule splits by four teeth which deepen into valves, containing few seeds. The species of the distinctive subgenus *Odontostemma* have petals eroded or lacinate at the margin, and are also characterized by the structure of the root. The last subgenus is founded on a species from the province of Yunnan described by Mr. A. Franchet*, which is remarkable for its long exserted styles and its distinctly lobed disk, which is half-free, with a somewhat concave receptacle truncate at the base.

In this Revision of the genus 168 species are admitted, under which are also grouped 103 varieties. Of these 168 species, 69 are represented in the iconography of the genus, and additional plates are also cited for 17 varieties. Not many more than a third, therefore, of the species have been figured.

II. GEOGRAPHICAL DISTRIBUTION.

Arenaria is a genus which includes plants of wide distribution both as regards latitude and altitude, chiefly confined to the north temperate zone; within the Arctic Circle extending beyond the limits of permanent human habitations, and in the Tropics found only at considerable elevations in mountainous districts. In the Old World species occur only in the northern hemisphere, and the range of the genus is from the west coast of Spitzbergen, lat. 78° (*A. ciliata*), to the island of Socotra, lat. 13° (*A. serpyllifolia*), and from the island of Novaya Zemlya (*A. ciliata*) to the Nilghiri Mountains in Malabar, lat. 11° (*A. nilghirensis*). In the Himalayas species are found at considerable altitudes. In Capt. Deasy's recent expedition to North-western Tibet (1896-97), specimens of *A. polytrichoides* were gathered at 5800 metres. Many years ago specimens of the same species were collected by Sir J. D. Hooker in Tibetan Sikkim at 4800 metres, and specimens of *A. pulvinata* at 5400 metres, and specimens of *A. oreophila* at nearly as great an elevation in the same region. *A. densissima* was gathered in the Yak Pass by Mr. C. B. Clarke

* Bull. Soc. Bot. France, xxxiii. p. 432 (1886).

† The South-African *A. glandulosa* of Jacquin belongs to *Spergularia*.

at 5100 metres. Strachey and Winterbottom collected *A. festucoides* in Western Tibet at 4700 metres. In Tibetan Sikkim Sir J. D. Hooker also gathered specimens of *A. debilis* at 4750 metres. In the mountainous region of the province of Yunnan, J. M. Delavay found *A. longistyla* and *A. Delavayi* at 4000 metres. In the New World there are several species in North America, and a few extend as far south as Chile and Argentina. Specimens of *A. lanuginosa*, which have remained unnamed in Herb. Kew., were collected on the river Vera Cruz in Patagonia by Charles Darwin in the course of the voyage of the 'Beagle.' The genus is not represented in Australia. Several American species have been inadequately described, whose identification from dried specimens which have lain long in herbaria is unsatisfactory; but some of them from their habit and appearance might more than doubtfully be referred to *Alsine*, *Stellaria*, and probably also *Colobanthus*.

It may be noted that the spelling [of geographical names of the localities cited is in the majority of cases that, used in the 'Times' Atlas, which is most convenient for the purpose; but for Russian and Chinese names in which the Atlas is deficient, the lists issued by the Russian Imperial Geographical Society have been consulted and followed.

III. SYNOPTIC KEY.

ARENARIA

Linn., Gen. Plant. ed. I. (1737), p. 133, n. 374; ed. II. (1742), n. 446; *Syst. Nat.* ed. VI. (1748), n. 446; *Sp. Plant.* ed. I. (1753), p. 423; *Gen. Plant.* ed. V. (1754), n. 505; ed. VI. (1764), n. 569; ex emend. *Fenzl in Endl. Gen. Plant.* p. 967, n. 5234; etiam *Ledeb., Fl. Rossica*, i. p. 360; *Engl. et Prantl, Natürl. Pflanzenf.* iii. pt. 1 b, p. 84 (1889): characteribus autem a prioribus auctorum definitis hoc in conspectu paullo mutatis.

Calyx 5-sepalus; sepala 5, imâ basi connata. Petala 5, integra, apice rotundata obtusa retusa vel emarginata, rarius erosa vel laciniata; interdum nulla. Stamina 10, rarius 5. Discus perigynus, staminifer; nunc annularis, glandulis inconspicuis vel obsolete in discum immersis, nunc 5- vel 10-lobatus in glandulas prominentes expansus; hinc inde glandulæ aut 5 staminiferæ aut 10 inter stamina sitæ rarius staminiferæ, membranacæ vel carnosæ, rotundatæ vel bigibbosæ. Gynæcium

meiomerum. Ovarium uniloculare; styli 3 vel 2 (interdum in nonnullis floribus 4-5), a basi distincti. Capsula globosa ovoidea breviter oblonga vel rarissime cylindrico-conica, interdum depressa, primùm dentibus duplo stylo numero dehiscens, demùm sæpius in valvas 3 vel 2 bidentatas interdum longitudinaliter fissas secedens. Semina estrophiolata nuda, reniformi-globosa vel a latere compressa, undique tuberculata scabra lævia vel lævissime nitida.

Herbæ annuæ biennes vel perennes, vel rarius suffruticosæ, sæpius cæspitosæ; nunc graciles vel rigidæ foliis subulatis parvisve, nunc diffusæ vel cæspitosæ foliis latioribus. Inflorescentia vulgo dichasiiformis; flores nunc terminales, cymoso-paniculati thyrsoidei capitati vel solitarii, nunc rarius axillares subsolitarii. Petala alba, rarius rubella.

SYN. *Alsinanthus*, Desvauz, Journ. Bot. 1814 (nomen).

Alsinella, S. F. Gray, Nat. Arr. Brit. Pl. ii. p. 655 (1821).

Bigelovia, Rafin. in Journ. Phys. lxxxix. (1819), p. 289.

Brachystemma, D. Don, Prodr. Fl. Nepal. p. 216 (1825).

Brewerina, A. Gray, in Proc. Amer. Acad. viii. (1872), p. 620.

Dolophragma, Fenzl, in Ann. Wien. Mus. i. (1836), p. 63, t. 7.

Dufourea, Gren., in Act. Soc. Linn. Bord. ix. (1837), p. 25.

Eremogone, Fenzl, Verbr. Alsin. p. 13, t. ad p. 18 (1833).

Euthalia, Rupr., Fl. Caucasi, p. 220 (1869).

Gouffea, Robill. et Cast., in DC. Fl. Franç. v. p. 609 (1815).

Leptophyllum, Ehrh., Beitr. iv. p. 147 (1789).

Lepyrodichis, Fenzl, in Endl. Gen. Plant. p. 966 (1840).

Odontostemma, Benth. ex G. Don, Gen. Syst. Bot. i. p. 449 (1831).

Pettera, Reichb., Ic. Fl. Germ. Helv. v. p. 33, t. 220 (1841).

Plinthine, Reichb., Handb. Nat. Pf. p. 298 (1837).

Subgen. 1. **Euarenaria**.—Sepala herbacea, vel basi indurascencia, vel interdum omnino coriacea; apicibus recta vel recurva, rarius incurva. Petala integra, apice rotundata retusa vel raro emarginata. Stamina 10 (in paucis speciebus 5). Glandulæ obsoletæ vel inconspicuæ, in discum annularem immersæ. Ovarium trisulcatum multiovulatum; styli 3 (in nonnullis floribus interdum 4 vel 5). Capsula oligo- vel polysperma, 6 dentibus vel 6 valvis, vel sæpe 3 valvis bidentatis, dehiscens. Semina granulato-tuberculata lævia nitida vel rarius rugulosa.—Herbæ annuæ biennes vel perennes, vel rarius suffruticosæ; in perennibus sæpius cæspitosæ.

Subgen. 2. **Eremogoneastrum**.—Sepala herbacea vel basi indurata; apicibus recta vel recurva. Petala integra, apice rotundata obtusa vel raro retusa. Stamina 10, glandulis alternantia. Discus crenato-lobatus, glandulis prominentibus. Ovarium trisulcatum multiovulatum. Styli 3 (in nonnullis floribus interdum 4). Capsula oligo- vel polysperma, ultra medium 6 valvis dehiscens. Semina tuberculata vel lævia.—Herbæ perennes, sæpius cæspitosæ, Asiaticæ et Americanæ; foliis angustis.

Subgen. 3. **Pentadenaria**.—Sepala interdum coriacea; apicibus recta vel recurva. Petala integra, apice obtusa retusa vel rarius denticulata. Stamina 10. Discus lobatus, in 5 glandulas staminiferas prominentes integerrimas vel emarginato-bigibbosas expansus. Styli 3. Capsula 6 dentibus vel 3 valvis bidentatis dehiscens. Semina granulato-tuberculata vel lævissima.—Species perennes, sæpe suffruticosæ.

Subgen. 4. **Dicranilla**.—Sepala apicibus marginibusque inflexis conniventia. Petala integra, in aliquot speciebus nulla. Stamina 5 vel 10, glandulis suffulta. Ovarium trisulcatum; styli 3 (interdum 2). Capsula membranacea ovoidea oligosperma, ultra medium 6 valvis dehiscens. Semina lævissima nitida nigra.—Herbæ alpicolæ, meridionali-Americanæ, pulvinatim cæspitosæ, habitû ab iis aliorum subgenerum valde diversæ. Folia confertissime 4-5-fariam imbricata minuta ovata vel ovato-lanceolata carinata. Flores terminales solitarii sessiles minimi, foliis occultati; gemmæ axillares, crescentes tandem alares.

Subgen. 5. **Arenariastrum**.—Sepala herbacea vel rarius subscariosa, angusta; apicibus in anthesi erecta conniventia nunquam inflexa. Stamina 10, rarius 5 ananthera. Glandulæ obsoletæ vel incospicuæ, in discum annularem immersæ. Styli 2. Capsula oligosperma, primum 4 dentibus conniventibus dehiscens, tandem in valvas secedens. Semina scabra vel granulato-tuberculata, subglobosa.—Herbæ annuæ vel biennes multifloræ, sæpius diffusæ.

Subgen. 6. **Odontostemma**.—Sepala anguste hyalino-marginata. Petala erosa vel laciniata. Stamina 10, paullo supra basin utroque latere gibbosa (veluti glandulâ bigibbosâ insidentia). Ovarium multiovulatum; styli 2. Capsula (ovulorum abortu) oligosperma, 4 valvis dehiscens. Semina magna compressa,

granulato-tuberculata vix lævia.—Species perennes sæpius valde glandulosæ et pilosæ, omnes Himalaicæ vel Yunnanenses: radix (saltem in pluribus speciebus) hinc inde inflato-nodosa, vel tubercula fusiformia edens.

Subgen. 7. *Macrogyne*.—Sepala basi indurascencia, late hyalino-marginata. Petala integra, apice rotundata. Stamina 10. Discus crenato-lobatus, receptaculo sensim concavo enascens; glandulis distinctis staminiferis. Styli 2, longe exserti. Capsula oligosperma, 4 valvis dehiscens.—Herba nana perennis Yunnanensis, caulibus diffusis.

SUBGEN. I.—*EUARENARIA*.

Sectio i. EUTHALLÆ.

Calyx basi haud indurascens; sepala (siccata) subnervia carinato-uninervia vel 3–5-nervia. Petala interdum nulla. Capsula ovoidea, calyce inclusa vel illo paullo longior, dentibus vel valvis dehiscens (dentibus quum 6 tum sæpius inæqualibus). Semina reniformi-globosa, globulosa, vel lenticularia, granulato-tuberculata (vel rarius scabro-rugulosa).—Herbæ amphigæ, foliis latis vel angustis planis (nunquam elongato-gramineis setaceis nec lineari-filiformibus), axillis foliorum sæpe fasciculiferis; annuæ vel biennes, caule in cymam paniculæformem foliosam raro depauperatam soluto, aut suffrutescens cæspitosæ, tunc caulibus sæpissime filiformibus, et flores nunc terminales et axillares solitarii, nunc per cymas depauperatas interdum abbreviatas (floribus itaque glomerato-capitatis) terminales dispositi.

Series A.—Stamina 10.

Subsectio 1.—Sepala uninervia vel (in vivo) enervia. Flores in cymas laxas paucifloras, in ramulis nonnullis interdum depauperatas ad florem unicum reductas, dispositi.

a. Petala calycem æquantia, vel eo longiora.

α. Species annuæ vel biennes.

† Folia obtusa vel apice rotundata.

A. conimbricensis, emarginata, nilghirensis, Pomeli.

†† Folia acuta.

A. obtusiflora, controversa, napuligera.

β. Species perennes.

(Axillæ caulium florum fasciculos foliorum edentes.)

† Petala basi vix unguiculata.

A. hispida, lesurina, montana, grandiflora, valentina, cinerea, Huteri, tmolea, rotundifolia, Redowskii, libanotica.

†† Petala basi longe attenuata.

A. tomentosa, gracilis.

b. Petala calyce breviora.

a. Species annuæ.

A. gorgonea, Benthami.

β. Species perennes.

A. orbiculata, tenella.

Subsectio 2.—Sepala 3-nervia vel (siccata) 3–5-nervia. Flores in cymas laxas paucifloras vel effusas dispositi, vel ramorum apice solitarii, vel glomerato-capitati (cymis abbreviatis).

a. Petala calycem æquantia, vel eo longiora.

a. Species annuæ. Flores cymosi vel rarius solitarii.

† Folia uninervia, aut subtrinervia nervis lateralibus rudimentariis vel obsoletis. Sepala haud obtusa.

A. retusa, modesta, capillipes, oxypetula, pamphylica, sabulina, algarbiensis, Liebmanniana.

†† Folia uninervia. Sepala apice incurva obtusa.

A. Loscosii, ciliaris.

††† Folia plurinervia. Sepala apice recta acuta.

A. conferta.

β. Species perennes.

† Flores solitarii, vel rarius cymis paucifloris (vulgo trifloris).

A. incrassata, racemosa, erinacea, tetraquetra, graveolens, filicaulis.

†† Flores glomerato-capitati,

A. Armeriastrum, capitata, pseudoarmeriastrum.

b. Petala calyce breviora.

a. Species annuæ vel biennes (*i. e.* monotocæ).

† Flores cymosi, in ramulis interdum depauperati ad florem unicum reducti.

A. serpyllifolia, leptoclados, cassia, nevadensis, tremula, macrosepala, conica, orbicularis.

†† Flores sessilibus, capitato-congesti. Capsula ovata sulcata.

A. nana.

††† Flores subsessiles, corymboso-fasciculati. Capsula anguste cylindrica.

A. Guicciardii.

β. Species perennes. Flores cymosi.

A. ovalifolia.

Series B.—Stamina 5.

A. andina, pentandra.

Sectio ii. SIKKIMENSES.

Calyx basi induratus; sepala (siccata ac in vivo) enervia. Petala majuscula. Stamina 10, rarius 5. Capsula ovoidea, calyce inclusa vel illo paullo longior, valvis dehiscens. Semina globulosa vel lenticularia, granulato-tuberculata, pallida, statu immaturo late alata.—Herbæ ut plurimum Himalaicæ, perennes cæspitosæ, caulibus non filiformibus, floribus terminalibus solitariis.

Series A.—Stamina 10.

Subsectio 1.—Folia margine incrassata aut nervoso-marginata. Calyx basi rotundatus.

A. ciliolata.

Subsectio 2.—Folia margine non incrassata neque nervoso-marginata. Calyx campanulatus.

α. Petala vix unguiculata.

A. Stracheyi, melandryiformis, bulica.

β. Petala in unguem attenuata.

A. Brotherana.

Series B.—Stamina 5, et staminodia 5.

A. nitida.

Sectio iii. LEIOSPERMÆ.

Calyx basi haud induratus; sepala carinata vel enervia. Petala interdum nulla. Capsula ovato-oblonga, calyce inclusa vel illo paullo longior, valvis dehiscens. Semina globoso-reniformia vel lenticularia, lævissima nitida, atra rarius rufa.—Herbæ perennes imprimis meridionali-Americane, caulibus interdum diffusis vel plus minus divaricato-ramosis flores axillares et terminales, solitarii vel rarius in cymas paucifloras aut dichasia composita dispositi.

Subsectio 1.—Flores solitarii, terminales et axillares.

A. muscoides, musciformis, Halacsyi, Balansæ.

Subsectio 2.—Flores solitarii axillares.

a. Sepala carinata, carinâ prominente pilosâ, margine ciliata, ceterùm glabra vel rarius puberula.

A. lanuginosa, megalantha, soratensis, pleurantha, parvifolia, reptans.

b. Sepala enervia puberula. (Petala nulla.)

A. Jamesoniana.

c. Sepala concava uninervia vel obsolete 3-nervia, glaberrima.

A. lycopodioides, Rohrbachiana.

Subsectio 3.—Flores solitarii, terminales.

A. Orbignyana, catamarcensis, achalensis, serpens.

Subsectio 4.—Flores axillares solitarii, et terminales subconferti.

A. microphylla, palustris.

Subsectio 5.—Flores longe pedicellati, in cymas paucifloras dispositi.

A. Stuebelii, sazosa, spathulata.

Subsectio 6.—Flores ad ramorum apicem conglomerati sessiles, vel dichasium valde compositum formantes.

a. Folia ovata obtusa. Sepala obtusa.

A. Mandoniana.

b. Folia angusta acuminata. Sepala acuta.

A. Peyrúschii, Poeppigiana.

Sectio iv. PORPHYRANTHÆ.

Calyx basi haud indurascens; sepala 3-5-nervia. Capsula cylindrica e calyce longe exserta, 6 dentibus brevibus æqualibus dehiscens. Semina compresso-globosa lævia fusca.—Herba perennis fruticulosa occidentali-Europæa, cæspitosa multiflora; foliis ovato-lanceolatis nitidis rigidulis. Flores in cymas terminales paucifloras dispositi, petalis roseis vel albis integerrimis.

A. purpurascens.

Sectio v. EREMOGONÆ.

Calyx basi demùm induratus; sepala (siccata) subtrinervia. Capsula ovata, calyce inclusa, dentibus sero bifidis vel valvis bidentatis dehiscens. Semina compressa, pyriformia vel oblonga, lævia.—Herbæ amphigæe perennes suffruticosæ cæspitosæ sæpe pulvinatæ, erectæ rigidæ: caudices lignosi, polycephali vel ramosi, caulibus floriferis elongatis strictis simplicissimis, basi imbricato-vaginatibus cum turionibus brevissimis (interdum foliorum denudatis vel tantum squamatis), sæpius foliis setaceis lineari-

filiformibus vel subulatis apice in comam densatis, vegetis, et interdum ad axillas fasciculos foliorum edentibus; cyma terminalis simplex depauperata vel geminæ ternæ aut plures per thyrsum brachiatum paniculæ-vel corymbiformem illinc dispositæ, floribus sæpe congestis confertis vel glomerato-fasciculatis.

Subsectio 1.—Axillæ foliorum non fasciculiferæ.

A. Flores subsessiles, in cymis capitato-aggregatis vel glomerato-fasciculatis.

A. cephalotes, congesta, Franklinii, Hookeri, polynemifolia.

B. Flores pedicellati, in cymas simplices aut compositas interdum depauperatas vel per thyrsum brachiatum paniculæ-vel corymbiformem dispositi, pedicellis calyci æquilongis vel longioribus suffulti.

a. Petala sepalis breviora.

A. pungens.

b. Petala calycem æquantia, vel sæpius eo longiora.

A. holostea, lychnidea, acutisepala, Szowitzii, compacta, isaurica, cucubaloïdes, juncea, saxatilis, longifolia, aculeata.

Subsectio 2.—Apud multa folia, axillæ fasciculos foliorum edentes.

A. drypidea, Ledebouriana, acerosa, Lessertiana, tetrasticha.

SUBGEN. II.—EREMOGONEASTRUM.

Sectio i.

Calyx basi haud indurascens. Flores solitarii, raro cymosi.

A. Bourgei, festucoides, monticola, kansuensis.

Sectio ii.

Calyx basi induratus. Flores cymosi vel solitarii.

Subsectio 1.—Caules floriferi simplices, remote foliati; turiones foliis angustis dense comati multum breviores. Flores cymosi. Petala sæpius sepalis longiora.

A. scariosa, graminea, blepharophylla, Griffithii, armeniaca.

Subsectio 2.—Caules breves, dense foliosi, simplices vel ramulosi. Flores solitarii. Petala semper sepalis longiora.

A. polytrichoides, pulvinata, globiflora, densissima, kumaonensis, tetragyna.

SUBGEN. III.—PENTADENARIA.

Sectio i. GLOMERIFLORÆ.

Flores subsessiles, in cymis capitato-aggregatis vel glomerato-fasciculatis; flore centrali sæpius ebracteato. Glandulæ emarginatæ.

A. Przewalskii, dianthoides.

Sectio ii. RARIFLORÆ.

Flores pedicellati, in cymas simplices aut compositas interdum depauperatas, vel per thyrsum brachiatum paniculæ- vel corymbiformem, dispositi, pedicellis calyci æquilongis vel longioribus suffulti; bracteæ ochraceæ subvaginantes scariosæ. Glandulæ integerrimæ.

Subsectio 1.—Folia lineari-setacea vel graminea, imprimis turionum. Semina lævia.

a. Sepala, præter nervum dorsalem viridem in mucronem haud excurrentem, flava vel albida.

A. rigida, graminifolia, Koriniana, oreophila, ferruginea, Tschukt-schorum.

β. Sepala, nervo dorsali lato in mucronem herbaceum recurvopatulum excurrente, picta vel subherbacea.

A. gypsophiloides, ursina, caricifolia, Roborowskii, capillaris.

Subsectio 2.—Folia imprimis caulina, lineari-setacea. Semina granulato-tuberculata.

A. macradenia, Fendleri.

Subsectio 3.—Folia ovata vel subrotunda. Semina scabra.

a. Petala sepalis longiora.

A. Saxifraga, ciliata, gothica, balearica, glanduligera.

β. Petala sepalis breviora, vel ea subæquantia.

A. biflora, Gayana.

SUBGEN. IV.—DICRANILLA.

Sectio i. RADIANTES.

Petala calyce longiora. Stamina 10.

A. radians, dicranoides.

Sectio ii. PYCNOPHYLLÆ.

Petala calyce multum breviora, vel nulla. Stamina 10.

A. bisulca, bryoides, pycnophylla, pycnophylloides, boliviana.

Sectio iii. PEDUNCULOSÆ.

Petala calyce multum breviora, vel nulla. Stamina 5.

A. pedunculosa, Alpamarçæ.

SUBGEN. V.—ARENARIASTRUM.

Sectio i. GOUFFEIA.

Flores minuti, cymoso-paniculati. Stamina 10. Capsula oblonga vel subglobosa, calyce inclusa.—Herba Europæa biennis tenuis diffusa, foliis linearibus vel setaceis.

A. massiliensis.

Sectio ii. LEPYRODICLIS.

Flores parvi, cymoso-paniculati. Stamina 10. Capsula inflato-globosa, calyce inclusa.—Herbæ Asiaticæ proceræ flaccidæ annuæ, foliis lanceolatis vel oblongo-lanceolatis.

A. holosteoides, tenera.

Sectio iii. BRACHYSTEMMA.

Flores numerosi, in paniculis axillaribus vel terminalibus. Stamina 10, quorum 5 ananthera. Capsula depresso-globosa, calycem non superans.—Herba Himalaïca annua subscandens diffusa, foliis lanceolatis vel ovato-lanceolatis.

A. nepalensis.

SUBGEN. VI.—ODONTOSTEMMA.

Sectio i. BARBATÆ.

Flores dichotomo-corymbosi, pedicellis elongatis erectis suffulti; bractæ foliaceæ.

A. barbata.

Sectio ii. YUNNANENSES.

Flores cymosi, pedicellis sub anthesi erectis mox deflexis suffulti; bractæ foliaceæ.

A. yunnanensis, glandulosa, debilis, Delavayi, quadridentata.

SUBGEN. VII.—MACROGYNE.

A. longistyla.

IV. DESCRIPTIVE ENUMERATION OF THE SPECIES.

Subgenus I. EUARENARIA.

 Sectio i. EUTHALIÆ.

Series A.—Stamina 10.

Subsectio 1.—Sepala uniuersia vel (in vivo) enervia. Flores in cymas laxas paucifloras, in ramulis nonnullis interdum depauperatas ad florem unicum reductas, dispositi.

a. Petala calycem æquantia, vel eo longiora.

a. Species annuæ vel biennes.

† Folia obtusa vel apice rotundata.

1. *A. CONIMBRICENSIS*, *Brot. Fl. Lusitanica*, ii. p. 200 (1804); *Willk. & Lange, Prodr. Fl. Hisp.* iii. p. 621.

β. glanduloso-viscosa, *Webb*, ex *Willk. & Lange, Prodr. Fl. Hisp.* iii. p. 621; *Welw. herb.*, et in litt. 1847.

Geogr. area. Spain and Portugal.

N. & E. Monistrol, in Catalonia.

S. Niebla, in Andalusia.

W. Coimbra, in prov. of Beira, and Serra de Monchique in prov. of Algarve.

Iconogr.—*Brot. Phytogr. Lusit. Sel.* p. 179, t. 73; *Willk. Ic. descr. Pl. Rar. Hisp.* i. p. 91, t. 61 A.

SYN. Spergula ciliaris, *Brot. Fl. Lusitanica*, ii. p. 215 (1804).

2. *A. EMARGINATA*, *Brot. Fl. Lusitanica*, ii. p. 202 (1804); *Willk. & Lange, Prodr. Fl. Hisp.* iii. p. 622.

Habitu similis *A. modestæ*, a qua antheris conspicue olivaceis; petalis emarginatis roseis, sepalis foliisque obtusis bene distincta est.

β. *Salzmanni*, *Willk. Ic. descr. Pl. Rar. Hisp.* i. p. 94, t. 62 c. Staturâ major. Flores duplo majores. Petala ovato-oblonga patentissima profundius emarginata, basi repente in unguem brevissimum contracta. Capsula paullo angustior, cylindraceo-conica.

In *Gay's MS.* note on this plant, which he obtained from *Salzmann*, he says that the alternate filaments are saccate at the base; though, in examining the specimens, I could not find any

evidence of enlarged glands attached to the inner series of filaments, a character which would warrant the transference of the plant to the subgenus *Pentadenaria*. Specimens of this species, accidentally placed in a parcel of Greek plants in Fauché's herbarium, were described as a new species by Chaubard under the name of *A. sordida*. The eastern limit of the species is determined from the specimens in the late Mr. G. C. Joad's herbarium.

Geogr. limits.—*N. & W.* Portugal: Faro in the prov. of Algarve.

E. Near Algiers (*Herb. Joad*, 1873).

S. Algeria: Andalous in the dept. of Oran (*Balansa*, Pl. d'Algérie, 1852, no. 452).

Iconogr.—*Willk. Ic. descr. Pl. Rar. Hisp.* i. p. 93, t. 62 B, et p. 94, t. 62 C (var. β); *Chaub. Fl. Péloponn.* n. 699, t. 24. f. 1 (*A. sordida*).

SYN. A. batica, Salzm. ex Ball, in Journ. Linn. Soc. xvi. p. 365 (1877).

3. *A. NILGHIRENSIS* [neelgherense], *Wight & Arn. Prodr. Fl. Ind. Or.* p. 43 (1834); *Hook. f. Fl. Brit. Ind.* i. p. 239.

Hab. N.W. Himalaya in Kashmir, and Nilghiri Hills in Malabar; also Belgaum and Dharwar in Bombay Presidency (*Dalz. & Gibs. Bomb. Fl.* p. 15 [1861]),—not mentioned in Hooker's 'Flora of British India.'

Wight says that it is only met with here and there in the Nilghiri Hills, and is not at all common. This locality remains the southern limit of the genus, which is 11° N. lat.

Iconogr.—*Wight, Ic. Pl. Ind. Or.* 949, et *Spicil. Neilgherr.* t. 15.

4. *A. POMELI*, *Munby, in Bull. Soc. Bot. France*, xi. p. 45 (1864); *Pomel, Nouv. Mat. Fl. Atlant.* p. 207.

Pumila, glauca, 4–10* centim., sæpius a basi ramosa, ramis erectis. Caules dense puberuli pilis brevibus retrorsis, simplices flore unico terminati vel sæpius superne dichotome ramosi, ramis dichotomiæ simplicibus flore terminatis vel iterum dichotome divisus, ramo altero dichotomiæ abortu sæpe deficiente. Folia glabra punctulato-tuberculata, margine scabra, nervo medio breviter dentato; inferiora oblongo-spathulata, media et superiora

* The stem-measurements throughout are taken with a centimetre measure from good average specimens; and in French authorities these of course usually agree with the length given in the original description.

obovato-oblonga vel oblongo-lanceolata sessilia. Flores in cymam laxam dispositi, alares longe pedicellati. Sepala erecta acuta inæqualia; exteriora 2 late ovata carinata, intermedium ovato-oblongum, nervo valido denticulato, interiora 2 obovato-oblonga carinata. Petala oblongo-lineararia integerrima alba, calycem æquantia. Capsula ovato-globosa, apice dentibus 6 dehiscens. Semina compresso-subglobosa, obtuse tuberculata.

A. spathulata huic affinis, sed præsertim differt pube glanduliferâ viscosâ, sepalis hispidis æqualibus oblongo-lanceolatis 5-nerviis marginato-membranaceis, petalis obovatis calyce duplo longioribus, et seminibus minute ruguloso-tuberculatis.

Hab. Algeria: Gharrouban and Afir in dept. of Oran.

Iconogr.—*Coss. Illustr. Fl. Atlant.* fasc. iii. (1890), p. 151, t. 98.

†† Folia acuta.

5. *A. OBTUSIFLORA*, *Kunze, Chloris Austro-Hisp.* in *Flora*, xxix. (1846) p. 632; *Willk. & Lange, Prodr. Fl. Hisp.* iii. p. 621.

Similis *A. modestæ*, hæc autem differt foliis paullo magis pubescentibus, sepalis trinerviis valde acutis, petalis calycem subæquantibus, seminibus breviter tuberculatis: etiam a Boissier (in *Pugill. Plant.* p. 23) cum *A. conimbricensi* perperam conjuncta est; differt ab ea caule altiore, ramis filiformibus erectis gracilioribus pedicellisque glabris vel sub lente minutissime puberulis, foliis lineari-lanceolatis breviter acutis conspicue uninerviis, floribus minoribus in cymâ repetito-dichotomâ regulari dispositis, sepalis obovato-oblongis, antheris luteis.

Geogr. range.—*N. & E.* Sierra de Chiva, in prov. of Valencia, where it was first collected by C. Boutelou, and recorded by him under the name of *A. saxatilis*, Linn.

S. & W. Peña Alta near Velez-Rubio, in prov. of Andalusia (*Rouy*, 1881).

A rare but distinct species found only in S.E. Spain.

Iconogr.—*Willk. Ic. descr. Pl. Rar. Hisp.* i. p. 91, t. 61 B.

SYN. *A. saxatilis* (non Linn.), *Bout. ex Willk. et Lge. Prodr. Fl. Hisp.* iii. p. 621.

6. *A. CONTROVERSA*, *Boiss. Voy. Bot. Esp.* p. 100 (1839); *Willk. & Lange, Prodr. Fl. Hisp.* iii. p. 622.

Although Gay compares his *A. tenuis* with *A. modesta*, an examination and comparison of the type-specimens in Herb. Kew. unmistakably show them to be identical with *A. controversa*. The specimens collected by Porta and Rigo in 1891 (exs. no.

414) on the Sierra de Alcaraz in Murcia, and the specimens collected by Bourgeau (named *A. tenuis*) in the same locality, are identical.

Geogr. limits.—*N.* France: dept. of Vienne

E. Central France.

S. Spain: Sierra de Alcaraz, in prov. of Murcia.

W. Spain: near Valladolid, in prov. of Leon.

Iconogr.—*Willk. Ic. descr. Pl. Rar. Hisp.* i. p. 92, t. 61 c; *Delastre, Fl. départ. Vienne*, p. 120, t. 2 (*A. conimbricensis* var.).

SYN. *A. tenuis*, J. Gay, in Walp. Ann. Bot. vii. p. 300 (1867).

A. conimbricensis, J. Gay, ex Gren. et Godr. Fl. de France, i. p. 260.

A. Gouffea, Puel, in Duch. Rev. Bot. i. p. 450 (1846).

7. *A. NAPULIGERA*, *Franch. in Bull. Soc. Bot. France*, xxxiii. p. 429 (1886); *Pl. Delavay*. p. 92, t. 24 A.

Radix inflata fusiformis, e collo unicaulis vel multicaulis. Caules rubescentes unilateraliter puberuli, plus minus dichotome ramosi, ramis intricatis. Folia linearia vel lineari-oblonga, punctis elevatis asperata, basi ciliolata, ceterum glabra. Inflorescentia paniculato-corymbosa; pedunculi rigidi erecti, inferiores solitarii, superiores 3-5. Calyx purpurascens; sepala lanceolata vel ovato-lanceolata, obtusa, margine membranacea. Petala rosea, calyce duplo longiora, obovata, emarginata vel breviter biloba. Ovula 10-14.

A handsome plant with large rose-coloured flowers, well characterized by its napiform root, very large in some specimens, less developed in others. It cannot be compared with any Himalayan species: its habit is rather that of certain annual European species, such as *A. controversa*, with more specious flowers, which are rose-coloured instead of white.

Hab. China: prov. of Yun-nan, in fissures of Mt. Koua-la-po, near Hokin (1884); and on the road to the hill of Yen-tze-hay near Lankong, at 2500 metres.

Iconogr.—*Franch. Pl. Delavay*. p. 92, t. 24 A.

β. Species perennes

(axillæ caulium floriferorum fasciculos foliorum edentes).

† Petala basi vix unguiculata.

8. *A. HISPIDA*, *Linn. Sp. Plant.* p. 425 (1753); *Willk. & Lange, Prodr. Fl. Hisp., Supplem.* p. 277 (1893).

The Linnean specimens were from the neighbourhood of Montpellier. It is not an "espèce exclusivement française," as claimed by Rouy and Foucaud (*Fl. de France*, iii. p. 244 [1896]), since it is found on the Spanish side of the Pyrenees. The stems are from 10–20 centim.

Geogr. limits.—*N.* Depart. of Aveyron. *E.* Depart. of Gard.

S. & W. On Mt. Costabona, in Catalonia (not usually marked in maps).

Iconogr.—*Willk. Ic. descr. Pl. Rar. Hisp.* i. p. 97, t. 65 B; *DC. Ic. Pl. Rar. Gall.* 47; *Cus. & Ansb. Herb. Fl. France*, iv. t. 701.

9. *A. LESURINA*, *Loret, Herb. Lozère*, p. 13 (1858–62); *Lecoq et Lam. Cat. Pl. Centr. France*, p. 104 (1847), *sub A. ligericina*.

Caules simplices vel ramosi, teretes erecti subfastigiati, 5–7 centim. Folia inferiora approximata subimbricata ovali-lanceolata acuminata uninervia læte virentia. Flores parvi in cyma dichotoma, terminales longe, alares brevius pedicellati; pedicellis florum alarium bracteolatis. Sepala ovato-lanceolata acuta anguste membranaceo-marginata. Petala suborbiculata pallide lutea calyce parùm longiora. Capsula in valvas 6 lanceolatas profunde dehiscens. Semina reniformi-globosa grosse et obtuse tuberculata.—Tota planta indumento patulo glanduloso-viscoso dense vestita.

The earlier name of *A. ligericina* is rejected, as it is the Latin name for the River Loire, instead of that for Lozère, which the author intended.

Hab. France: departments of Lozère and Aveyron.

Iconogr.—*Willk. Ic. descr. Pl. Rar. Hisp.* i. p. 99, t. 66 A (*A. ligericina*); *Cus. & Ansb. Herb. Fl. France*, iv. t. 696 (*A. ligericina*).

10. *A. MONTANA*, *Linn. Cent. Plant.* i. p. 12 (1755); *Amœnit. Acad.* iv. p. 272; *Willk. & Lange, Prodr. Fl. Hisp.* iii. p. 623.

Syn. Præ-Linnæana.—*Alsine* foliis linearibus acuminatis, petalis florum integris calyce duplo longioribus, *Le Monnier, Catalogue des Plantes en Auvergne, etc.* (1744).

Myosotis lusitanica linariæ folio, magno flore, *Tournef. Inst. Herb.* p. 244, ex auct. herbarii Vaillant.

Le Monnier wrote that it occurred plentifully on the road from Orleans to Bourges, especially in the forest of Alloigni. He is the first botanist to give a satisfactory account of the plant.

β. saxicola, *Rouy, Exc. Bot. Esp.* iii. p. 38 (*ex Bull. Soc. Bot. France*, xxxi. [1884]).

Folia sepalaque latiora dense pubescentia candicantia.

Hab. Valencia: Mt. Mongo, Bernia, and Cabo de S. Antonio.

γ. intricata, *Ser. in DC. Prodr.* i. p. 410.

Læte virens. Caules ramosiores fragiles cæspitem laxum imbricatum formantes. Folia linearia glabrescentia. Sepala glabra.

Hab. Provinces of Andalusia, Murcia, and Valencia.

According to Saccardo and Bizzozzero this variety has been found in the Venetian Alps, but Maratti's specimens are imperfect, and the record has never since been verified. They may be identical with *A. grandiflora*, as the locality given is Mt. di Lozzo.

Geogr. limits.—*N.* Dept. of Eure, near Evreux (*Morière*, Fl. Norm.). *S.* Prov. of Andalusia.

E. Dept. of Hérault. *W.* S. Portugal.

Iconogr.—*Reichb. Ic. Fl. Germ. Helv.* 4951; *Asso, Syn. Stirp. Arrag.* n. 383, t. 2. f. 3 (1779); *Bot. Mag.* t. 1118; *The Garden*, Dec. 1893; *Cus. & Ansb. Herb. Fl. France*, iv. t. 693; *Vent. Hor. Cels*, t. 34.

SYN. A. linearifolia, *Poir. Encycl.* vi. p. 366.

A. pyrenaica, *Hort. ex Steud. Nomencl.* ed. 2, i. p. 126.

Bigelowia montana, *Rafin. in Journ. Phys.* 1819, p. 289.

11. *A. GRANDIFLORA*, *Linn. Syst. Plant.* ed. X. p. 1034 (1759); *Sp. Plant.* ed. II. p. 608 (1762); *Willk. & Lange, Prodr. Fl. Hisp.* iii. p. 624, et *Supplem.* p. 277.

α. genuina, *Rouy & Fouc. Fl. de France*, iii. p. 251 (1896).

Caules 1–2-flori. Folia omnia linearia vel anguste lanceolata, plana rigida.

β. abietina, *Presl (sp.), Delic. Prag.* i. p. 63; *Fl. Sicula*, p. 164.

Caules 1–2-flori. Folia omnia linearia vel anguste lanceolata, revoluta.

γ. mixta, *Lapeyr. (sp.) Hist. abr. Pl. Pyr.* i. p. 255; *Rouy & Fouc. Fl. de France*, iii. p. 251.

Caules 2–6-flori fastigiati. Folia stricta vel paullo patentia recurva; inferiora lineari-subulata plana, reliqua lanceolata.

δ. *triflora*, Linn. (sp.) *Mant. Plant.* p. 240 (1771).

Linnæus gives a clear and full description of this plant in the second portion of his 'Mantissa Plantarum': *Caules palmares, copiosi, diffusi, adscendentes, teretes, subpubescentes: ramis alternis erectis. Folia lanceolato-subulata (juniperina), patentia, acuminata, ciliata, subtus pubescentia: floralia ovato-lanceolata, subtus pilosa. Pedunculi terminales, plures, teretes, pubescentes, articulis caulinis longiores, triflori; pedicellus intermedius aphyllus, laterales longiores; bracteis duabus, ovatis, ciliatis, extus pubescentibus. Calyx ovatus, acutus, erectus, pubescens. Petala obovata, oblonga, calyce duplo longiora, patentia, obtusa, alba, lineata. Stamina alba. Pistillum viride staminibus brevius.*

The following more or less intergrading forms of this variety are worked out from the material in the Vienna Herbarium, consisting of the specimens from Fenzl's own herbarium. They differ in minor details when placed side by side, but are rather difficult to separate satisfactorily by definition:—

Lusus 1 (parviflorus). *Humilis*. Confertim et pulvinatim cæspitosa, caudiculis lignescentibus. Cauliculi 1-3-flori stricti 12-35 mm. Folia imbricato-congesta, erecta vel patula, anguste subulata. Calyx 3 mm.

Hab. Depart. of Pyrénées-Orientales.

Lusus 2 (angustifolius).

Forma *humilis*.—Differt a præcedente florum magnitudine, sepalis magis ovato-oblongis quam late ovatis.

Hab. Switzerland.

Forma *stricta*.—Læte viridis, plerumque late cæspitosa.

Folia plerumque stricta, remotiora ac magis patula vel recurva.

Hab. Switzerland: Mt. Chasseron in the Jura, canton Vaud.

Forma *intermedia*.—Caudiculi cauliculique magis elongati, sæpe 2-3-flori. Folia fasciculorum magis patula tamen rigida.

Hab. Switzerland: canton Vaud.

Forma *flaccida*.—Læte viridis. Cauliculi plerumque multi-flori elongati. Folia flaccida varie patula vel recurvata.

Hab. Switzerland.

Forma *glauca*.—Præcedente, etiam rigidior, eximie glauca.

Lusus 3 (*latifolius*).

Forma *heterophylla*.—Laxe cæspitosa. Folia flaccida quam typo (α) majora latiuscula, juniora angustissima fere setacea.

Hab. Montpellier, Mt. Ventoux, and Val d'Eynes in the Pyrenees.

Forma *elongata*.—Cauliculi valde elongati 3-7-flori. Folia inferiora stricta, superiora flaccida.

Hab. Sierra Nevada in Andalusia; Vallée de Cervières, in depart. of Aveyron (*A. minor*, Decne., and *A. triflora*, Willd.).

ϵ . multiflora, *Ser. in DC. Prodr.* i. p. 404.

Caulis 3-4-flori. Folia lineari-subulata rigida ciliolata.

Possibly the same as *lusus* 2 forma *stricta* of preceding var., but the leaves uniformly ciliolate instead of only towards the base.

ζ . stolonifera, *Vill. Journ. Mens.* p. 437 (MSS.) ap. *Verlot, Pl. Dauph.* p. 62; (sp.) *Vill. ex DC. Prodr.* i. p. 404.

Caulis floriferi 1-2-flori surculis multis sterilibus intermixti. Folia rigida, inferiora subulata, reliqua lanceolato-lineararia.

η . aculeata, *Willk. Prodr. Fl. Hisp., Supplem.* p. 277.

SYN. *Stellaria aculeata*, Scop. Fl. Carniol. (ed. 2) i. p. 316.

Hab. Andalusia: Sierra de Alfacar and Sierra de Peñagolosa.

This polymorphous species varies considerably within narrow limits. The forms have been grouped into seven varieties on the characters of the length, breadth, and direction of the leaves, the size of the flowers, and the number of pedicels springing from one axis. The leaves are frequently imbricated on the stem, but never tetrastichous. Cosson proposed to sink *A. incrassata* also in this species; but in typical specimens of *A. grandiflora* the stem is distinctly 4-angled, especially in vigorous specimens with furrowed surfaces between the angles; the seeds also are more distinctly tuberculate. In one of the specimens growing this year in the Alpine house at Kew Gardens, most of the flowers had 4 styles.

Geogr. limits.—*N.* Austria: Mt. Pollauer and the Nikolsberg in West Moravia.

S. Alpine stations in Sicily up to 1500 metres (*Lojacono*).

E. Croatia.

W. Corunna in Spain (*Guardia*, ex herb. Groves).

This is a species widely distributed in Central and Southern

Europe, but it is doubtful whether its range extends so far east as Transylvania, as stated by Schur.

Iconogr.—*All. Fl. Pedem.* n. 1711, t. 10. f. 1; *Ic. Taurin.* xiv. t. 73. f. 7; *Pedem. Stirp. Spec.* p. 49, t. 10. f. 1 (1755); (var. β) *Reichb. Ic. Fl. Germ. Helv.* 4946; (var. η) *Reichb. l. c.* 4946 β ; *Scop. Fl. Carniol.* (ed. 2) n. 527, t. 17 (*Stellaria aculeata*).

SYN. *A. capillacea*, *All. Fl. Pedem.* ii. p. 365 (=var. *a*).

A. graminea, *Steud. Nomencl.* ed. 2 i. p. 124 (=var. *a*).

A. juniperina, *Vill. Hist. Pl. Dauph.* iii. p. 624 (=var. *e*).

A. juniperina, *Thuill. Fl. Env. Paris*, p. 218 (=var. *d*).

A. laricifolia (*non Linn.*), *Lapeyr. Hist. abr. Pl. Pyr.* p. 255 (=var. *a*).

A. laxa, *Fisch. ex Ser. in DC. Prodr.* i. p. 404 (=var. *a*).

A. liniflora (*non Linn.*), *Willd. ex Spreng. Syst. Veg.* ii. p. 399 (=var. *a*).

A. montana (*non Linn.*), *All. Fl. Pedem.* ii. p. 112 (=var. *a*).

A. saxatilis (*non Linn.*), *Lapeyr. Hist. abr. Pl. Pyr.* p. 234 (=var. *a*).

12. *A. VALENTINA*, *Boiss. Diagn. Pl. Or. Nov. Ser. II. i.* p. 90 (1854); *Willk. & Lange, Prodr. Fl. Hisp.* iii. p. 625.

Fruticulosa. Caules diffusi filiformes flexuosi teretes retrorsum papilloso-puberuli, alternatim ramosi, sæpe intricati. Folia lineari-subulata areolata-punctata, margine revoluta, subtus nervo valido instructa, basi ciliata ceterum glabra, rigida sed vix pungentia, patula vel recurva. Sepala ovata longe acuminata glabra, exteriora anguste, interiora late membranaceo-marginata. Petala oblongo-spathulata, calyce duplo longiora. Capsula valvis 6 dehiscens. Semina compresso-reniformia, obscure et obtuse tuberculata.

According to C. Pau, this plant is identical with *A. montana* var. *intricata*, which occurs in the northern part of the province of Valencia. But specimens of true *A. valentina*, which hitherto have been found only in the southern part of the province, certainly seem to differ from this variety of *A. montana*. Intermediate forms have not been collected.

Hab. Spain: southern part of prov. of Valencia.

Iconogr.— *Willk. Ic. descr. Pl. Rar. Hisp.* i. p. 97, t. 75 A.

13. *A. CINEREA*, *DC. Fl. Franç., Supplem.* p. 611 (1815); *Rouy & Fouc. Fl. de France*, iii. p. 245 (1896).

18 centim., cinereo-pubescent. Caules di-trichotomi diffusi. Folia inferiora oblongo-lanceolata basi plus minus ciliata, superiora lanceolata-lineararia, omnia acuta uninervia; axillis inferioribus

fasciculiferis. Flores dichotome paniculati; pedicelli calyce 5-6-plo longiores. Calyx ovato-cylindricus; sepala lanceolata acuta, margine basi ciliata, nervo post anthesin ciliato denticulato, interiora late scarioso-marginata, cetera anguste scarioso-marginata. Petala apice rotundata obtusa, calyce duplo longiora. Antheræ aurantiacæ. Capsula ventricosa ovoidea, calycem superans. Semina reniformia, dorso convexa, faciebus leviter excavata, obtuse tuberculata.

Prope *A. hispidam*, quæ staturâ minore, pubescentiâ longiore glanduloso-viscosâ, foliis lineari-lanceolatis glabris, pedicellis refractis, seminibusque duplo minoribus acuteque (nec obtuse) tuberculatis ab ea statim dignoscitur.

Described from specimens gathered at Castellane, in the department of Basses-Alpes. Included by E. Tanfani in Parlatore's 'Fl. Italiana,' but all the localities given are in French territory.

Hab. S.E. France: departs. of Basses-Alpes and Alpes-Maritimes.

Iconogr.—*Willk. Ic. descr. Pl. Rar. Hisp* i. p. 96, t. 64.

SYN. A. ruscifolia, Requier, in Guer. *Vaucl.* ed. 2, p. 254.

14. *A. HUTERI*, *Kern. in Oesterr. Bot. Zeitschr.* 1872, p. 368; *Tanf. in Parl. Fl. Italiana*, ix. p. 541.

Glanduloso-pubescent. Caules decumbentes, congesti in cæspitem laxum. Folia oblongo-lanceolata vel spathulata acuta uninervia ciliata. Flores solitarii vel geminati, rarissime dichasium triflorum efformantes; pedicelli calyce 3-5-plo longiores, glanduloso-pubescentes. Sepala anguste oblonga obtusiuscula navicularia anguste membranaceo-marginata pubescentia ciliata subnervia. Petala alba, late obovata, calyce duplo longiora, post anthesin fauce recurva. Antheræ pallide purpureæ. Semina reniformi-globosa granulata.

Affinis *A. gracili*, quæ differt cæspitibus densis, caulibus pedicellisque erectis glabris, foliis viridibus, bracteis subulatis, sepalis ovato-lanceolatis glabris lævibus, petalis basi longe attenuatis.

a. rupestris, *Huter & Porta*, exsicc. 1873.

β. glareosa, *Huter & Porta*, exsicc. 1873.

Var. *β* minus cæspitosa. Folia magis acuta. Flores sæpius geminati.

Described from authentic living specimens *in situ*, which flowered in Kew Gardens in 1896. It is quite distinct from *A. grandiflora* and *A. gracilis*.

Hab. Confines of S. Tyrol and Venetia at 700–1900 metres ; along the Cimolais Canal at Serra delle Gotte, Valley of Inferna, Valley of Bricca, Val Zelline in Udine, and (β) at Serra della Fontana.

Iconogr.—*Journ. Hortic.* ser 3, xxix. p. 369.

15. A. TMOLEA, *Boiss. Diagn. Pl. Or. Nov.* Ser. I. i. p. 50 (1842) ; *Fl. Orient.* i. p. 698.

β . macropoda, *Haussk.* pl. exs. in *P. Sintenis, It. Orientale*, 1890, no. 2844 b.

Planta puberula, 31 centim., floribus regulariter cymosis. Caudiculi longi. Folia 3-nervia.

Hab. Turkish Armenia : Egin, in prov. of Diarbekir.

γ . Sintenisii, *Haussk.* pl. exs. in *P. Sintenis, It. Orientale*, 1890, no. 2844.

Planta fere glabra, 18 centim., clarescenti-viridis. Bracteæ acuminatæ. Petala calyce duplo longiora.

Hab. Turkish Armenia : Egin, in prov. of Diarbekir.

δ . Kotschyana, *Fenzl* (sp.), in *Russegg. Reise*, ii. p. 930 (1843) ; *Boiss. Fl. Orient.* i. p. 699.

Folia sæpius glabra lanceolata vel linearia, nervis subtus magis prominentibus. Scapi 2–5-flori. Sepala sæpius glabra, elevatius carinata.

Hab. Mt. Taurus, in Cilicia ; and at Egin with the other two varieties (*P. Sintenis, It. Orient.* 1890, no. 2685).

Geogr. range.—*N.* Mt. Ak-dagh, in prov. of Siwas (*Bornmüller*, 1889, no. 990).

E. Turkish Armenia : Egin, in prov. of Diarbekir.

S. & W. Mt. Budrun (Halicarnassus), in Anatolia.

This species ascends to 3000 metres on Mt. Beryt-dagh, in the prov. of Marash.

16. A. ROTUNDIFOLIA, *Bieb. Fl. Taur. Cauc.* i. p. 343 (1808) ; *Boiss. Fl. Orient.* i. p. 700.

β . colchica, *Albaff, Prodr. Fl. Colch.* p. 36 (1895).

Densius cæspitosa, microphylla, nana. Caules 1–3 centim. Folia ovata. Cymæ 1–3-floræ, rarius subunifloræ ; floribus minutis.

Hab. Mt. Lekudeli in Mingrelia, and Mt. Okhaczkie above Samurzakania.

It has been observed in this species that, with the growth of

the branches of the stem and the lengthening of the internodes, the fasciculate leaves become discrete, so that it may be seen that between two pairs of large fully-developed leaves several pairs of smaller leaves are intercalated. Where the branches remain short and undeveloped, so that the upper portion of the flowering stem does not branch out, the stems are few-flowered, and such specimens were referred by Grisebach to *A. biflora*. Boissier, however, very properly referred them to this species, reducing them to the variety next mentioned.

γ. pauciflora, Boiss. *Fl. Orient.* i. p. 700.

Rami multum abbreviati 1–2-flori.

Hab. Mt. Olympus in Thessaly, and Mt. Scardus in Rumelia.
Geogr. limits.—*N.* Mt. Kazbek, in the Central Caucasus, at 2530 metres (*C. A. Meyer*, 1829).

S. Mt. Taurus, in Cilicia (*Kotschy*).

E. Afghanistan: district of Badakshan (*Regel*, *It. Turkestan.* 1882).

W. Montenegro: summit of Savin-Kuk, a peak of Mt. Durmitor (*Baldacci*, in *Malpighia*, 1891, p. 65); also in Albania, Mt. Nimereka in the district of Premeti (*Baldacci*, in *Bull. Herb. Boiss.* 1896, p. 619).

SYN. *A. biflora* (*non* Linn.), Griseb. *Spicil. Fl. Rumel. Bithyn.* i. p. 203.

A. transilvanica, Simk. in *Termés. Füv.* x. 1886, p. 180.

Euthalia rotundifolia, Rupr. *Fl. Caucasi*, p. 220.

17. *A. REDOWSKII*, *Cham. et Schlecht. in Linnæa*, i. p. 58 (1826); *Ledeb. Fl. Rossica*, i. p. 370.

Habitu etc., *A. ciliatam* revocat, sed caudiculis brevibus ramosis, caulibus floriferis simplicibus plerumque erectis gracilibus 1–2-floris, foliis caulinis remotioribus subacuminatis.

The species was founded on Kamtschatka specimens. Regel, who was able to examine specimens from other localities for the purpose of figuring the plant, draws attention to the 1-nerved sepals, and says that the petals are ovate-subrotund, not obovate-cuneate as in the original description, which must have been drawn up from more shrivelled specimens.

Geogr. limits.—*E.* Siberia.

N. & W. Between Jakutzk and Ochotzk.

E. Kamtschatka.

S. Ayan, on the coast.

Iconogr.—*Regel, Pl. Raddeanæ*, t. 9, in *Bull. Soc. Nat. Mosc.* 1862.

18. *A. LIBANOTICA*, *Kotschy, in Boiss. Fl. Orient.* p. 699 (1867); *Post, Fl. Syr.* p. 153 (1896).

Nana, tantum 22 mm. supra terram. Folia glabrescentia minima obovata carinata obtusa ad basin ramorum imbricata. Rami floriferi breves glanduloso-velutini 1-3-flori. Pedicelli calyce longiores. Sepala ovata obtusa glanduloso-hirsuta. Petala alba obovata calyce longiora.

Distinguished specifically by the small leaves imbricated at the base of the short branches. Mr. Post does not seem to have been able to obtain specimens, since he has not added any fuller characters to Boissier's somewhat fragmentary description. It is certainly one of the smallest species in the genus.

Hab. Mt. Lebanon, in Syria.

†† Petala basi longe attenuata.

19. *A. TOMENTOSA*, *Willk. in Linnæa*, xxv. (1852) p. 15; *Prodr. Fl. Hisp.* iii. p. 626.

Suffruticosa, tota crispato-tomentosa, cæsiocanescens. Caulis breves pumili erecti, simplices vel patule ramosi, teretes, cæspitem compactum fastigiatum formantes. Folia minuta 4-fariam imbricata oblonga obtusa recurva, nervo albido marginata, dorso nervoso-carinata. Flores 2-5 ad apicem cauliculorum aggregati, alii capitati, alii sub capitulo solitarii axillares; bracteæ ovato-lanceolatae obtusæ. Sepala inæquilonga lanceolata acuminata anguste membranaceo-marginata. Petala alba spathulata, calycem parum superantia.

Hab. Sierra Nevada in Andalusia, on the peak between Las Vertientes and Chirivel up to 1200 metres.

Iconogr.—*Willk. Ic. descr. Pl. Rar. Hisp.* i. p. 98, t. 65 D.

20. *A. GRACILIS*, *Waldst. et Kit. Pl. Rar. Hung.* iii. p. 305, t. 276 (1812); *Schloss. et Vukot. Fl. Croat.* p. 352.

β. *cretica*, *Spreng.* (sp.), *Syst. Veget.* ii. p. 396.

Superne glanduloso-hirtella. Folia elliptico-oblonga. Sepala oblongo-lanceolata.

γ. *intermedia*, *var. nov.*

Minus cæspitosa, 7-9 centim., puberula. Folia linearia magis acuta, margine scabra. Sepala ovalia. Petala oblonga apice rotundata (*Vandas, Fl. Herceg. australis, exsicc.* 1891).

δ. *Stygia*, Boiss. & Heldr. (sp.) *Diagn. Pl. Or. Nov. Ser.* II. i. p. 91 (1854); Boiss. *Fl. Orient.* i. p. 699.

Tota planta breviter velutino-viscida.

Geogr. limits.—N. Croatia.

S. Cyprus.

E. Cyprus.

W. Dalmatia.

Iconogr.—Waldst. & Kit. *Pl. Rar. Hung.* iii. t. 276; Sibth. *Fl. Græca*, t. 438 (*A. ciliata*); Reichb. *Ic. Fl. Germ. Helv.* 4945.

SYN. *A. densa*, Kit. ex Schlecht. in *Gesellsch. naturf. Fr. Berl. Mag.* vii. p. 200 (1813).

A. hirta (non Wormsk.), Sieber, ex Oken, *Isis*, 1828, p. 272 (= var. β).

b. Petala calyce breviora.

α. Species annuæ.

21. *A. GORGONEA*, J. A. Schmidt, *Beitr. Fl. Cap. Verd. Ins.* p. 278 (1852); Walp. *Ann. Bot.* vii. p. 298.

Glutinosa, pilis glandaliferis patentibus obsita. Caules ramossissimi adscendentes teretes subflexuosi. Folia acuta, inferiora in petiolum brevem attenuata ovato-oblonga, superiora ovato-lanceolata, margine ciliolata. Flores dichotomi. Sepala lanceolata acuminata, anguste membranaceo-marginata, apicibus recurva, petalis subduplo longiora. Petala alba ovata. Capsula valvis 6 dehiscens. Semina reniformia rugosa nigra.

Planta *A. serpyllifoliam* revocat, sepala autem uninervia et inter se homomorpha.

Hab. In sugar plantations, on the island of São Antão (St. Anthony) of the Cape Verd Islands, lat. 17°, long. 25° (1851).

This interesting endemic species is quite distinct from any of the forms of *A. serpyllifolia*.

22. *A. BENTHAMI*, Fenzl, in *herb. Benth.*, ex Torr. & Gray, *Fl. N. Amer.* i. Suppl. p. 675 (1840); *A. Gray*, *Pl. Wright.* ii. p. 18.

β. *diffusa*, var. nov.

Caules uno latere pubescentes, ramosi, 10–15 centim. Folia caulina cuspidato-acuminata subpungentia. (*Heller*, Pl. of S. Texas, no. 1686.)

Hab. Bear Creek, Kerr County (April 1894).

Geogr. area. S. United States: Texas and New Mexico.

SYN. *A. monticola*, Buckl. in *Proc. Acad. Sc. Philad.* 1861, p. 449.

β. Species perennes.

23. *A. ORBICULATA*, *Royle, ex Hook. f. Fl. Brit. Ind.* i. p. 240 (1874); *Duthie, List N. W. Ind. Pl.* p. 22 (1881).

Caules a basi ramosi; rami tenues dichotomi decumbentes fere glabri, 5–50 centim., uno latere lineato-puberuli. Folia orbiculata uninervia obtusa vel apiculata glabriuscula. Flores solitarii vel in cymis paucifloris. Sepala glabra, ovata vel lanceolata, nervo vix manifesto. Petala alba. Capsula valvis 3 bidentatis dehiscens. Semina reniformia, subtiliter granulata.

SYN. *A. serpyllifolia*, var., in herb. Royle.

A. muralis, Edgew. herb.

Geogr. limits.—Temperate Himalaya.

N. Ballal in Kashmir.

S. Sikkim.

E. Bhutan.

W. Kulu District of the Punjab.

24. *A. TENELLA*, *Duthie, ined. in Pl. Kumaon*, 1884, no. 2763.

Caules simplices, 9–12 centim., tenelli, breviter puberuli. Folia spatulato-lineararia uninervia acuminata papilloso-punctata glabriuscula. Flores solitarii, axillares et terminales. Sepala ovata subacuta papilloso-punctata subnervia late membranaceo-marginata. Petala obtusa.

Hab. N.W. India: Ralam Valley in Kumaon.

Described from specimens in Herb. Mus. Brit.

Subsectio 2.—Sepala 3-nervia vel (siccata) 3–5-nervia. Flores in cymas laxas paucifloras vel effusas dispositi, vel ramorum apice solitarii, vel glomerato-capitati (cymis abbreviatis).

a. Petala calycem æquantia, vel eo longiora.

α. Species annuæ. Flores cymosi vel rarius solitarii.

† Folia uninervia, aut subtrinervia nervis lateralibus rudimentariis vel obsoletis. Sepala haud obtusa.

25. *A. RETUSA*, *Boiss. Voy. Bot. Esp.* p. 99, t. 27 A (1839); *Willk. & Lange, Prodr. Fl. Hisp.* iii. p. 622.

Hab. Sierra Nevada, in Andalusia.

Iconogr.—*Boiss. l. c.*

26. *A. MODESTA*, *Duf. in Ann. Sc. Gén. Phys.* vii. p. 291 (1820); *Willk. & Lange, Prodr. Fl. Hisp.* iii. p. 622.

Forma typica. Semina obtuse tuberculata.

A. trachysperma, Willk. Semina acute tuberculata.

Species valde glutinosa, a formâ viscoso-pubescente *A. obtusifloræ* caute distinguenda.

Included in Parlatore's 'Fl. Italiana,' apparently for the ethnographical reason that it occurs in Corsica.

Geogr. limits.—*N.* France : dept. of Gard. *E.* Corsica.

S. Andalusia : Sierra Nevada, up to 1800 metres.

W. Andalusia : near Granada.

Iconogr.—Willk. *Ic. descr. Pl. Rar. Hisp.* p. 91, t. 62 A.

27. *A. CAPILLIPES*, Boiss. *Voy. Bot. Esp.* p. 98, t. 27 B (1839); Willk. et Lange, *Prodr. Fl. Hisp.* iii. p. 621.

Hab. Sierra Bermeja, in Andalusia, up to 1200 metres.

Iconogr.—Boiss. *l. c.*

28. *A. OXYPETALA*, Sibth. et Sm. *Fl. Græc. Prodr.* i. p. 303 (1806); Boiss. *Fl. Orient.* i. p. 704.

Geogr. limits.—*N. & W.* Greece : nome of Achaia.

S. & E. Syria : Mt. Lebanon, at Aïn-Sofa.

Iconogr.—Sibth. & Sm. *Fl. Græca*, v. p. 26, t. 437.

Boissier evidently misunderstood this figure of the plant, as he writes after his description of a new species, *A. Rhodia*,—"an eadem sit ac *A. oxypetala* e miserrimis hujus operis diagnosis absque iconis inspectione dignoscere nequeo."

29. *A. PAMPHYLICA*, Boiss. & Heldr. *Diagn. Pl. Or. nov.* Ser. I. viii. p. 102 (1849); Boiss. *Fl. Orient.* i. p. 704.

Tenera, pumila, patule hirtella, 7–15 centim. Caulis erectus, stricte et dichotome ramosus fere eglandulosus, superne laxè corymbosus, pauciflorus. Folia inferiora ovata vel deltoidea obtusa in petiolum brevem contracta, superiora elliptico-linearè acuta; pedicelli erecti setacei. Sepala lanceolata acuminata obsolete 5-nervia, late membranaceo-marginata. Petala obovata obtusa inferne longe attenuata, calyce $\frac{1}{3}$ longiora. Styli supra medium hirtello-papillosi. Capsula inclusa. Semina reniformia granulato-tuberculata.

A. modestæ hæc planta notis fere omnibus est simillima, diversa tamen est habenda ob inflorescentiam puberulam non glanduloso-pilosam et petala obovata non elliptico-oblonga; item ob folia caulina omnia plus vel minus ovata vel spathulato-elliptica non vero pleraque linearè.

β . *lycia*, Boiss. *Fl. Orient., Suppl.* p. 116 (1888).

Capsula calycem excedens. Planta magis nana.

Geogr. limits.—Asia Minor.

N. Amphitheatre of the town of Perge, in prov. of Anatolia.

S. Cyprus. *E.* Genova, in prov. of Cilicia.

W. Castelrosso, on the coast of prov. of Anatolia (var. β).

30. *A. SABULINEA*, *Griseb. in Russegg. Reise*, ii. p. 333 (1843); *Boiss. Fl. Orient.* i. p. 704.

Facies *A. controversæ* et *A. modestæ*, a præcedentibus foliorum formâ diversa.

Geogr. area. Turkey in Asia: in the provinces of Diarbekir and Orfah.

31. *A. ALGARBIENSIS*, *Welw. ined. in pl. exsicc.* (1851), ap. *Willk. Ic. descr. Pl. Nov. Hisp.* i. p. 91, t. 61 D (1853); *Walp. Ann. Bot.* iv. p. 255.

Gracillima, 3–7 centim. Caulis a basi ramosus; rami erecti simplices cauliformes teretes purpurascens, inferne glabri, mediatim puberuli, superne viscidis, patentim glanduloso-pubescentes. Folia minima glabra, margine ciliolata, lanceolata obtusa integerrima, nervo mediano valido purpurascens percursa, venis lateralibus obsoletis, patulo-erecta. Flores in dichasium dispositi; cymæ dichotomæ depauperatæ compositè sed laxius racemosæ; flores longissime pedunculati; pedicelli flexuosi capillares; bracteæ lanceolato-lineares obtusæ herbacæ glanduloso-ciliatæ. Sepala patentia lanceolata acuta anguste membranaceo-marginata, 5-nervia, dorso ad nervos et margine dense glanduloso-pubescentia. Petala obovato-cuneata emarginata, calyce duplo longiora, utroque dimidio triangulari. Antheræ flavæ. Semina reniformi-compressa ruguloso-tuberculata.

Hab. S. Portugal: prov. of Algarve.

Iconogr.—*Willk. l. c.*

32. *A. LIEBMANNIANA*, *Rohrb. in Linnæa*, xxxvii. (1871), p. 274; *Jacks. Ind. Kew.* i. p. 180.

Glauca. Caules adscendentes simplices graciles piloso-puberuli, 3–8 centim. Folia minima, lanceolata vel ovato-lanceolata mucronulato-acuminata, ad basin versus attenuata, margine ciliata, utrinque punctulato-scabrida. Flores solitarii vel in dichasium pauciflorum dispositi, longe pedicellati, pedicellis tenuibus. Sepala ovato-lanceolata mucronulato-acuminata

viridia punctulato-scabra, margine ad basin ciliata late scariosa. Petala alba ovato-oblonga obtusa, calycem superantia. Semina atra seriatim punctulata.

Hæc species inter Caryophyllaceas Mexicanas Liebmannianas sub no. 77 reperitur, nullus autem locus natalis in schedulâ propositus est. Itaque an hæc herba revera sit civis Mexicana adhuc est dubium.

Hab. Republic of Brazil.

†† Folia uninervia. Sepala apice incurva obtusa.

33. A. LOSCOSII, *Texid. in Losc. Trat. Pl. Aragon*, ii. p. 28 (1877); *Willk. Prodr. Fl. Hisp., Supplem.* p. 276 (1893).

Glanduloso-pubescent, cinereo-virens, viscida. Caules a basi dichotomo-ramosi. Folia oblongo-lanceolata vel oblongo-linearia acuta, basi attenuata utrinque fimbriato-ciliata. Cymæ dichasiiformes terminales laxissimæ; flores stricte pedicellati, pedicellis sub anthesi erectis, postea patentibus. Sepala oblonga navicularia, anguste membranaceo-marginata, dorso margineque fimbriis articulatis acutis obsita. Petala alba obovata, calyce duplo longiora. Antheræ atro-purpureæ. Capsula ovoideo-conica. Semina reniformia, acute tuberculata.

Geogr. area.—E. Spain.

N. Monserrat in Catalonia (*Tremols*, Pl. exs. Cat.).

E. Monistrol in Catalonia (*Vayr.* Pl. Not. Cat.).

S. & W. Serrania de Cuença in New Castile (*Diek*, 1892).

Iconogr.—*Willk. Illustr. Fl. Hisp.* i. (1883) t. 62 v.

SYN. *A. modesta*, var. *Assoana*, Losc. et Pard. (*ex parte*).

34. A. CILIARIS, *Losc. Trat. Pl. Aragon*, i. p. 69 (1876); *Willk. Prodr. Fl. Hisp., Supplem.* p. 276 (1893).

Gracilis, pulverulento-puberula. Caules sæpe a basi ramosi violascentes, ramis dichotomis. Folia oblongo-linearia, basi attenuata, fimbriato-ciliata, fimbriis articulatis obtusis albis. Cymæ dichasiiformes terminales laxissimæ; bracteæ ad basin fimbriatæ; pedicelli erecti. Sepala oblonga navicularia, late membranaceo-marginata, exteriora 3 a basi ad medium fimbriata. Petala alba obovato-elliptica, calyce duplo longiora. Antheræ roseo-purpurascens. Capsula globoso-conica. Semina reniformia, obtuse tuberculata.

Hab. Aragon and New Castile.

N. S. Aragon: Peña Palomera (*Arenaria* no. 382 ex *Asso*, Syn. Stirp. Aragon. [1779]).

S. New Castile: valley of river Gabriel (*Mme. Blanca de Catalan*, 1879).

E. S.E. Aragon: Cantavieja (*Loscos*, 1876).

W. Aragon: Albarracin (*Rev. Padre Zapater*, 1879).

Iconogr.—*Willk. Illustr. Fl. Hisp.* i. p. 96, t. 62 A (1883).

SYN. *A. modesta*, var. *Assoana*, *Losc. et Pard.* (ex parte).

††† Folia plurinervia. Sepala apice recta acuta.

35. A. CONFERTA, *Boiss. Diagn. Pl. Or. nov.* Ser. I. i. p. 51 (1842); *Fl. Orient.* i. p. 702.

Velutino-cinerascens, pumila. Caules 5–13 centim., foliosi purpurascens, apice 1–3 fasciculos confertifloros ferentes, numerosi. Folia parva ovata acuta 5–7-nervia. Pedicelli stricti hispidi. Sepala lanceolata carinato-trinervia hispida anguste membranaceo-marginata. Petala ovata obtusa. Semina reniformi-globosa tuberculata.—Annuua vel biennis.

Described from Prof. Haussknecht's specimens from Mt. Pindus.

Hab. Turkey: Mt. Olympus in Macedonia, Mt. Zygos in Epirus (*Haussknecht*, in *Mittheil. Thüring. Bot. Ver.* 1893, p. 57); Mt. Cika near Delvino in Albania (*Baldacci*, in *Bull. Herb. Boiss.* 1896, p. 619).

β. Species perennes.

† Flores solitarii, vel rarius cymis paucifloris (vulgo trifloris).

36. A. INCRASSATA, *Lange, Pl. Nov. Hisp.* fasc. i. p. 3, t. 4. f. 2 (1864); *Willk. & Lange, Prodr. Fl. Hisp.* iii. p. 624.

Laxe cæspitosa, dense hirtella. Caules numerosi diffusi prostrati adscendentes fragillimi tetragoni. Folia elliptica vel elliptico-lanceolata subglanduloso-hispida, margine valde cartilagineo-incrassata, rigida, cuspidato-acuminata, nervo mediano subtus valde prominulo excurrente, basi angustata barbato-ciliata, plerumque decussato-imbricata. Cymæ plerumque trifloræ; pedicellis hirtellis. Sepala ovata cuspidata membranaceo-marginata. Petala obovato-spathulata, calyce vix duplo longiora. Capsula 6-dentata. Semina reniformia granulata.

β. glabrescens, *Willk. & Lange, Prodr. Fl. Hisp.* iii. p. 624.

Folia caulina basi ciliolatâ exceptâ utrinque glaberrima, surcu

lorum sterilium laxius disposita, vix imbricata, omnia tenuiora margine minus incrassata.

Geogr. area. N. & Central Spain, and Majorca in the Balearic Isles.

Iconogr.—*Lange, Pf. Nov. Hisp.* fasc. i. t. 4. f. 2.

SYN. *A. Bourgaeana*, Coss. *ex Willk.* in *Linnaea*, 1876, p. 117 (var. β).

37. *A. RACEMOSA*, *Willk.* in *Bot. Zeit.* v. p. 239 (1847); *Prodr. Fl. Hisp.* iii. p. 627.

Specimens labelled *A. hispida*, Linn., in Salzmann's herbarium, stated to be found at Trapani in Sicily, were described by Presl under the name of *A. Salzmanni*. The description appears rather to tally with that of *A. racemosa*, but E. Tanfani states that no plant answering this description has since been found or recorded in the district; so that the matter remains in doubt for the present. The specimens on which the species is founded were collected by Cabrera "in montibus Bæticæ," and are labelled *Arenaria saxatilis* in Hänseler's herbarium. Similar specimens were collected by Perez Lara at Grazalema in Andalusia, and this is the only precise locality known for the plant.

Iconogr.—*Willk. Ic. descr. Pl. Rar. Hisp.* i. p. 97, t. 65 c.

38. *A. ERINACEA*, *Boiss. Voy. Bot. Espagne*, ii. p. 103, t. 29 A; *Willk. & Lange, Prodr. Fl. Hisp.* iii. p. 627.

Hab. Sierra de Leon, in Leon; Sierra de las Nieves, Sierra de Lujar, and Sierra Tejada up to 2000 metres, in Andalusia.

Iconogr.—*Boiss. l. c.*

SYN. *A. aggregata* (non Loisel), *Boiss. El. Plant.* p. 23 (1838).

39. *A. TETRAQUETRA*, *Boiss. Voy. Bot. Espagne*, ii. p. 103, t. 29 B (1839-45); *Willk. & Lange, Prodr. Fl. Hisp.* iii. p. 627.

Basi suffruticosa, cæspites compactos depressos glauco-virentes formans, nana. Folia minima connato-vaginantia recurva ovata canaliculata carinata, apice rotundata, margine incrassata, basi ciliolata, ceterum glabra. Flores terminales solitarii sessiles, foliis supremis bracteiformibus calyce brevius stipati. Sepala oblongo-lanceolata obtusa ciliolata, dorso nervoso-striata. Petala spathulato-lanceolata alba, calycem superantia. Capsula dentibus 6 dehiscens. Semina tuberculata.

It would be absurd to cite Linnæus as the authority for this species. I would refer the pedantic purist, in the matter of

such specific names, to what Mr. Ball says in his remarks on *Cerastium glomeratum*, Thuill., in the course of his paper on the Flora of the Peruvian Andes. He writes: "It is, I think, time for botanists to free themselves from the servitude of adhering to a Linnean name when the object to which the name properly belongs is involved in confusion, and the practice serves only to prolong profitless controversy. Every one knows what is meant by *Cerastium glomeratum*, Thuill., but who is quite sure as to *Cerastium vulgatum*, Linn.?"

a. granatensis, Boiss. *Elench. Pl.* no. 34 (1840).

Hermaphrodita, floribus pentameris.

β. pyrenaïca, Boiss. *Elench. Pl.* no. 34 (1840).

Forma 1, legitima, Gren. et Godr. *Fl. de France*, i. p. 262.

3-6 centim., polygama, floribus pentameris.

Forma 2, condensata, Gren. et Godr.

Minor, polygama, floribus tetrameris, caulibusque abbreviatis.

Geogr. limits.—The Pyrenees (both French and Spanish sides), and Sierra Nevada in Andalusia, up to 3330 metres.

Iconogr.—Boiss. *Voy. Bot. Espagne*, ii. t. 293; drawing in Herb. Kew. by Prêtre (1824).

SYN. *A. amabilis*, Bory, in Ann. Gén. Sc. Nat. Phys. iii. p. 5 (1820).

A. decussata, Salisb. Prodr. p. 299.

A. imbricata (non Bieb.), Lag. Prodr. in Anal. Cienc. Nat. v. p. 278 (1802).

40. *A. GRAVEOLENS*, Schreb. in *Nov. Act. Nat. Curios.* iii. p. 478 (1767); Boiss. *Fl. Orient.* i. p. 700.

β. grandiflora, Boiss. *Fl. Orient.* i. p. 701.

Habitu notabiliter laxa; petala calyce duplo longiora.

γ. glabrescens, Boiss. *Fl. Orient.* i. p. 701.

Folia minus pubescentia. Sepala glabra tuberculata.

Hab. Anatolia: Mt. Manissa-dagh (on vertical precipitous cliffs) between Smyrna and Manissa (Magnesia).

Post (*Fl. Syr.*) mentions a var. *minuta*, but the plant does not seem to differ from the type, except in the somewhat smaller flowers. The forms which are recorded from Greece and Rumelia, and which are narrow-leaved, should be referred to *A. filicaulis*.

Geogr. limits.—*N.* Island of Scio, in the Turkish Archipelago.

S. Mt. Sinai (*A. deflexa*, Decne. in Ann. Sc. Nat. 1835, p. 277).

E. Zebedâni, in the Anti-Lebanon.

W. Island of Crete.

SYN. *A. deflexa*, Decne. l. c.

A. muralis, Sieb. pl. exs. ex Spreng. Syst. Veg. ii. p. 397 (1825).

A. papillosa, Steud. Nomencl. ed. 2, i. p. 126.

A. pubescens, Urv. in Mém. Soc. Linn. Par. i. p. 306 (1822).

A. rhodia, Boiss. Diagn. Pl. Nov. Or., Ser. I. i. p. 52.

A. sipylea, Boiss. l. c. p. 51.

41. *A. FILICAULIS*, Fenzl, in Griseb. Spicil. Fl. Rumel. Bithyn. i. p. 203 (1843).

α. *rumelica*, Williams.

SYN. *A. graveolens*, var. *Athoa*, Boiss. Fl. Orient. i. p. 701.

A. graveolens, var. *nervosa*, Hal. & Charrel, in Oesterr. Bot. Zeit. 1892, p. 272.

Folia perparva lanceolata. Sepala subtrinervia. Capsula calyce sublongior.

Hab Mt. Athos, in Rumelia; also Mt. Pournar-dagh.

β. *græca*, Williams.

SYN. *A. graveolens*, var. *græca*, Boiss. Fl. Orient. i. p. 701.

Folia majora angustiora præ longitudine. Sepala ovato-oblonga tenuiter striato-5-nervia. Capsula inclusa.

Hab. Greece, Crete, and Anatolia.

Though this species is united with the preceding by Boissier and others, I think that the narrow-leaved forms should be separated from the broad-leaved forms, as they differ materially in other respects.

Geogr. limits.—S. Crete.

N. & E. Mt. Kapu-dagh, on the north coast of prov. of Anatolia (*Sintenis*, It. Trojanum, 1883, no. 502).

W. Khelmos, in the nome of Achaia, Greece.

†† Flores glomerato-capitati.

42. *A. ARMERIASTRUM*, Boiss. Elench. Pl. Hisp. p. 22, n. 35 (1838); Willk. & Lange, Prodr. Fl. Hisp. iii. p. 625, Supplem. p. 277.

α. *elongata*, Boiss. Elench. Pl. Hisp. p. 22.

Laxe cæspitosa. Caules filiformes erecti, 10–20 centim. Folia propter internodia elongata iis multò breviora, surculorum steriliū elongatorum laxè aut vix imbricata. Sepala valde nervosa.

β. *frigida*, Boiss. Elench. Pl. Hisp. p. 22.

Dense cæspitosa, surculis abbreviatis. Folia surculorum dense

imbricata. Capitula subsessilia pauciflora, vel flores subsolitarii. Sepala subnervia glabrescentia.

γ. cæsia, *Boiss. Elench. Pl. Hisp.* p. 22.

Laxe cæspitosa, tota pubescentia crispula densa cæσιο-pruinosa. Caules elongati. Capitula pedunculata. Sepala stricta valde nervoso-striata sublanata.

Geogr. limits.—N. Murcia : Sierra d'el Muguñón (*Porta et Rigo*, exs. 1890).

S. & W. Andalusia : Sierra de Ronda (*Rouy*, 1881).

E. Valencia : Sierra Mariola (*Leresche*, 1881).

All three of these stations are an extension of the range of the species as given by Willkomm and Lange in 1878.

Iconogr.—*Boiss. Voy. Bot. Esp.* p. 102, t. 30.

43. A. CAPITATA, *Lam. Fl. Franç.* iii. p. 39 (1778); *Willk. & Lange, Prodr. Fl. Hisp.* iii. p. 626.

β. querioides, *Willk. in Bot. Zeit.* v. p. 239 (1847).

Dense retrorsum tomentosa, canescens. Folia latiora, caulina superiora cordato-ovata, subrevoluta glabra.

This is the species described under *Saponaria* no. 5 in Linn. Hort. Upsal. p. 107, which had previously been figured by Magnol in 'Hortus Regius Monspelienensis,' p. 53, t. 5 (1697), from specimens gathered in the Cevennes mountains. Nyman (Consp. p. 116) erroneously quotes *A. aggregata*, Lamk., instead *A. capitata*. It has been pointed out above how it is impossible to keep up the species usually cited as *A. tetraquetra*, Linn.

Geogr. limits.—N. Piedmont : Col di Tenda in the Maritime Alps (*Gypsophila aggregata*, Linn.).

E. Liguria : Mt. Carmo in the Maritime Alps (*Gentili* ap. *Tanfani*).

S. Prov. of Murcia ; Sierra de Alcaraz (the specimens figured by Barrelier).

W. N. Portugal (*ex* Nym. Consp. Fl. Eur., *A. tetraquetra*, Brot.).

Iconogr.—*Barrel. Pl. Gall. Hisp. Ital.* 595 (1714) (*Rubeola montana*); *All. Fl. Pedem.* t. 89. f. 1 (1785); *Gay in Ann. Sc. Nat. Bot.* iv. t. 4 (1828); *Reichb. Ic. Fl. Germ. Helv.* 4952 (*Plinthine aggregata*); drawing in Herb. Kew. by Prêtre, 1824 (*A. tetraquetra* var. *aggregata*).

Syn. *A. aggregata*, Loisel. Fl. Gall. i. p. 317.

A. Allionii, Rausch. Nomencl. ed. 3, p. 130.

A. querioides, Pourr. *ex* Willk. in Bot. Zeit. v. p. 239 (1847).

A. tetraquetra, All. Fl. Pedem. ii. p. 115.

A. tetraquetra var. *aggregata*, Reichb. Syst. Plant. ii. p. 359.

Gypsophila aggregata, Linn. Sp. Plant. p. 406.

Plinthine aggregata, Reichb. Ic. Fl. Germ. Helv. 4952.

Rubeola montana, Barrel. Pl. Gall. Hisp. Ital. 595.

Stellaria muralis, Link, Enum. Hort. Berolin. i. p. 429.

44. *A. PSEUDARMERIASTRUM*, *Rouy, Exc. Bot. in Bull. Soc. Bot. France*, xxix. p. 46 (1882); *Willk. Prodr. Fl. Hisp., Supplem.* p. 277.

Fruticulosa, glauca. Caules 25–50 centim., elongati numerosi teretes graciles intricati fere filiformes, adscendentes vel erecti pruinoso-puberuli. Folia brevia coriacea, basi vaginantia connata lineari-subulata cuspidata patula, supra canaliculata glabra, subtus convexo-carinata puberula, nervo calloso valido margine incrassato-cincta. Flores in capitula densa congesti; bracteæ ovali-lanceolatæ mucronatæ, margine ciliatæ, dorso nervoso-striatæ puberulæ, cum summis foliis involucratæ. Sepala elongato-lanceolata subulato-acutata nervoso-marginata, dorso nervoso-striata puberula. Petala spathalata, calycem æquantia. Antheræ albidæ. Capsula valvis 6 dehiscentes. Semina tuberculata.

Distinguished from the preceding by its glomerules of flowers half the size, petals equalling the sepals, leaves shorter and less recurved, and the flowering-stems numerous and intricate.

Hab. Spain: Vallidigna, in prov. of Valencia (*Rouy*, 1880).

b. Petala calyce breviora.

α. Species annuæ vel biennes (*i. e.* monotocæ).

† Flores cymosi, in ramulis interdum depauperati ad florem unicum reducti.

45. *A. SERPYLLIFOLIA*, *Linn. Sp. Plant.* p. 423 (1753); *Willk. & Lange, Prodr. Fl. Hisp.* iii. p. 620.

aa. E glandulosæ. Pedicelli calyce 2–3-plo longiores.

α. scabra, *Ledeb. Fl. Rossica*, i. p. 369 (1842).

Glauca, totâ pube minutissimâ scabrâ. Pedicelli fructiferi erecti.

β. alpina, *Gaud. Fl. Helvetica*, iii. p. 192 (1830).

Planta humilior, viridis vel flavicans, pubescentia longiore. Flores in paniculam densam dispositi. Sepala longius acuminata,

interiora angustius membranaceo-marginata. Capsula oblongo-ovoidea, minus ventricosa.

bb. Glandulosæ. Pedicelli calycem subæquantes, vel eo tantum sesquilingiores.

γ. macrocarpa, *Lloyd, Fl. Loire-Inf.* p. 42 (1844).

Viridis, scabra. Caules 2–10 centim. Panicula deusa, brevis; pedicellis fructiferis erectis, calycem æquantibus. Sepala nervis densatis instructa. Capsula quam in typo lentior.

δ. gracillima, *Willk. & Lange, Prodr. Fl. Hisp.* iii. p. 620.

Pusilla, tenera. Caules 2–10 centim., ob internodia abbreviata eleganter distichophylla. Folia minima sed internodia superantia. Flores dimidio minores quam in var. *α*, in cymam subcorymbosam dispositi. Sepala interiora subuninervia (nervis lateralibus fere obsoletis). Semina dimidio minora.

cc. Glanduloso-pilosæ. Pedicelli calyce 2–3-plo longiores.

e. patula, *Martr.-Don.* (sp.) *Fl. Tarn*, i. p. 107 (1864).

Viridis. Rami diffusio-patentes. Pedicelli fructiferi repando-patentes.

ζ. alpicola, *G. Beck, in Ann. k.-k. Naturhist. Hofmus.* vi. p. 326 (1891).

Tota copiose glanduloso-pilosa; planta ramosissima multiflora procumbens. Sepala ovata acuminata multinervia viridia, interiora membranaceo-marginata. Petala elliptica, calyce tertia breviora. Semina squamato-verrucosa.

dd. Glandulosæ. Pedicelli calyce sesquilingiores.

η. viscidula, *Roth, Enum. Pl. Germ.* ii. p. 318 (1827).

Minor, glauca, superne tantum glanduloso-pilosa. Pedicelli erecti. Capsula latior, fere subglobulosa.

Hæc herba verum est species polymorpha, quoad internodiorum longitudinem, foliorum figuram, florum magnitudinem et dispositionem atque indumentum valde varians.

As in the case of *A. grandiflora*, the grouping (and sequence) of the many variable forms of this species into seven varieties is based on examination of the very copious material in the Vienna Herbarium. It is a common plant of wide distribution over Europe, Asia, and North Africa; introduced into North America, but scarcely naturalized there.

On English hills it ascends to 600 metres; on the Great

St. Bernard in the Swiss Canton of Valais it occurs at 2450 metres, and near Bergamasco in Piedmont it reaches 2500 metres in the Caucasus it is found up to 1830 metres. In geographical range the species does not extend so far beyond the Arctic Circle as *A. ciliata*.

Geogr. limits.—*N.* Norway, lat. 69° (*Norman*). *S.* Socotra.

E. China: by the stream Tchín-teou-yn near Tali, in prov. of Yun-nan (*Delavay*, 1884, no. 910, ex *Franch.* in Bull. Soc. Bot. France, xxxiii. p. 429 (1886)).

W. Ireland: county of Mayo.

Iconogr.—*Var. α*, *Fuchs*, *Hist. Stirp. Comm.* (1542), p. 20, t. 23 (under the name of *Alsine minor*,—the earliest notice and figure of a plant of *Arenaria*); *Engl. Bot.*, (ed. 1) t. 923, (ed. 2) t. 642, (ed. 3) t. 235; *Fl. Danica*, t. 977; *Tenore*, *Fl. Napol.* iv. p. 222, t. 228. fig. 3 (*A. sphærocarpa*); *Reichb. Ic. Fl. Germ. Helv.* 4941; *Willk. Ic. descr. Pl. Rar. Hisp.* i. t. 63 c; *Curt. Fl. Lond.* ii. t. 51; *Schkuhr, Bot. Handb.* t. 122.

Var. γ, *Willk. Ic. descr. Pl. Rar. Hisp.* i. t. 63 A, p. 95.

Var. δ, *Willk. l. c.* t. 63 B.

SYN. *Arenaria breviflora*, Gilib. *Fl. Lituan.* ii. p. 155.

A. cantabrica, Amo, *Fl. Iber.* vi. p. 140 (*var. δ*).

A. Lloydii, Jord. *Pugill.* p. 37 (*var. γ*).

A. Marschlinii, Koch, in *Flora*, 1841, ii. p. 509 (*var. β*).

A. sphærocarpa, Martr. *Fl. Tarn*, p. 107 (*non Ten.*) (*var. ε*).

A. sphærocarpa, Ten. *Viagg. Bot. Abruzz.* p. 66 (1832) (*var. a*).

A. uralensis, Pall. ex Spreng. *Syst. Veg.* ii. p. 396 (*var. η*).

A. varia, Dulac, *Fl. Hautes-Pyr.* p. 249.

A. viscida, Hall. f. ex Loisel. *Not. Pl.* p. 68 (*var. η*).

A. Wallichiana, Ser. in *Cand. Prodr.* i. p. 411.

Alsine serpyllifolia, Crantz, *Instit.* ii. p. 406.

Alsinella serpyllifolia, S. F. Gray, *Nat. Arr. Pl.* ii. p. 665.

Alsinanthus serpyllifolius, Desv. *Journ. Bot.* 1814.

Euthalia serpyllifolia, Rupr. *Fl. Caucasi*, p. 220.

Stellaria serpyllifolia, Scop. *Fl. Carn.* (ed. 2) i. p. 319.

46. *A. LEPTOCLADOS*, *Guss. Fl. Sic. Syn.* p. 284 (1845); *Willk. & Lange, Prodr. Fl. Hisp.* iii. p. 620.

α. scabra, *Rouy & Fouc. Fl. de France*, iii. p. 242 (1896).

Pubescenti-scabra, eglandulosa. Panicula fere laxa, floribus parvis.

β . viscidula, *Rouy et Fouc. Fl. de France*, iii. p. 242 (1896).

Glanduloso-pubescentis. Panicula minus laxa, floribus parvis.

γ . minutiflora, *Losc. (sp.) Tratat. Pl. Aragon*, i. p. 21 (1876).

Dense glanduloso-puberula ideoque subcinerea. Ramosissima diffusa floribunda, floribus autem perparvis.

Ab *A. serpyllifolia* hæc varietas (γ) cui similis, differt floribus 3-4-plove minoribus oculo nudo vix perspicuis, sepalis acuminato-subulatis, inæqualibus, capsulâ longioribus; petalis calyce dimidio brevioribus, capsulâ triplo minore, ovoidea basi non ventricosa, membranacea, inter digitos compressibili et facillime rumpente, seminibus duplo minoribus, dorso tuberculis acuminatis hispidulis.—Primo intuitu discernitur copiosa pubescentia glutinosa, caulibus intricato-ramosissimis flexibilibus, foliis parvis mollibus submembranaceis, pellucido-punctatis, floribus perparvis: planta erectiuscula vel diffusa, usque ad 20 centim et ultra.

δ . crassifolia, *Freyn, Fl. Süd. Istr.* p. 252 (1877-78); *Marchesetti, Fl. Trieste*, p. 72 (1896-97).

Caules magis fragiles, glandulosi. Folia crassa. Pedicelli abbreviati.

Mr. François Crépin has observed that this plant, growing in similar localities to those where *A. serpyllifolia* is found, seems quite distinct, and that its characters are fixed and constant. Maximowicz says that this species is the more common of the two in Siberia, though the plant is usually recorded under the name of *A. serpyllifolia*. In Japan it is the only representative of the genus recorded up to the present. Mr. R. Yatabe's specimens of *A. platysperma* belong to *Moehringia*.

Geogr. limits.—*N.* Siberia (*Maximowicz*). *S.* Algeria.

E. Japan (*Franchet*). *W.* Ireland (Galway).

Iconogr.—*Reichb. Ic. Fl. Germ. Helv.* 4941 β ; *Sô mokou Zoussetz*, viii. p. 68 (O. Wakobe).

SYN. *A. grandiflora* (*non* Linn.), *Tornab. Fl. Sic.* p. 151, et *Fl. Aetnea*, p. 169.

A. serpyllifolia, *Guss. Fl. Sic. Syn.* i. p. 495.

Alsine leptoclados, *Calc. Desc. Is. Lin.* p. 22.

47. *A. CASSIA*, *Boiss. Diagn. Pl. Or. nov. Ser. I.* viii. p. 101 (1849); *F. Orient.* i. p. 702.

Pubescenti-scabra. Caules decumbentes dichotome paniculato-ramosi. Folia ovato-spathulata obtusa mucronulata subsessilia plurinervia tuberculato-punctata. Flores in dichasium dispositi;

pedicelli erecti, calyce duplo longiores. Sepala late ovata scabrido hirsuta, exteriora 5-nervia, interiora et intermedium 3-nervia. Petala oblonga, calyce triplo breviora. Capsula ventricosa ovata, in collum exsertum abrupte attenuata. Semina reniformia, tuberculata.

A. serpyllifolia affinis, differt caulibus brevioribus decumbentibus, foliis obtusioribus, sepalis latioribus plurinerviis, capsulâ duplo majori (5 mm. long.) in collum attenuatâ, seminibus triplo majoribus. Culta in Horto Boissieriano characteres servavit.

Hab. N. Syria: the wooded heights of Mt. Cassius and the cedar region of Mt. Lebanon.

48. *A. NEVADENSIS*, *Boiss. Diagn. Pl. Or. nov. Ser. II. i. p. 90* (1854); *Willk. & Lange, Prodr. Fl. Hisp. iii. p. 619.*

Annua, humilis, obscure virens, tota calyce excepto viscido-puberula. Radix prælonga obliqua cylindrica. Caulis 5-8 centim., erectus robustus, e nodis inferioribus approximatis ramos patulos strictos robustos cauliformes teretes edens. Folia subtrinervia; inferiora patula ovata in petiolum brevem subvaginantem attenuata, obtusa, sæpe amœne purpurascens; cetera adpressa lineari-lanceolata minus obtusa sessilia canaliculata. Flores inconspicui, ad apicem ramorum conferti corymboso-cymosi; pedicelli erecti; bracteæ lineares uninerviæ omnino herbaceæ. Sepala lanceolata obtusa membranaceo-marginata ciliolata, dorso nervoso-striata. Petala alba oblonga obtusa, calyce triplo breviora. Capsula ovato-oblonga, dentibus 6 debiscens. Semina reniformia, transverse ruguloso-tuberculata.

Hab. Andalusia: the peak of Mulahacen on Sierra Nevada.

Iconogr.--*Willk. Ic. descr. Pl. Rar. Hisp. p. 94, t. 62 D.*

49. *A. TREMULA*, *Boiss. Diagn. Pl. Or. nov. Ser. I. viii. p. 101* (1849); *Fl. Orient. i. p. 702.*

Inferne pruinoso-scabridula, 15-22 centim. Caules 1-3, dichotome ramosi, effuse cymosi. Folia oblonga acuta subsessilia. Pedicelli rigidi capillares. Sepala ovato-oblonga acuminata 3-nervia glabra late membranaceo-marginata. Petala oblonga, calyce triplo breviora. Semina reniformi-globosa, ruguloso-tuberculata.

Planta facie *Lini cathartici*; capsulam magnam habet *A. serpyllifolia* a quâ differt inflorescentiâ valde effusâ, calyce glabro, et seminibus triplo majoribus.

Hab. On the wooded heights of Mt. Cassius in N. Syria, and in the gorge of Guzuldere on the coast of Cilicia.

50. *A. MACROSEPALA*, *Boiss. Diagn. Pl. Or. nov.* Ser. I. i. p. 52 (1842); *Fl. Orient.* i. p. 703.

β . *minor*, *Boiss. Fl. Orient.* i. p. 703.

Planta minor, cymis magis confertis. Calyx tantum 4 mm. longus. Petala calyce triplo minora.

Planta facie *Saponariam viscosam* revocat, cujus flores eis *A. serpyllifoliae* triplo majores.

Mr. Ball's specimens considerably extend the range of this species.

Geogr. limits.—*N.* Anatolia, between Karaghieulderé and Ushak.

W. (var. β). Anatolia, between Ushak and Yachamich-larkeui.

S. & E. Mt. Lebanon, in Syria (*Ball, It. Orientale*, 1877, no. 1683, no. 1997).

SYN. A. saponarioides, *Boiss. & Bal. Diagn. Pl. Or. nov.* Ser. II. vi. p. 35 (var. β).

51. *A. CONICA*, *Boiss. Voy. Bot. Espagne*, ii. p. 98, t. 31 B (1839-45); *Willk. & Lange, Prodr. Fl. Hisp.* iii. p. 621.

Specifically distinct in the form of the closed calyx, in which it differs further from *A. emarginata* in having acute sepals provided with three nerves ciliated on the dorsal surface.

Hab. Andalusia: Niebla and Malaga.

Iconogr.—*Boiss. l. c.*

52. *A. ORBICULARIS*, *Vis. Fl. Dalmatica*, iii. p. 180 (1850), et *Suppl.* p. 131, t. 5; *Nym. Consp. Fl. Eur.* p. 114.

Annua. Caules filiformes gracillimi puberuli subramosi, superne floridi nudi. Folia orbiculata mucronulata petiolata punctata tenuia piloso-ciliata venoso-reticulata, basi 3-nervia; floralia angusta linearia. Flores in dichasium gracile dispositi. Sepala æquilonga lineari-lanceolata acuminata 5-nervia; inter nervos transverse venulosa, interiora solum membranaceo-marginata. Petala oblongo-ovata. Capsula dentibus 6 obtusis dehiscens. Semina reniformia ruguloso-muricata.

Ab *A. rotundifolia* differt, pedicellis terminalibus nec lateralibus, divisionum loco foliis binis linearibus, nec orbicularibus ut reliquis plantæ foliis.

Hab. Mt. Velebith, in Dalmatia.

Iconogr.—*Vis. l. c.*

†† Flores subsessiles, capitato-congesti. Capsula ovata sulcata.

53. *A. NANA*, *Boiss. & Heldr. Diagn. Pl. Or. Nov. Ser. I. viii.* p. 103 (1849); *Boiss. Fl. Orient. i.* p. 703.

Annua; nana, glanduloso-hirta. Caules 1-3, tantum 21 mm. longi, erecti simplices. Folia ovato-oblonga obtusa 5-7-nervia. Cyma conferta 1-5-flora, foliis summis involucrata. Sepala oblonga acuta 3-5-nervia navicularia apice recta. Petala ovata, calyce 3-plo breviora. Semina granulata, reniformi-compressa.

Hab. Crete; also Cyprus (*Sintenis and Rigo*, *It. Cyprium*, 1880, no. 762).

††† Flores subsessiles, corymboso-fasciculati. Capsula anguste cylindrica.

54. *A. GUICCIARDII*, *Boiss. et Heldr. Diagn. Pl. Or. Nov. Ser. II. v.* p. 60 (1856); *Boiss. Fl. Orient. i.* p. 703.

Annua; pubescenti-scabra, pilis plerumque retrorsis, superne sæpe transversis. Caudex simplex vel a collo sæpius pluricaulis. Caules nani erecti simplices, tantum 23 mm. longi. Folia ovato-oblonga acuta plurinervia, inferiora in petiolum attenuata, superiora sessilia angustiora, ciliata; bracteæ a foliis haud distinguendæ. Calyx angustus; sepala lanceolata acuminata scabra 3-nervia valde nervosa, apice recurva anguste scarioso-marginata. Petala oblonga, calyce 3-plo breviora. Capsula dentibus 6 obtusis dehiscens. Semina rugoso-tuberculata nigra, reniformia vix compressa, dorso plana vel leviter sulcata.

Ab *A. nana* præsertim differt, foliis acutis, sepalis apice acuminatis recurvis nec rectis; facies autem verum *Alsines*; ab omnibus speciebus sectionis *Euthaliæ* capsulâ anguste cylindricâ facile dignoscenda.

There is no specimen of this interesting and distinct species in *Herb. Kew.* or *Herb. Mus. Brit.*; so that the above description is drawn up from specimens kindly sent by Dr. Th. von Heldreich from his own herbarium, which were gathered in the *locus classicus*. At first glance the plant certainly more resembles an *Alsine*, but an examination of the capsule shows that it dehisces by six short equal teeth. In three capsules from different specimens there were respectively 7, 9, and 13 seeds. The capsules were firmly closed, so that I do not think that any had escaped. Prof. von Heldreich points out that the plant was discovered on Mt. Parnês in Attica by his old friend T. Guicciardi in 1854, and not by

himself as stated by Boissier. The species cannot be referred to the section *Porphyranthea*, which includes *A. purpurascens*, as the latter is a perennial plant with smooth shining leaves and flattened smooth seeds.

Geogr. area. Greece: nome of Attica, in the fir zone of Mt. Parnès near the summit at 1200–1350 metres (*Guicciardi*, 1854), and on Mt. Parnassus (*Guicciardi*, 1857); nome of Laconia, on Mt. Malevo, and near Zatuna on the mountains of the nome of Arcadia (*Orphanides*, 1870, from the last locality much larger and more robust specimens).

β. Species perennes. Flores cymosi.

55. *A. OVALIFOLIA*, *Somm. & Lev. Pl. Caucac. nov.*, in *Act. Hort. Petropol.* xiii. p. 40 (1893).

Radix tenuis. Caules permulti filiformes flaccidi prostrati undique proserpentes ramosissimi inferne radiculiferi, tenuiter puberuli; rami axillares vel terminales, elongati dichotome paniculati multiflori (20 florum et ultrà). Folia breviter petiolata uninervia glabra fere acuta ovata, petiolo hinc inde ciliis paucis consperso; bracteæ, præter supremas, foliaceæ. Sepala ovato-lanceolata acuta glabra 5-nervia, nervis lateralibus vix distinctis, anguste hyalino-marginata. Petala e basi cuneatâ ovato-lanceolata. Antheræ fusco-rubellæ. Semina nigra, globosa granulato-rugulosa.

Affinis *A. rotundifoliæ*, sed petalis quam calyce brevioribus. Ab ea etiam planta differt ramis multifloris elongatis, foliis ovatis nec orbiculatis plerumque subacutis, et bracteis omnibus præter supremas foliaceis: altit. 30 centim. et ultrà.

Hab. Abkhasia in Trans-Caucasia; at 1600 metres in valley of the R. Kliutsch.

Series B.—Stamina 5.

56. *A. ANDINA*, *Rohrb. in Linnæa*, xxxvii. p. 255 (1871–72); *Jacks. Ind. Kew.* i. p. 178.

Caules pusilli, cæspitem laxum formantes, plus minusve ramosi, ramis brevibus adscendentibus dense foliosis, glaberrimi, 3–5 centim. Folia valde approximata, crassiuscula lineari-vel subspathulato-lanceolata subaristata, ad basin membranaceam vix angustata, glaberrima. Flores solitarii terminales, brevissime pedicellati, pedicello glabro. Sepala ovato-oblonga obtusa flava.

Petala nulla. Capsula ovata, valvis 3 latis emarginato-bifidis dehiscens. Semina brunnea globuloso-reniformia, striatim granulata.

Species valde insignis, a plurimis meridionali-americanis diversa seminum structurâ.

Hab. Bolivia: prov. of Larecaja, at 3300 metres.

57. *A. PENTANDRA*, *Maxim. in Bull. Acad. Pétersb.* xxvi. p. 429 (1880); *Pl. Mongol.* p. 96, t. 6 (1889).

Suffrutex glaber, trunco crasso lignoso polycephalo, 30 centim. Folia subulata pungentia basi breviter membranacea, caulina connata margine scaberula. Cyma terminalis, ter trichotoma; bracteæ abbreviatæ lanceolatæ præter costam hyalinæ. Sepala lanceolata acuminata late hyalino-marginata, extima in alabastro breviora. Petala oblonga, calyce paullo longiora. Stamina 5, et staminodia 5. Ovarium ovatum, ovulis 2. Semina obtuse tuberculata.

Hab. Soungaria; not far from the Mongolian frontier, in the mountains of Kitschui-ne-tau near the post of Saissan (*Potanin*).

Iconogr.—*Maxim. l. c.*

Sectio ii. SIKKIMENSES.

Series A.—Stamina 10.

Subsectio 1.—Folia margine incrassata aut nervoso-marginata.

Calyx basi rotundatus.

58. *A. CILIOLATA*, *Edgew. in Hook. f. Fl. Brit. Ind.* i. p. 240 (1874); *Duthie, List N. W. Ind. Pl.* p. 22 (1881).

Eglanduloso-pubescent, laxe cæspitosa. Caules 5–7 centim., simplices bilineato-pubescentes foliosi. Folia ovata vel oblonga, cuspidata vel acuminata, obscure uninervia, basi attenuata vix petiolata, utrinque puberula, margine pilis longis articulatis hispidis ciliato. Pedicelli villosi-pubescentes ebracteati. Sepala lanceolata acuta ciliata. Petala alba late obovata apice rotundata, calycem superantia. Capsula ovoideo-globosa.

β. pendula, *Duthie, Pl. of Kumaon*, no. 2761 (1884) in *Herb. Kew.*

Habitu laxior. Pedicelli recurvati.

Hab. Napalcha, in Byans.

Geogr. area. Sikkim Himalaya; also Kumaon and Garhwal (*Duthie*).

Subsectio 2.—Folia margine non incrassata neque nervoso-marginata. Calyx campanulatus.

α. Petala vix unguiculata.

59. A. STRACHEYI, *Edgew. in Hook. f. Fl. Brit. India*, i. p. 240 (1874); *Jacks. Ind. Kew.* i. p. 181.

Glaberrima. Caules 2–5 centim., adscendentes simplices. Folia anguste lineari-oblonga acuminata vel acuta, nervis obscuris, plana. Sepala lanceolata acuminata coriacea, apice recta. Petala albida obovata apice rotundata, calycem superantia.

Specifically distinct in being wholly glabrous.

Hab. W. Tibet, Rakas Tal at 4650 metres; and Ladakh in Kashmir; also N.W. Tibet at 5750 metres (*Capt. Deasy's Exped. Tibet 1896–97*, no. 876).

60. A. MELANDRYOIDES, *Edgew. in Hook. f. Fl. Brit. Ind.* i. p. 241 (1874); *Jacks. Ind. Kew.* i. p. 180.

Glanduloso-pubescent. Caulis 5–10 centim., a basi ramosus; rami adscendentes cylindracei simplices vel parce ramosi, inferne glabri. Folia laxè disposita, sessilia carnosula, sordide viridescens vel basin versus purpurascens, utrinque glandulosa, oblongo-elliptica vel oblongo-lanceolata obtusa uninervia. Pedicelli primum cernui, fructiferi multum elongati stricti erecti, dense glandulosi. Calyx basi truncatus; sepala glandulosa angusta, apicibus recurva obtusa. Petala carnea vel roseo-purpurascens, linearia apice rotundata, calycem superantia.

A well-marked species, resembling somewhat in habit *Cerasium trigynum*, very glandular, with flesh-coloured or purplish flowers.

Hab. Sikkim Himalaya, at 4200 to 5400 metres.

61. A. BULICA, *Stapf, ined. in Herb. Orientale, in Herb. Kew.*

Pumila, asperulo-pubescent. Caudex parce ramosus. Folia spathulata acuta, basin versus attenuata vix autem petiolata, margine scabra. Sepala lanceolata acuminata asperulo-ciliata late membranaceo-marginata. Petala ovato-lanceolata, apice vix acuta, basi vix unguiculata, sepalis fere bis longiora. Semina subreniformi-globosa.

Hab. Persia: Mt. Kuh-Bul (1885).

β. Petala in unguem attenuata.

62. A. BROTHERANA, *Trautv. in Act. Hort. Petropol.* viii. p. 151 (1883); *Boiss. Fl. Orient., Suppl.* p. 115 (1888).

Glaberrima, densissime cæspitosa, pulvinulos parvos exhibens 37 mm. Folia minuta, ovato-elliptica vel ovato-oblonga, obtusa ciliata 3-nervia, supra concava fere enervia, basin versus pectinatim ciliata. Flores sessiles cæspiti immersi. Sepala ovato-oblonga obtusa, basin versus ciliata, 3-nervia, nervis fere obsoletis, margine anguste albo-membranacea. Petala calycem longe superantia, lineari-oblonga integra, alba. Ovarium ovatum, profunde trisulcatum.

With regard to Trautvetter's description, in the specimens I examined the seeds were very minute, certainly not black, and did not appear to be smooth. I have therefore placed it in this section, rather than in the subgenus *Dicranilla*, after an examination of the dried specimens.

Plantula *Gypsophilæ aretioidi* vel *Alsinæ aretioidi* facie similis, pulvilli ramis arcte adpressis imbricatim et columnariter foliosis. Verùm herba quoad habitum *Thylacospermo rupifrago* simillima, quod autem reliquum est, ab hæc diversa: planta tota, exceptis foliis et sepalis ciliatis, glaberrima eglandulosa.

Hab. Trans-Caucasia: Mt. Mamisson, near the source of the R. Rion, in the Central Caucasus, in province of Imeretia, at 3000 metres (1877).

Series B.—Stamina 5, et staminodia 5.

63. A. NITIDA, *Rohrb. in Linnæa*, xxxvii. p. 249 (1871-72) (nomen); *Bartl. Reliq. Haenk.* ii. p. 12 (1825) (*Cherleria nitida*).

Cauliculi fragiles, basi procumbentes. Folia coriacea ovata mucronata, basi vix attenuata, connata glaberrima nitida plana, supra enervia, subtus bisulca, sulcis distantibus 4-7 mm. longis. Flores in cauliculorum summitate subterminales. Calyx cylindraceus glaberrimus coriaceus, basi turbinatus; sepala lanceolata acuta subcarinata, dorso non sulcata, apicibus recta non conniventia. Petala calyce duplo breviora, lineari-oblonga subacuta vel subemarginata, basi attenuata vix unguiculata. Capsula angusta. Semina fere globulosa, seriatim tuberculata.

Hab. Peru: Quebrada de l'Obrajillo.

Sectio iii. LEIOSPERMÆ.

Subsectio 1.—Flores solitarii, terminales et axillares.

64. *A. MUSCOIDES*, *H. B. & K., Nov. Gen. et Spec.* vi. p. 34, t. 26 (1823); *Jacks. Ind. Kew*, i. p. 180.

Hab. The Andes of Ecuador: summit of Mt. Antisana, at 4600 metres.

Iconogr.—*H. B. & K. l. c.*

If *A. nana*, Willd., were retained for the name of this species as Rohrbach suggests, a new name would have to be found for *A. nana*, Boiss., which would only cause confusion. Schlechtendal gave but a very meagre and unsatisfactory diagnosis of the plant in Willdenow's herbarium.

65. *A. MUSCIFORMIS*, *Triana & Planch. Prodr. Fl. Novo-Gran. in Ann. Sci. Nat. sér. IV.* xvii. 1862, p. 150; *Rohrb. in Linnæa*, xxxvii. (1871-72) p. 253.

Humilis, musciformis. Caules debiles, plus minus ramosi intricati glabri 4-sulcati, tantum 23-28 mm. alti. Folia parva approximata patentia neque unquam imbricata, lineari-lanceolata acuminata ac fere mucronulata, nervo medio subtus valde prominente, nervis 2 lateralibus fere obsolete, ciliata. Pedicelli longi graciles villosuli. Sepala ovato-oblonga acuminata, margine scariosa ciliata. Petala alba oblongo-spathulata, calycem paullum excedentia. Semina lenticularia.

Differt hæc species a præcedenti, foliis non imbricatis eorumque nervo mediano prominente ciliatis neque enerviis glabris, floribus longe pedicellatis nec sessilibus, petalis calyce longioribus.

A. musciformis, Hook. f. in *Fl. Brit. India*, of Tibet, is a form of *A. polytrichoides*, and so becomes a synonym, apart from being homonymous with the South American plant.

Hab. Republic of Colombia: prov. of Pasto, Plateau de Tuquerres, at 3400 metres.

66. *A. HALACSYI*, *Bald. in Malpighia*, v. p. 65 (1891).

Cæspitosa, prostrata. Caudiculi tortuosi exiles plus minus longi, glabri vel parce pilosi præcipue juniores. Folia parvula in ramis sterilibus approximata, ovalia spathulata vel lanceolata carinato-uninervia, glandulosa vel sublævia, ad basin rigidula alata in petiolum attenuata. Rami 1-2-flori; pedicelli longi villosi nunquam glandulosi. Sepala foliacea oblongo-lanceolata obtusa

membranaceo-marginata utrinque glandulosa. Petala late spathulata, calycem paullum superantia. Capsula calyce paullo longior.

Hab. Albania.

67. *A. BALANSÆ*, Boiss. *Fl. Orient.* i. p. 700 (1867); Fenzl, in *Tchihat. Asie Min. Bot.* i. p. 237 (1860), (*A. nilghirensis*, varr. α et γ).

Caudiculi filiformes subterranei nudi, ramis procumbentibus dense foliosis. Folia obovata obtusa, basi attenuata, uninervia glabra vel scabro-hirsuta. Pedicelli breves stricti. Sepala glabra vel pilosula lanceolata acuta membranaceo-marginata obscure uninervia. Semina globoso-reniformia.

A. formis A. nilghirensis longe distat, jamprimùm seminibus haud scabro-tuberculatis.

Hab. Turkey-in-Asia, Mt. Taurus in Cilicia; Persia, Mt. Kellal and Mt. Daëna; Beluchistan, Mt. Sebz.

SYN. A. nilghirensis, Fenzl, ex Boiss. *Fl. Orient.* i. p. 700.

Subsectio 2.—Flores solitarii axillares.

a. Sepala carinata, carinâ prominente pilosâ, margine ciliata, ceterùm glabra vel rarius puberula.

68. *S. LANUGINOSA*, Rohrb. in *Mart. Fl. Bras.* xiv. pt. II. p. 274, t. 63 (1872); et in *Linnaea*, xxxvii. p. 259.

Caules diffusi, debiles, procumbentes, inferne teretes, superne sulcati vel subquadrangulares, ramosi, ramis oppositis aut altero minore vel abortivo; pubescentes, pilis brevibus plus minus densis subuncinato-reflexis, raro glabrescentes. Folia formâ et magnitudine variantia, nunc linearia et interdum subulata, nunc lineari-lanceolata lanceolatave, internodiis aut breviora aut rarius ea subæquantia, acutiùscula aut rarius obtusa, superiora sensim decrescentia, aut punctulata et ad nervos basinque tantum puberula aut plus minus scabriuscula. Pedicelli longi filiformes patentens dense puberuli, fructiferi apice sursum curvati. Sepala ovato-oblonga acuminata submucronata carinata, carinâ viridi pilis brevibus scabriusculâ, margine interdum ciliato late scariosa. Petala alba oblonga vel ovalia obtusa, plerumque calyce breviora vel interdum eum vix æquantia, raro nulla. Stamina calyce paullum breviora. Ovarium subglobosum, in ipso flore jam per valvas dehiscens. Capsula ovato-oblonga. Semina sphæroideolenticularia.

Stirps magnopere variabilis, imprimis foliorum formâ et pubescentiâ, petalorum cum calyce proportionem aliisque notis in lusus conversa, varietates tamen bene limitandas vix offert.

a. genuina, Rohrb.

Caules et folia nunc pubescentes nunc glabrescentes. Folia linearia vel lineari-lanceolata, plus minus acuminata, longitudine et latitudine ita variantia, ut his notis lusus vix distingui possint, 10–35 mm. lg., 2–8 mm. lt. Petala calyce breviora vel eum æquantia, interdum nulla.

Lusus 1:—Caules levissime puberuli vel interdum glabrescentes. Folia glabra punctulata, formâ valde variantia.

Lusus 2:—Caules levissime puberuli; folia nunc pilis brevissimis adspersa nunc punctulata glabrescentia.

Lusus 3:—Caulis et folia plus minus dense hirsuta.

β. diffusa, Rohrb.

Caules humifusi, valde diffusi, longe repentes, interdum adscendentes, glabrescentes vel pilis paucis adspersi. Folia parva, lineari-spathulata acuminata vel obtusa, pilis paucis adspersa vel punctulata, valde approximata, 5–8 mm. lg., 1–2 mm. lt., læte viridia. Petala calyce paullum breviora.

A species of very wide distribution in the New World. In the United States it extends from N. Carolina to Florida and westward to New Mexico. In Central America it is recorded in Costa Rica, and is common throughout Mexico from the province of Sonora in the north to the peninsula of Yucatan in the south. In the West Indies Bancroft and Wilson collected specimens in Jamaica, and Mr. Moseley brought specimens from Bermuda in the 'Challenger' Expedition. The species under one of its many forms is found in all the countries of S. America, excepting that there are no records for Guiana and Paraguay. Very few species of *Arenaria* extend south of the tropics. Besides *A. lanuginosa* they include only *A. tetragyna*, near Concepcion and on the summit of Pico de Pilque in the Andes of Chile, *A. palustris* in Chile and Argentina, and *A. serpens* var. *andicola* in the Chilean Andes. There are some very interesting (somewhat damaged) specimens in Herb. Kew. brought by Charles Darwin from Santa Cruz in Patagonia in the course of his voyage in H.M.S. 'Beagle' (1832–36). These historical specimens not only mark the south limit of the species, but, more important still, the limits of the southern range of the genus, which is thus fixed at 50° S. At first I thought they might be specimens of *A. palustris*, which is found in North Patagonia at Lake Nahuelhuapi on the Argentine side of the Andes; but the flowers are clearly axillary and not closer together towards the top of the stem as in the former species, and further the sepals

are shorter than the petals and hairy along the keel. Pinned to the sheet containing the specimens is a drawing by Sir J. D. Hooker of the magnified representation of a flower after fertilization, which well shows the structure of the gynæcium and the floral envelopes. In Haenke's herbarium are specimens collected in Chile; but whether they have been overlooked or not, the species is not included in Messrs. Reiche and Johow's recent 'Flora de Chile.'

Geogr. limits.—*N.* United States: San Antonio in New Mexico, 37° N. (*Whipple Exped.*, and *Fendler*, no. 58).

S. Argentina: Santa Cruz in Patagonia, at the mouth of the river of that name (*Charles Darwin*).

W. Mexico: Santa Cruz in prov. of Sonora (*Wright*, no. 864).

E. Brazil: Caldas in prov. of Minas Geraës (*Lindberg*).

Iconogr.—*Rohrb. in Mart. Fl. Bras.* xiv. pt. II. t. 63.

SYN. *Arenaria alsinoides*, Willd. *ex* Schlecht. in *Gesellsch. naturf. Fr. Berl. Mag.* vii. p. 201 (1813).

A. diffusa, Ell. *Sketch*, i. p. 519.

A. Jussieii, Cambess. in *St.-Hil. Fl. Brasil. merid.* ii. p. 126.

A. nemorosa, H. B. K. *Nov. Gen. Spec.* vi. p. 28.

A. paradoxa, Bartl. in *Reliq. Haenk.* ii. p. 15.

Alsine repens, Ruiz *ex* *Rohrb.* in *Linnæa*, xxxvii. p. 262.

Micropetalum lanuginosum, Pers. *Syn. Plant.* i. p. 509 (1805).

Mehringia nemorosa, Fenzl *ex* Hemsl. *Biol. Centr.-Amer., Bot.* i. p. 69.

Spergulastrum lanuginosum, Michx. *Fl. Bor.-Amer.* i. p. 275.

Stellaria elongata, Nutt. *Gen.* i. p. 289.

S. lanuginosa, Torr. et Gray, *Fl. Amer. Bor.* i. p. 187.

S. longepedunculata, Baldw. *ex* *Rohrb.* in *Linnæa*, xxxvii. p. 261.

S. pubescens, H. B. K. *Nov. Gen. Spec.* vi. p. 28.

Bigelovia elongata, Rafin. in *Journ. Phys.* 1819, p. 289.

69. A. MEGALANTHA.—*A. lanuginosa*, var. *megalantha*, *Rohrb.* in *Linnæa*, xxxvii. p. 264 (1871-72).

Caules diffusi, laxi, primùm procumbentes, dein adscendenti-erectiusculi, inferne teretes, superne sulcati vel subquadrangulares, ramis oppositis aut altero minore vel rarius abortivo; pubescentes, pilis brevibus plus minus densis subuncinato-reflexis, vel glabrescentes. Folia formâ et magnitudine variantia, unce anguste linearia subulataque, nunc lineari-lanceolata, nunc late ovata, internodiis aut breviora aut rarius ea subæquantia, mucronulato-acuminata, superiora sensim decrescentia, aut punctulata et ad nervos basinque tantum puberula aut plus minus

scabriuscula. Pedicelli filiformes patentes dense puberuli, fructiferi apice sursum curvati. Sepala ovato-oblonga acuminata carinata, carinâ viridi pilis brevibus scabriusculâ, margine interdum ciliato late scariosa. Petala alba oblonga obtusa, e calyce exserta. Ovarium subglobosum, in ipso flore jam per valvas dehiscens. Capsula ovato-oblonga. Semina sphæroideo-lenticularia.

Planta a præcedenti specificè distincta caractere cardinali petalorum longitudinis, ac in multis notis.

a. genuina, Williams.

SYN. *A. lanuginosa* var. δ : *megalantha*, Rohrb. in Linnæa, xxxvii. p. 264 (1871-72).

A. alsinoides var. *ovatifolia*, J. D. Smith in Bot. Gazette, 1893, p. 198.

Caules plus minus dense pubescentes vel glabrescentes. Folia late ovata, aut punctulata et margine tantum ciliata aut dense pubescentia, 8-12 mm. lg., 6-12 mm. lt. Petala calyce sesquilingiora.

β . ensifolia, Williams.

SYN. *A. lanuginosa*, var. γ . *ensifolia*, Rohrb. l. c.

Caules laxi pilis paucis adpersi. Folia anguste linearia et subulata, nervo centrali subtus valde prominente, 20 mm. lg., approxim. $\frac{1}{2}$ -1 mm. lt. Petala e calyce exserta.

Lusus 1 :—Folia subtus pilis paucis adpersa, ceterum glabrescentia.

Lusus 2 :—Folia utrinque dense hirsuta.

γ . tucumanensis, Williams.

SYN. *A. diffusa*, var. *tucumanensis*, Griseb. in Götting. Abhandl. xxiv. p. 27 (1879).

Folia elliptica vel elliptico-oblonga, mucronulata.

I think that varr. γ and δ of *A. lanuginosa*, Rohrb., should form a distinct species. The petals are exerted from the calyx as is the case in var. *tucumanensis* (of which there are specimens in Herb. Kew.) and there are other distinctive characters. The species is limited to S. Mexico and N. Argentina. Like *A. nepalensis* it is found clambering 9-15 decim. among bushes and shrubs (vide *Pringle*, Pl. Mexican. 1894, no. 4641).

Geogr. limits.—N. Mexico : Mt. Orizaba in prov. of Vera Cruz (var. β).

S. & E. Argentina : prov. of Tucuman (var. γ).

W. Mexico : Chinautla in prov. of Puebla (var. β).

70. *A. SORATENSIS*, *Rohrb. in Linnæa*, xxxvii. p. 266 (1871-72); *Jacks. Ind. Kew.* i. p. 181.

Radix repens. Caules multi adscendenti-erecti, simplices vel paullum breviter ramosi, pilis reversis brevibus, superne densius hirtello-pubescentes ad summum, 20 centim. Folia ovato-lanceolata vel anguste ovata, marginato-incrassata, axillis inferioribus fasciculiferis, acuminata, superne pilis brevissimis sparsis, ad marginem versus et subtus nervo mediano paullum prominente densioribus, reversis scabrida, binorum oppositorum altero ad caulis ramorumque basin sterili, ad apicem florifero, altero rarum fere semper abbreviatum contractum ferente. Flores longe pedicellati, pedicellis patentibus nisi apice arcuato-erectis, pilis reversis densis griseo-scabridis. Calyx ovoideo-campanulatus, basi rotundatus; sepala ovato-lanceolata acuminata, apice nigricante recurvo, margine scarioso ciliato, nervo mediano prominente scabrido. Petala alba ovato-oblonga obtusa, calyce paullum longiora. Semina fusco-atra, lenticularia.

Differt hæc, quæ *A. lanuginosæ* affinis est, ab illa habitu, floribus multo majoribus calycisque structura diversissima.

Description verified from unnamed specimens in Herb. Kew. labelled "Mandon, no. 959," collected in 1858. In a medium-sized capsule there were 22 seeds.

Hab. Bolivia: near Sorata in prov. of Larecaja (*Mandon*, no. 959).

71. *A. PLEURANTHA*, *Phil. in Anal. Univ. Santiago*, 1893, p. 763; *Reiche & Johow, Fl. de Chile*, p. 191 (1896).

Glabra, perramosa, 12 centim. Radix gracilis. Caules ramosi, adscendenti-erecti, ramis teneris. Folia oblonga obtusa, basi in petiolum brevem attenuata, obsolete nervata, margine lævia vix incrassata. Sepala 4 mm. longa, ovato-lanceolata, apice acuta recta. Petala 6 mm. longa, calycem superantia, alba, obtusa. Semina rufo-atra, globoso-reniformia.

The original description of this plant by Philippi is very brief and scarcely diagnostic. As far as it reads it might apply almost equally well to *A. parvifolia*; and from the description alone as applying to Hartweg's specimens from the Andes of Ecuador, I was disposed to sink it in this species. There are, however, authentic specimens from Philippi in Herb. Kew., and from these is drawn up a fresh description, in which satisfactory points of difference between the two plants are recognizable.

It is from an examination of these specimens that its position in the genus is determined. In the 'Flora de Chile,' cited above, in course of publication by Messrs. Reiche and Johow, the short description is only a Spanish translation of Philippi's Latin diagnosis, without additional characters. In habit the plant rather resembles *A. palustris*.

Hab. Chile: found by F. Delfin on the banks of the river Palena in 1887.

The name of the species is probably derived from the axillary flowers.

72. *A. PARVIFOLIA*, *Benth. Plant. Hartweg.* p. 163 (1839-48); *Rohrb. in Linnæa*, xxxvii. p. 272 (1871-72).

α. *spatulæfolia*, *Rohrb. in Linnæa*, xxxvii. p. 272 (1871-72).

Caules et folia indumento vario. Folia ovato- vel lanceolato-spathulata in petiolum brevem ciliatum attenuata, mox acuta mox obtusa. Petala nunc nulla, nunc parva vel evanescentia.

Lusus 1:—Caules glaberrimi vel unifariam puberuli. Folia glabra, petiolo ac nervo mediano ciliatis exceptis, acuminata. Flores breviter pedicellati, apetal.

SYN. *A. parvifolia*, *Benth.* (sensu limitato).

Hab. In the Andes of Ecuador; Hacienda de Antisana: in the Andes of Colombia (*Purdie*).

Lusus 2:—Caules glabri vel leviter puberuli. Folia nunc glabrescentia punctulataque nunc sparse pilosa, acuta vel obtusiuscula. Flores in eodem specimine mox longe mox breviter pedicellati, pedicellis glabris vel puberulis; petala in floribus his adsunt, in illis deficient.

Hab. In the Andes of the republic of Ecuador: near the snow-line of Mt. Pichincha, on the line of the Equator. Mountains of Mexico: Mt. Orizaba; and Chinautla, in the prov. of Puebla.

Lusus 3:—Caules et folia latere superiore pilis densis rigidis griseo-hirsuta. Flores breviter pedicellati. Calyx omnino dense pubescens. Petala semper adsunt.

Hab. Mexico: Mt. Orizaba.

β. *Schiedeana*, *Rohrb. in Linnæa*, xxxvii. p. 273 (1871-72).

Caules humifusi, nunc glabri nunc puberuli. Folia anguste lanceolata ad basin versus ciliatam vix angustata, acuta vel obtusiuscula, glabra vel pubescentia. Flores apetal, nunc longe nunc breviter pedicellati.

Lusus 1:—Caules et folia minima, 2–3 mm. lg., dense puberula. Flores paullum minores, calyce pubescente.

Hab. In the Andes of the republic of Ecuador: Hacienda de Antisana.

Lusus 2:—Caules et folia glabrescentia. Sepala glabra, carinâ exceptâ.

SYN. *A. scopulorum*, Schlecht. in Linnæa v., et xii., non H. B. et K. *A. Schiedeana*, Fenzl ms.

Hab. Mexico: just below the snow-region of Mt. Orizaba, 3150–4420 metres; also at Sempaaltepec.

Geogr. area. Mexico, Colombia, and Ecuador.

73. *A. REPTANS*, *Hemsl. Diagn. Pl. Nov. Mexic.* p. 22 (1879); *Biol. Centr.-Amer., Bot.* i. p. 70.

Radix gracilis, e collo ramosa, ramis tenuibus debilibus reptantibus ad nodos radicanibus angulatis hispidulo-pilosis. Folia obtusa vel apiculata, sparsim punctata, obovato-lanceolata, axillis plerumque fasciculiferis. Sepala ovato-oblonga vel lanceolata, obtusa late membranaceo-marginata. Petala nulla. Semina lenticularia, rufo-atra, longe funiculata.

Hab. Valley of Mexico (type-specimens); and prov. of Michoacan (*Pringle*).

β. *Pringlei*, *var. nova*.

Nana, cæspitosisissima (*Pringle*, *Pl. Mexicanæ*, 1894, no. 4724).

Hab. Sierra de San Felipe, prov. of Oaxaca, at 3000 metres.

Geogr. area. Mexico.

b. Sepala enervia puberula. (Petala nulla.)

74. *A. JAMESONIANA*, *Rohrb. in Linnæa*, xxxvii. p. 267 (1871–72); *Jacks. Ind. Kew.* i. p. 179.

Radix sublignosa, gracilis. Caules permulti laxè adscendenti-erecti graciles albidi glabrescentes, 5–8 centim. Folia parva, anguste lineari-lanceolata acuta, nervo mediano subtus valde prominente, margine præsertim ad basin membranaceam versus ciliata. Pedicelli glabrescentes, haud rarò folium superantes. Sepala anguste ovato-lanceolata, anguste membranaceo-marginata, breviter puberula, acuminata. Ovarium globosum. Capsula ovata. Semina lenticularia.

Hab. Republic of Ecuador: summit of Mt. Pichincha in the Andes, 4700 metres.

c. Sepala concava uninervia vel obsolete 3-nervia,
glaberrima.

75. *A. LYCOPCIDIODES*, Willd. *Herb.* no. 8793, ex *Schlecht. in Gesellsch. naturf. Fr. Berl. Mag.* vii. p. 212 (1813); *H. B. & K. Nov. Gen. et Spec.* vi. p. 27.

The specimens on the next sheet of Willdenow's herbarium named *A. decussata*, Willd. herb. no. 8794, are more compact in habit, but are not otherwise sufficiently different to justify their separation as a distinct species.

Hab. Mexico.

SYN. *A. decussata*, Willd. *Herb. ap. Schlecht. in Gesellsch. naturf. Fr. Berl. Mag.* vii. p. 212 (1813).

76. *A. ROHRBACHIANA*, Garcke, in *Linnæa*, xxxvii. p. 311 (1871-72).

Omnino glabra. Caules adscendenti-erecti crassi 4-angulares neque vero sulcati, ramosi, ramis erectis. Folia anguste linearia, erecta vel patentia, demùm sæpe reflexa, plaua, interdum basin versus ciliolata, acuminata neque rarò mucronulata. Pedicelli longi, basi subcrassiores, primùm erecti, demùm patentes vel reflexi. Sepala ovato-oblonga late membranaceo-marginata, obsolete triinervia. Petala alba elongato-oblonga obtusa, calyce sesquiflongiora. Semina oblongo-lenticularia.

Resembles a small-leaved form of *Stellaria glauca*, but petals not bifid.

Hab. Mexico.

Subsectio 3.—Flores solitarii, terminales.

77. *A. ORBIGNYANA*, Wedd. in *Ann. Sci. Nat. Sér. V. i.* 1864, p. 293; *Rohrb. in Linnæa*, xxxvii. p. 254.

Humilis, glabra. Caules cæspitem parvum formantes, 3-5 centim., breviter ramosi. Folia subimbricata lineari-vel subspathulato-lanceolata acuta, margine præsertim basin versus serrulato-ciliata. Pedicelli apicem versus puberuli. Sepala ovato-lanceolata vix obtusa. Petala alba obovato-lanceolata obtusa, calycem vix æquantia. Stamina 5, calyce breviora.

Hab. Republic of Bolivia: in the Andes, near Potosi.

78. *A. CATAMARCENSIS*, Pax, in *Engl. Bot. Jahrb.* xviii. 1893, p. 29.

Humilis, pilis brevibus recurvis scabra, glaucescens. Caulis ramosus. Folia linearia vel anguste lanceolata acuminata

crassiuscula, margine fere cartilagineo dense ciliata, nervo mediano subtus prominente. Pedicelli scabri. Sepala lanceolata acuminata, præsertim interiora late hyalino-marginata, omnia secus nervum medium scabrida, ceterum vix glabrescentia, post anthesin paullo accrescentia. Petala calycem æquantia vel superantia, obovata obtusa, breviter unguiculata. Stamina 10, petalis breviora. Ovarium subglobosum.

Hab. Argentina.

79. *A. ACHALENSIS*, *Griseb. in Gött. Abhandl.* xxiv. p. 26 (1879); *Jacks. Ind. Kew.* i. p. 178.

Serpens, perramosa, glabra, dense cæspitosa. Rami debiles, $2\frac{1}{2}$ –7 centim. Folia elliptica vel lanceolato-elliptica acuta, basi angustata, margine inferne ciliolata. Sepala ovato-oblonga subacuta. Petala nulla. Semina lenticulari-subrotunda rubicunda. Ovarium globosum.

Habitus *A. serpentis*, sed folia fere *A. serpyllifoliæ* et corollâ deficiente accedit ad *A. confertam* ubi folia “imbricata” (ex descriptione).

Hab. S. Achala in Argentina.

Both this species and the preceding might by some botanists be considered as varieties of *A. serpens*: all three are found in Argentina.

80. *A. SERPENS*, *H. B. & K. Nov. Gen. et Spec.* vi. p. 32 (1823); *Rohrb. in Linnæa*, xxxvii. p. 263 (1871–72).

Stirps valde variabilis, præsertim foliorum forma, quæ etiam in eodem specimine nunc obtusa sunt nunc acuta, eorumque indumento. Varietates certis limitibus vix distingui possunt.

a. genuina, *Rohrb. in Linnæa*, xxxvii. p. 269 (1871–72).

Caules procumbentes ac serpentes raro diffusi et adscendenti-erecti, haud dense cæspitosi, fuscescentes, glaberrimi vel hirtelli. Folia mox obtusa mox acuta. Flores fere semper breviter pedicellati, pauci.

Lusus 1:—Caules procumbentes ac serpentes glaberrimi.

Flores breviter pedicellati. Petala calycem paulum superantia.

SYN. *A. serpens*, *H. B. & K. l. c.*

A. pauciflora, Willd. herb. no. 8788.

Lusus 2:—Caules procumbentes ac serpentes, ramulis hirtellis.

Flores breviter pedicellati. Petala calyce sesquilingiora.

SYN. *A. digyna*, Willd. herb. no. 8738; Schlecht. in *Gesellsch. naturf. Fr. Berl. Mag.* vii. p. 201 (1813).

A. scopulorum, H. B. & K. *Nov. Gen. et Spec.* vi. p. 81.

Lusus 3:—Caules diffusi adscendenti-erecti glaberrimi. Flores nunc breviter nunc longe pedicellati. Petala calyce ferè duplo longiora.

β. andicola, Gill. (sp.) in *Hook. Bot. Miscell.* iii. p. 148 (1833); *Rohrb. in Linnæa*, xxxvii. p. 270 (1871-72).

Lusus 1:—Caules laxi glaberrimi.

SYN. *A. serpylloides*, Naud. in C. Gay, *Fl. Chilena*, i. p. 271.

A. cæspitosa, Phil. in *Linnæa*, xxviii. 1856, p. 675.

Lusus 2:—Caules laxi, sub nodis pilis brevissimis farinosi.

SYN. *A. multicaulis*, Phil. in *Linnæa*, xxviii. 1856, p. 673.

Lusus 3:—Caules pusilli glaberrimi densi, vix 2-3 centim. alti; flores 2 mm. longi, sepalis carnosis.

SYN. *A. rivularis*, Phil. *Florula Atacam.* p. 10 (in descriptione calycis sepala false acuta [aucta?] dicuntur).

A. brachyphylla, Phil. *Pl. Nuev. Chilens.*, in *Anal. Univ. Chile*, 1893, p. 762.

Re hujus speciei polymorphæ et variabilis Peyritsch in *Linnæa*, xxx. p. 58 recte *Arenariam serpentem* ac *A. scopulorum* conjungendas esse animadvertit. Illius folia sunt obtusa ac nisi ad basin versus ciliatam glabra, hujus acuta totoque margine ciliata. Occurrunt autem specimina perplurima, quæ nunc foliis gaudent acutis nunc obtusis atque plus minus ciliatis. Idem valet de caulibus ac pedicellorum indumento horumque cum calyce proportione. Ceterum *A. serpens* valde affinis est *Arenariæ parvifoliæ*, imprimis ejus var. *Schiedeana*; sed ceteris omnibus notis neglectis, jam primo aspectu illa sepalis acutis differt.

As with *A. lanuginosa*, Rohrbach devoted a considerable amount of attention to the material accumulated for the elucidation of this species; and after examination of the specimens again I am inclined to coincide almost exactly with his views as to the circumscription and limitation of these two species. Under various forms they have a wide and extensive range in Central and South America, and it is scarcely possible to recognize so many distinct species as have been described by Prof. Philippi within the limits of Chile. Specimens of the same plant, described in somewhat different words, have been ranked as new species, from the neighbouring republics of Bolivia, Brazil, and Ecuador.

A. serpens, var. *Orizabæ*, Rohrb. = *A. bryoides*.

Geogr. limits.—*N.* & *W.* Mexico: Cerro Leon in prov. of Guanajuato. *E.* Brazil.

S. Chile: in the Andes of the district of Chillan (*A. multicaulis*, Phil.).

Subsectio 4.—Flores axillares solitarii, et terminales subconferti.

81. *A. MICROPHYLLA*, Phil. in *Linnæa*, xxviii. p. 673 (1856); Rohrb. in *Linnæa*, xxxvii. (1871-72) p. 270 (*syn.* *A. serpens*, var. *andicola*).

Glabra. Caules breves ascendenti-erecti, non dense cæspitosi. Folia minima oblonga obtusa parùm remota. Sepala ovata obtusa. Petala alba, calycem superantia. Semina lenticulari-reniformia.

Reduced by Rohrbach to *A. serpens* var. *andicola*,—"forma foliis minutis, floribus confertis." Allied rather to the next species, from which it is at once distinguished by the obtuse and more distant pairs of leaves. Philippi's brief description scarcely serves to distinguish the plant.

Hab. Chile: in the Andes of prov. of Coquimbo.

82. *A. PALUSTRIS*, Naud. in *C. Gay, Fl. Chilena*, i. p. 271 (1845); Rohrb. in *Linnæa*, xxxvii. p. 257 (1871-72).

β. patagonica, Phil. (sp.) in *Linnæa*, xxviii. p. 671 (1856); Reiche & Johow, *Fl. de Chile*, p. 192 (1896).

SYN. *A. fastigiata*, Phil. in *Linnæa*, xxviii. p. 673 (1856).

Though included in the flora of Chile mentioned above, this variety is found at the lake of Nahuelhuapi in the Argentine Republic, on the other side of the Andes. The specific type in Chile always occurs on the borders of lakes. Var. *β* seems to be more widely distributed than the type; and the limits given below all refer to localities in which var. *β* occurs. In Chile this variety has been recorded under the name of *A. fastigiata*, Phil.

Geogr. limits.—*N.* Chile: district of Linares.

S. & *E.* Argentina: Lake Nahuelhuapi.

W. Chile: lake of Llanquihué in prov. of Valdivia.

Subsectio 5.—Flores longe pedicellati, in cymas paucifloras dispositi.

83. A. STUEBELII, Hieron. *Pl. Stuebel.*, in *Engl. Bot. Jahrb.* xxi. 1895, p. 307.

Glaucæ. Caules permulti adscendenti-erecti subsimplices vel basi ramosi, pilis reversis brevibus minutis superne densius subhirtello-puberuli, 10 centim. Folia lineari-lanceolata, acuta vel subacuminata, utrinque puberula (pilis brevissimis sparsis), ad marginem versus et subtus nervo mediano prominente scabrida (pilis reversis). Pedicelli longi erecti scabrido-puberuli. Sepala ovata; exteriora acuminata anguste membranaceo-marginata scabrida basi ciliata dorso carinata, interiora obtusa breviter mucronata late membranaceo-marginata. Petala alba ovato-oblonga leviter emarginata. Ovarium ovatum.

Hab. Bolivia.

84. A. SAXOSA, A. Gray, *Pl. Wright.* ii. p. 18 (1853), ex *Smiths. Contrib.* v.; Robinson, in *Proc. Amer. Acad.* xxix. p. 293 (1894).

Viridis, leviter puberula. Caules 5-50 centim., simplices vel ut plurimum a basi ramosi permulti decumbentes dein erecti. Folia oblongo-lanceolata uninervia subglabra, obtusa vel apiculata, subsessilia vel in petiolum brevem contracta. Sepala ovato-oblonga acuta glabra membranaceo-marginata, nervo valido. Petala calycem æquantia. Semina lenticularia.

β. cinerascens, Robinson, in *Proc. Amer. Acad.* xxix. p. 293. Rigidior cinerascens. Folia pungentia. (*Herb. Columbia Coll.*)

Hab. Huachuca Mtns., in Arizona (*J. G. Lemmon*).

This is a species of wide range, occurring alike in rocky subalpine regions and much lower upon sandy banks, accordingly varying much in height and diffuseness of branching. The character of the seeds is not given in the original description, but in the specimens in Herb. Kew. they are lenticular, smooth and shining: I have no hesitation therefore in placing the plant in this subgenus. Mr. B. L. Robinson says that it shows transition to typical forms of *A. lanuginosa*; but its diagnostic characters do not warrant its reduction to that polymorphous species.

Geogr. limits.—*N.* United States: Colorado.

S. & W. Mexico: Lower California.

E. United States: Guadeloupe Mtns. in Texas.

85. *A. SPATHULATA*, Desf. *Fl. Atlantica*, i. p. 158 (1798); *Willk. & Lange, Prodr. Fl. Hisp.* iii. p. 619.

De Candolle says that in the authentic specimens he examined (*Prodr.* i. p. 413) the capsule had only five valves after dehiscence; but J. Gay, who examined similar authentic specimens, traverses this statement. What is certain is that in Schimper's authentic specimens from the *locus classicus*, the capsule is deeply 6-valved, and there are remains of three styles distinct at the base. Boissier's Spanish specimens are those which seem to most nearly agree with the type-specimens, labelled *Stellaria Arenaria*, in Linnæus's own herbarium.

Geogr. limits.—*N.* Andalusia: environs of Seville.

S. Mekinez, in Marocco. *E.* Constantine, in Algeria.

W. Puerto de Sta. Maria, on the bay of Cadiz.

SYN. *A. cerastioides*, Poir. *Voy. Barb.* ii. p. 166 (1789) ?

A. hispanica, Spreng. *Syst. Veg.* ii. p. 396.

Cerastium arenarioides, Crantz, *Instit.* ii. p. 402 (1766).

Subsectio 6.—Flores ad ramorum apicem conglomerati sessiles, vel dichasium valde compositum formantes.

a. Folia ovata obtusa. Sepala obtusa.

86. *A. MANDONIANA*, Wedd. in *Ann. Sci. Nat. Sér. V.* i. 1864, p. 294; *Jacks. Ind. Kew.* i. p. 180.

Dense pulvinato-cæspitosa. Caudicis rami lignosi plus minus abbreviati. Folia fere navicularia, supra glabra, subtus villosa, margine ciliata. Flores 3-5-conglomerati, foliis supremis involu-crati. Sepala ovata, margine villosa. Petala nulla.

I know of no other reference to this plant than that given above. The short description is scarcely more than sufficient to determine its position in the genus, and the damaged specimens are too fragmentary to add much more.

Hab. Bolivia (*Mandon*, no. 961).

b. Folia angusta acuminata. Sepala acuta.

87. *A. PEYRITSCHII*, *Rohrb. in Linnæa*, xxxvii. p. 264 (1871-72); *Jacks. Ind. Kew.* i. p. 180.

Caules laxi erecti quadrangulares, paullum breviter ramosi, pilis crispulis reversis, præsertim ad binos angulos, scabridi. Folia lineari-lanceolata, margine dorsoque ciliata. Flores ad caulis apicem dichasium valde compositum formantes, bifurca-

tionum ramis diffusis, alternis fere semper abbreviatis, longe pedicellati, pedicellis capillaribus dense pubescentibus: bracteæ parvæ folia æquantēs. Sepala ovato-lanceolata, dorso carinata, carina viridi dense pilosa, ceterum membranacea ac glabrescentia. Petala alba oblonga acuta, calyce triente breviora.

SYN. *A. diffusæ*, Elliott, affinis, fortassis species nova, ap. Peyritsch, in Linnæa, xxx. p. 58.

Species *A. megalanthæ* atque *A. pleuranthæ* valde affinis, tamen inflorescentia distinctissima primo aspectu diversa est. Etiam ad speciem sequentem accedit, quæ habitu, calycis structurâ, petalis obtusis et caulis pubescentiâ distingui potest.

The species is found in marshy localities, under similar circumstances as *A. palustris*.

Hab. Mexico: Real del Monte and Cerro Ventoso, also at San Miguel near Toluca at 2770 metres.

88. A. POEPPIGIANA, *Rohrb. in Linnæa*, xxxvii. p. 265 (1871-72); *Jacks. Ind. Kew.* i. p. 180.

Caules humifusi longe repentes quadrangulares, ramos pluri- mos breves dense foliosos steriles, paucos elongatos minusque dense foliatis, apice floriferos, laxaque adscendenti-erectos, 5-20 centim., edentes, æque ac ramuli pilis brevibus simplicibus stellatisque intermixtis hirtulo-pubescentes. Folia linearia vel anguste lineari-lanceolata, basin versus subattenuata, plus minus dense, præsertim ad marginem nervumque medianum, puberula, in ramulis sterilibus subimbricata. Flores ad ramulorum apicem dichasium plus minus compositum laxum formantes, longe pedicellati, pedicellis puberulis: bracteæ parvæ lineari-setaceæ mucronulatæ. Sepala oblonga anguste membranaceo-marginata, exteriora omnino puberula, interiora nervo mediano leviter hirsuto excepto glabrescentia. Petala alba oblonga obtusa, calyce sublongiora.

Species non minus quam prior *A. megalanthæ* affinis est; differt autem habitu, præsertim ramis illis dense foliatis sterilibus ac florum dispositione, caulis pubescentiâ, demùm calycis structurâ.

Hab. Cassapi, in the Peruvian Andes.

Sectio iv. PORPHYRANTHÆ.

89. A. PURPURASCENS, *Ram. ap. DC. Fl. Franç.* iv. p. 785 (1805); *Willk. & Lange, Prodr. Fl. Hisp.* iii. p. 628.

De Candolle's figure is sometimes cited as the earliest publi-

cation of this species; but as Alphonse de Candolle points out, vol. iv. of the 'Fl. Française' was published in 1805, *not* in 1815 as printed in many copies. P. B. Webb (Iter. Hispan. p. 62) claims to have found this species on Sierra Nevada in Andalusia,—"in stagnis elatis prope verticem." But, as Prof. Willkomm asserts, since neither Boissier nor any other botanist who has explored and examined the vegetation of this mountain chain has ever found there this Pyrenean plant, it is extremely probable that P. B. Webb incorrectly identified his specimens. But for the smooth seeds, it could be referred to *Cerastium*.

Hab. The Pyrenees (French and Spanish sides) and in the Cantabrian Mountains.

Iconogr.—*DC. Ic. Plant. rar. Gall.* 45 (1808); *Bot. Mag.* t. 5836.

SYN. *A. cerastioides*, Pers. Syn. Plant. i. p. 502.

Cerastium purpurascens (*non* Adams), Fenzl, Verbreit. Alsin. t. ad p. 56.

C. Ramondi, Fenzl, *ex* Benth. & Hook. f. Gen. Plant. i. p. 149.

Dufourea purpurascens, Gren. in Act. Soc. Linn. Bord. 1837, p. 25.

Sectio v. EREMOGONÆ.

Subsectio 1.—Axillæ foliorum non fasciculiferæ.

A. Flores subsessiles, in cymis capitato-aggregatis vel glomerato-fasciculatis.

90. *A. CEPHALOTES*, *Bieb. Fl. Taur. Cauc.* i. p. 346 (1808), et iii. p. 309; *Ledeb. Fl. Rossica*, i. p. 361.

Caudex polycephalus crassus, caules erectos edens. Folia turionum prælonga curvata, margine ciliis asperis scaberrima; folia caulium duplo latiora breviora, superiora rigida adpressa. Ochrea brevis. Flores in thyrsum compactum turbinatum vel hemisphæricum conferti; bracteæ latæ subulatæ rigidæ elongatæ. Sepala ovata acuminata obtusa carinata. Petala e basi sublatiore rotundatâ oblonga obtusa, calycem subsuperantia vel eum æquantia.

Described from Rehmann's specimens in Herb. Kew.

Geogr. area.—S. Russia.

N. South part of the prov. of Podolia.

S. Prov. of Kherson, near Odessa.

W. Prov. of Bessarabia.

E. Prov. of Kherson (Rehmann, Exsicc. It. Cherson, no. 27).

SYN. *Eremogone cephalotes*, Fenzl, *Verbreit. Alsin. t. ad p. 46.*

91. *A. CONGESTA*, *Nutt. ex Torr. & Gray, Fl. N. Amer. i. p. 178 (1838); Robinson, in Proc. Amer. Acad. xxix. p. 295 (1894).*

Nuttall in his MS. description says, "a remarkable species, resembling in habit *Dianthus prolifer*."

β. suffrutescens, *Robinson in Proc. Amer. Acad. xxix. p. 295.*

Caudex sæpius lignosus crassus. Capitula umbellatim sphaerica; floribus paullum minoribus.

SYN. *Brewerina suffrutescens*, A. Gray, in *Proc. Amer. Acad. viii. p. 620 (1872).*

A form too well marked in its foliage, ligneous caudex, and allium-like inflorescence to be united with the typical *A. congesta*. The capitellate stigmata are not of generic importance.

γ. subcongesta, *S. Wats. Bot. Calif. i. p. 69; Robinson, in Proc. Amer. Acad. xxix. p. 295.*

Caudex plus minus lignosus. Caules glabri vel pulverulento-pubescentes, sæpius geniculati nodis valde tumescentibus. Flores minus congesti, in cymas dichotomas conferti. Sepala ovata acuminata.

SYN. *A. Fendleri* var. *subcongesta*, *S. Wats. Bot. King Exped. p. 40.*

A. Fendleri var. *glabrescens*, *S. Wats. l. c. p. 40.*

δ. Kingii, *Jones (sp.) in Proc. Calif. Acad. Sci. ser. 2, v. p. 627; Gray & Robinson, Syn. Fl. N. Amer. i. p. 241 (1897).*

Flores in cymas dichotomas conferti, petalis emarginatis. Planta superne glanduloso-pubescentis.

Hab. Humboldt Mtns. in N. Nevada, and S. Utah.

Geogr. area.—W. Canada and W. United States.

N. Canada: Cypress Hills in prov. of Assiniboia.

S. Arizona. W. Colorado.

E. Rocky Mountains of California.

Iconogr.—*S. Wats. Bot. King Exped. p. 39, t. 6. figs. 1-3 (Stellaria Kingii).*

92. *A. FRANKLINII*, *Dougl. ex Hook. Fl. Bor.-Amer. i. p. 101, t. 35 (1833); Robinson, in Proc. Amer. Acad. xxix. p. 297 (1894).*

Specimens collected by Douglas at source of the Missouri may well have been the next species.

Hab. N.W. United States; Oregon and Washington.

93. *A. HOOKERI*, *Nutt. in Torr. & Gray, Fl. N. Amer.* i. p. 178 (1838); *Robinson in Proc. Amer. Acad.* xxix. p. 297 (1894).

This species, with much the habit of the preceding, differs in its much denser caudex and constantly pubescent stem. The stem is terete even in a dried state, while the stems of *A. Franklinii* in drying become furrowed and angulate, as though slightly fleshy. The slightly exerted petals are also characteristic. It can scarcely be considered a variety of the preceding.

Hab. United States: Colorado, Wyoming, Nebraska, and Montana.

94. *A. POLYCNEMIFOLIA*, *Boiss. Diagn. Pl. Or. nov. Ser. I.* i. p. 48 (1842); *Fl. Orient.* i. p. 692.

Glaucæ. Folia turionum brevia stricta setacea mucronata. Capitulum pauciflorum (floribus 3-6), bracteis involucreto; bracteæ lineari-lanceolatæ acuminatæ viridi-carinatæ. Sepala oblongo-lanceolata acuta late membranaceo-marginata carinata, nervo ad apicem usque producto. Petala alba oblongo-linearîa, basi vix attenuata, calyce sublongiora.

The bracts do not seem to be "abbreviatæ," as in Boissier's description. But the description may be based on Aucher-Eloy's specimens numbered 4255, in which the heads of flowers are very much crushed and mutilated, and in which it is not possible to ascertain the length of the bracts. Sintenis's specimens, determined by Prof. C. Haussknecht, show the structure of the fascicles of flowers very clearly, and from these specimens the description has been revised.

Geogr. limits.—*N. & W.* Turkish Armenia: Ketsetvikale, near Gumuchkhane, in prov. of Trebizond (*Sintenis*, *It. Orientale*, 1891, no 6111).

S. & E. N. Persia: Mt. Demawend, in the Elburz Mountains.

B. Flores pedicellati, in cymas simplices aut compositas interdum depauperatas vel per thyrsum brachiatum paniculæ-vel corymbiformem dispositi, pedicellis calyci æquilongis vel longioribus suffulti.

a. Petala sepalis breviora.

95. *A. PUNGENS*, *Clem. in Lag. Gen. et Spec. Nov.* p. 15, no. 199 (1816); *Willk. & Lange, Prodr. Fl. Hisp.* iii. p. 625.

This very distinct and remarkable species is limited in Europe to the range of the Sierra Nevada, and forms broad hemispherical bristly tufts from 50 to 20 centim. high, growing on the alpine slopes and also above the snow-line at 1750 to 2700 metres. As J. Gay points out, in plants raised from seed in the Paris Botanic Garden, the whole plant is glaucous, and not as one sees it in Boissier's otherwise well-coloured plate. It was only a considerable time afterwards that glabrous specimens referable to this species were found in S. Marocco, by Mr. E. Cosson and Mr. John Ball. In all the specimens I examined the seeds appeared to be quite smooth, and free from elevated tubercles, neither had they the rough surface mentioned in Willkomm's description. This was also certainly the case in the Marocco specimens.

β. glabrescens, Ball, in Journ. Bot. 1873, p. 301.

Differt a typo Hispanico, sepalis glabris, nervo mediano basin versus ciliato, caulibus glabris, foliis ad basin membranaceam connatis ciliatis, antheris fusco-griseis nec rubentibus.

Geogr. limits.—*N. & E.* Andalusia : southern slopes of Sierra Nevada.

W. Mt. Ouensa, to the south of the city of Marocco, a spur of the Great Atlas, var. *β* (*Cosson, 1873*).

S. Tâcherat, on the Anti-Atlas, still further south, var. *β* (*Ball*).

SYN. Eremogone pungens, Fenzl, Verbreit. Alsin. t. ad pp. 57 et 59.

b. Petala calycem æquantia, vel sæpius eo longiora.

96. A. HOLOSTEA, *Bieb. Fl. Taur. Cauc. i. p. 345 (1808); Ledeb. Fl. Rossica, i. p. 364.*

Lusus 1 :—*cyma puberula (forma normalis).*

Lusus 2 :—*cyma glaberrima (spec. in Willd. herb. no. 8751).*

Geogr. limits.—*N.* Cis-Caucasia; prov. of Terek, along the river Terek between Balta and Larsk.

S. Turkish Armenia: Bayazid.

W. Cis-Caucasia: prov. of Terek, Mt. Kazbek in the Central Caucasus, 14 miles from the northern limit, at 2750 metres (*C. A. Meyer*).

E. Cis-Caucasia: prov. of Daghestan.

SYN. Eremogone Holostea, Rupr. Fl. Caucasi, p. 217.

97. *A. LYCHNIDEA*, *Bieb. Fl. Taur. Cauc.* i. p. 347 (1808), et iii. p. 309; *Ledeb. Fl. Rossica*, i. p. 366.

Admissa a Ledebour species subdubia et probabiliter varietas stenopetala *A. formosæ*, Fisch., postea conjuncta est a b. E. Regel cum *A. capillari*, Poir.; sed hæc planta in cymæ plurifloræ pedicellis elongatis, petalis ellipticis basi vix attenuatis, et imprimis glandulis 5 brevibus truncatis staminiferis est certe distincta.

The specimens in Herb. Kew. are from the source of the R. Argun (1881).

Geogr. range.—*N.* Trans-Caucasia: prov. of Tiflis, at the source of the R. Argun.

E. Trans-Caucasia: prov. of Tiflis, Azunta in the Caucasus, at 3350 metres (*Ruprecht*, Fl. Caucasi, p. 219).

S. & W. Turkish Armenia: Mt. Ararat.

SYN. *A. setacea* (non Thuill.), Fisch. *ex Ser.* in DC. *Prodr.* i. p. 402.

Eremogone lychnidea, Rupr. Fl. Caucasi, p. 219.

98. *A. ACUTISEPALA*, *Haussk. ined. in exs., Sintenis, It. Orientale*, 1890, no. 2764.

22 centim. Omnino glabra, glaucescens. Folia turionum lineari-setacea cuspidato-acuminata incrassato-marginata, caulina magis pungentia. Flores in cymas compositas multifloras dispositi. Sepala late membranaceo-marginata, 2 interiora ovata acuminata, 2 exteriora lanceolata longe attenuato-acuminata, intermedium lanceolato-ovatum longe attenuato-acuminatum. Petala elliptico-oblonga, apice subeucullata, calycem duplo superantia.

Hab. Turkish Armenia: on bare hills near Salachlu in the district of Egin, prov. of Diarbekir.

99. *A. SZOWITZII*, *Boiss. Fl. Orient.* i. p. 695 (1867); *Jacks. Ind. Kew.* i. p. 181.

23 centim. Glabra. Caudiculi prostrati. Caules debiles, basi foliorum denudati. Folia stricta setacea scabrida. Cyma 1-4-flora; flores alares supra medium pedicellis braceati, bracteis scariosis incurvis linearibus acuminatis. Sepala pallida oblongo-lanceolata acuminata anguste scariosa. Petala oblonga, calyce sublongiora.

Ab *A. Holostea* differt, caudiculis prostratis, caulibus adscendentibus basi denudatis, sepalis 6 mm. longis anguste scariosis.

Boissier's description is very short. The above has been drawn up from authentic specimens ex Herb. Hort. Petropolit., labelled "Armenia," but without precise locality.

Hab. Persian Armenia: Dilman, near Lake Urumiah.

100. A. COMPACTA, *Coville, in Proc. Biol. Soc. Wash.* vii. p. 67; *Robinson, in Proc. Amer. Acad.* xxix. p. 295 (1894).

Glaucâ. Caules graciles circiter 3 centim., fere foliorum denudati. Folia turionum glandulosa ciliata. Sepala ovato-lanceolata acuminata. Petala calycem excedentia.

Hab. California: mountains of Tulare Co. (1891).

Iconogr.—*Coville in Contrib. U. S. Herb.* iv. p. 70, t. 5.

101. A. ISAUERICA, *Boiss. Fl. Orient.* i. p. 695 (1867); *Jacks. Ind. Kew.* i. p. 179.

Basi suffrutescens. Caules basi foliorum denudati. Folia turionum stricta lineari-filiformia margine scabrida, caulina multum longiora. Flores in thyrsium brevem pauciflorum sub-corymbosum dispositi. Sepala carinata oblonga obtusa late viridia, anguste hyalino-marginata, apice nigricantia. Petala obovato-oblonga inferne attenuata, calyce duplo longiora.

Primùm Boissier eam habuit pro formâ *A. graminifoliae*, a quâ longe differt caulibus basi nudis, sepalorum et petalorum formâ, et insigniter glandulis nullis.

Hab. Cilicia: alpine pastures of Mt. Ghei-dagh, in the Taurus range.

102. A. CUCUBALOIDES, *Smith, Plant. Ic. Ined.* i. p. 17, t. 17 (1789); *Boiss. Fl. Orient.* i. p. 695.

α. glabra, *Ledeb. Fl. Rossica*, i. p. 365 (*Willd.* herb. no. 8744).

Cyma et sepala glaberrima.

β. viscida, *Ledeb. Fl. Rossica*, i. p. 365.

Cyma et sepala viscido-puberula.

Geogr. limits.—N. Turkish Armenia: between Gumuchkhane and Baïburt, in prov. of Trebizond.

S. & W. Mt. Hassan-dagh, in prov. of Karamania (*Whittall, exsicc.* 1893, no. 153).

E. Russian Armenia, near Erivan.

Mr. Edward Whittall's specimens are interesting, as they considerably extend the range of the species.

Iconogr.—*Smith, l. c.*

SYN. *Eremogone cucubaloides*, Hohen. in Bull. Soc. Nat. Mosc. 1838, p. 401.

Arenaria gypsophiloides (non Linn.), Stev. ex Ledeb. Fl. Ross. i. p. 365.

103. A. JUNCEA, *Bieb. Fl. Taur. Cauc.* iii. p. 309 (1819); *Ledeb. Fl. Rossica*, i. p. 366.

a. *typica*, *Regel, Pl. Raddeanæ*, in *Bull. Soc. Nat. Mosc.* 1862, pt. 1, p. 364.

Cyma et sepala glanduloso-pubescentia.

β. *glabra*, *Regel, Pl. Raddeanæ, l. c.* p. 365.

Cyma et sepala glaberrima.

Geogr. limits.—N. Along the R. Argun, near Nertschinsk, in the Siberian province of Trans-Baikalia (*Turczaninow*, ex Ledeb. Fl. Rossica, i. p. 366).

E. Manchuria (*Maximowicz, Pl. Mongol.*).

W. Between the Yablonoi Mountains and Lake Baikal (*Herb. Kew. ex Herb. hort. Petropolit.*).

S. China: Wei-chang near the source of the R. Ying-ho-Chuang-ho, in the prov. of Chihli (*Palibin*, in *Act. Hort. Petropol.* 1895, p. 111).

SYN. *A. dahurica*, Fisch. ex Cand. Prodr. i. p. 402.

Eremogone juncea, Fenzl, *Verbreit. Alsin.* p. 37.

104. A. SAXATILIS, *Linn. Sp. Plant.* p. 423 (1753), excl. omnia syn. [in ed. 2, septem]; *DC. Prodr.* i. p. 405.

Glabra. Caudices ramosi radicanter. Folia turionum linearisetacea, recta vel heteromallo-curvata, margine scaberrima; caulina media filiformia; floralia lineari-subulata longe acuminata. Ochrea elongata sæpeque fissa. Cymæ ternæ breves, contractæ nec patulæ; floribus in thyrsum pauciflorum paniculæformem dispositis. Calyx ellipsoideus; sepala chartaceo-scariosa nitida, præter nervum dorsalem viridem, in mucronem herbaceum haud excurrentem flavescenti-albida, plana ecarinata late hyalino-marginata, apice rotundato-obtusa, omnia æqualia, ovalia vel sæpius late ovata. Petala alba obovata vel obovato-oblonga rotundata, calyce vix duplo longiora. Capsula oblongo-ovata.

As great confusion has unnecessarily arisen between specimens of this species and others referable to *A. longifolia* and *A. graminifolia*, the above is to a great extent transcribed from J. Gay's

MS. description of the Linnean specimen. Linnæus's brief description (Sp. Plant. ed. II.) is:—"Arenaria foliis subulatis, caulibus paniculatis, calycum foliolis ovatis obtusis"; which is not particularly characteristic. In 'Mantissa Plantarum' he cites as a synonym "*Alsine arenaria: foliis subulatis, inferioribus longissimis*," from *Gmelin, Fl. Sibir.* iv. p. 157, t. 63. f. 2; and this figure exactly represents the specimen in the Linnean herbarium. Fenzl then is wrong in separating the two plants, of which he refers one (the Linnean specimen) to *A. longifolia* ("fide speciminis cum Linneano comparati"), and refers the other (Gmelin's figure) to *A. graminifolia* (—Fenzl, in Ledeb. Fl. Rossica, i. pp. 362, 363). The two plants are identical, and, judging from the Linnean specimen, they could neither of them belong to *A. longifolia*, Bieb. In this specimen the sepals are quite plane and in no way carinate. In this respect, as in many other characters (few-flowered cymes, very obtuse sepals, oboval petals somewhat exceeding the calyx), it nearly agrees with *A. graminifolia*, though it cannot well be reduced to it. But it differs from the latter in its three contracted cymes with shortened pedicels, which gives it a different aspect, and also in its evidently smaller flowers. The arrangement and aspect of the flowers is almost exactly that of *Stellaria Holostea*. Linnæus gives as the geographical range, Germany, Switzerland, France, and Siberia. But though the last is correct, the distribution of true *A. saxatilis* in Europe includes Croatia, Transylvania, Roumania, and Central and Southern Russia; and in other countries the somewhat similar specimens should be referred to *A. graminifolia*.

As Gay himself suggests, the proper authority as well as type for this species is the actual specimen in the Linnean Herbarium. In the second edition of 'Sp. Plantarum' seven synonyms are given. In Gay's MSS. in the Kew Herbarium they are all referred to other species: taking them in the order in which they are given they may be disposed of as follows:—(1) *Alsine setacea*, Mert. et Koch; (2) *Alsine mucronata*, Linn.; (3) *Alsine verna*, Wahlenb., though Linnæus in 'Mant. Plant.' p. 72 transferred this synonym to *Arenaria verna*; (4) Vaillant's specimen is *Alsine setacea*, and Haller's specimen is *Alsine verna*; (5) *Alsine mucronata*; (6) *Alsine verna*; (7) possibly *Alsine tenuifolia*, Crantz, but uncertain.

Other synonyms usually referred to *A. graminifolia*, Schrad., should thus be referred to *A. saxatilis*:—*A. stenophylla*, Ledeb., Ind. hort. Dorpat, 1823, et Fl. Altaica, ii. p. 165; *A. longifolia* (non Bieb.), DC. Prodr. i. p. 402 (the reverse is cited in 'Index Kewensis'); *A. procera*, Spreng. Hist. Rei Herb. ii. p. 268 (1808), et Hornem. Hort. Hafn. p. 424 (1813); *A. graminifolia*, var. *a. parviflora*, Ledeb. Fl. Rossica, i. p. 363; *A. otitoides*, Adams ex Cand. Prodr.; and finally *Eremogone longifolia*, Fenzl.

Geogr. limits.—*N.* Siberia: R. Irtysh. *E.* Lake Baikal.

S. Transylvanian Alps. *W.* Croatia.

Iconogr.— *Ic. Taurin.* xiv. t. 73. f. 3; *Reichb. Ic. Fl. Germ. Helv.* 4934 (*Pettera graminifolia*).

105. *A. LONGIFOLIA*, *Bieb. Fl. Taur. Cauc.* i. p. 345, iii. p. 308 (1808); *Ledeb. Fl. Rossica*, i. p. 362 (excl. var. β).

The type-specimens of this plant are in Willd. herb. no. 8752 (fol. 4, 5).

Hab. South and Central Russia, and South and Western Siberia.

Iconogr.—*Ledeb. Ic. Pl. Fl. Rossic.* 403.

106. *A. ACULEATA*, *S. Wats. Bot. King's Exped.* p. 40 (1871); *Robinson, in Proc. Amer. Acad.* xxix. p. 294 (1894).

Glabra, glauca, 15 centim. Folia subulata rigida aculeata Cymæ paucifloræ. Sepala late ovata acuta. Petala elliptico-lanceolata, emarginata vel eroso-dentata, $1\frac{1}{2}$ –2-plo calyce longiora.

A plant distinguishable from those allied to it by the character of the margin of the petals. The sepals are variable, and become more acute in the southern form, which is more difficult to distinguish from those varieties of *A. congesta* which have an open inflorescence.

Geogr. area. *W.* United States, from Oregon to Arizona.

Subsectio 2.

Apud multa folia, axillæ fasciculos foliorum adentes.

107. *A. DRYPEIDA*, *Boiss. Diagn. Pl. Or. nov.* Ser. I. i. p. 49 (1842); *Fl. Orient.* i. p. 696.

Hab. Prov. of Marasch, between the Eastern Taurus and the R. Euphrates; occurs up to 2700 metres on rocky places.

108. A. LEDEBOURIANA, *Fenzl, in Russegg. Reise*, ii. p. 931 (1841-42); *Boiss. Fl. Orient.* i. p. 696.

β . glutinosa, *Boiss. (sp.) in Ann. Sc. Nat.* 1854, p. 247, t. 2; *et Fl. Orient.* i. p. 697.

Rami superne glutinosi.

γ . parviflora, *Boiss. Fl. Orient.* i. p. 697.

Cyma magis effusa. Pedicelli calyce 4-7-plo longiores. Calyx minor, sepalis magis acutis.

Geogr. limits.—*N. & E. Russian Armenia.*

S. Mt. Taurus, in Cilicia.

W. Angora, in prov. of Anatolia.

Iconogr.—*Boiss. in Ann. Sc. Nat.* 1854, p. 247, t. 2; *et in Tchihat. Asie Min. Bot.* iii. t. 14 (1862) (var. β).

SYN. A. trichotoma (non Royle), *Boiss. Diagn. Pl. Or. nov. Ser. II.* v. p. 60 (var. γ).

109. A. ACEROSA, *Boiss. & Heldr. exsicc.* 1847, *et Boiss. Diagn. Pl. Or. nov. Ser. I.* viii. p. 103 (1849); *Fl. Orient.* i. p. 697.

Caudices prostrati. Rami pumili breves glabri. Folia ramorum sterilium stricta penicilliformia, ramorum floriferorum remota, omnia brevia rigida triquetra setaceo-subulata aristata margine scabra, viridia vel basi rubella. Cymæ confertim et corymbose 5-9-floræ; floribus in pedicellis glutinosis suffultis. Calyx ovatus; sepala valde glutinoso-hirsuta oblonga setaceo-acuminata subacerosa late scarioso-marginata, dorso convexo-carinata. Petala oblonga obtusa, calyce $\frac{1}{3}$ parte longiora.

Facies et folia præcedentis, differt cymâ simplicis, pedicellis brevibus, sepalis acerosis, flore duplo majore.

β . glabra, *Boiss. Fl. Orient.* i. p. 697.

Calyx et pedicelli glabri. Pedicelli alares ad medium bracteati, pedicellus dichotomialis basi bracteatus (ut in typo).

Geogr. limits.—*N. & E. Kharpūt, in prov. of Diarbekir (Sintenis, It. Orientale, 1889, no. 538).*

S. Mt. Ak-dagh, in S. Anatolia.

W. Mt. Bereket-dagh, in Anatolia.

In fixing the limits of these Oriental species, one has to remember that there are five mountains in Asia Minor which bear the name of Ak-dagh—one in prov. of Erzeroum, one in prov. of Van, one in prov. of Karamania, and two in prov. of Anatolia (one near Kiutayeh and the other above Elmalu). Specimens were first collected between Konieh and the lake of Bey-sheyr, in the prov. of Karamania (1845).

110. *A. LESSERTIANA*, Fenzl, in *Russegg. Reise*, ii. p. 932 (1841-42); *Boiss. Fl. Orient.* i. p. 697.

β. minor, *Boiss. Fl. Orient.* i. p. 698.

Folia 10-13 mm. longa; scapi $2\frac{1}{2}$ -7 centim. a basi sæpe dichotomi vel uniflori.

Geogr. range. Persia (up to 3850 metres).

SYN. *A. persica*, Boiss. *Diagn. Pl. Or. nov. Ser. I. i.* p. 49. (This plant was described a few months after Fenzl's species.)

Alsine pungens, Stapf, *Bot. Polak. Exped.* 1882.

111. *A. TETRASTICHA*, *Boiss. Diagn. Pl. Or. nov. Ser. I. i.* p. 50 (1842); *Fl. Orient.* i. p. 698.

Geogr. range. Persia.

Subgenus II. EREMOGONEASTRUM.

Sectio i.

Calyx basi haud indurascens. Flores solitarii, raro cymosi.

112. *A. BOURGÆI*, *Hemsl. Diagn. Pl. Nov.* ii. p. 21 (1879); *Biol. Centr.-Amer., Bot.* i. p. 70.

Parcissime pilosula. Rami 7-30 centim., debiles procumbentes angulati. Folia parva distantia lineari-oblonga sessilia basi que subamplexicaulia, obtusa vel subacuta, margine ciliolata. Flores solitarii axillares pedicellati albi. Sepala glabra ovato-oblonga vel fere elliptica, margine diaphano-scariosa. Petala oblonga, sepalis duplo longiora. Disci glandulæ aurantiacæ. Ovarium globosum. Semina reniformia cinnamomea nitida punctulata.

Hab. Mexico.

113. *A. FESTUCOIDES*, *Benth. in Royle, Illustr. Bot. Himal.* p. 81, t. 21. f. 3 (1839); *Hook. f. Fl. Brit. Ind.* i. p. 236 (1874).

Geogr. range.—West alpine Himalaya.

N. Kunawar in Kashmir. *E. R.* Karnali in W. Tibet.

S. Pindasi in Kumaon. *W.* Lahul, in the Punjaub.

Iconogr.—*Royle, l. c.*; *Klotzsch in Bot. Ergeb. Waldem. Reise*, p. 142, t. 27 (*A. Gulielmi-Waldemarii*).

SYN. *A. Falconeri*, Edgew. (no. 257 in Herb. E. Ind. Co.).

A. muralis, Edgew. ex J. F. Watson, *Pl. Kumaon* (1874).

A. pungens (non Clem.), Jacquem. (no. 894 in Herb. Paris.).

A. Roylei, Benth. (in Herb. Kew.), et Garcke ex Klotzsch.

114. *A. MONTICOLA*, *Edgew. in Hook. f. Fl. Brit. Ind.* i. p. 238 (1874); *Jacks. Ind. Kew.* i. p. 180.

Glabra, dense cæspitosa omnino squarrosa, basi lignosa. Rami dense foliati. Folia basi scarioso-vaginantia, rigida brevia patenti-recurva subulata, apice aciculata, margine incrassata ciliolata, nitida, nervo mediano valde prominente floralia majuscula lanceolato-subulata scariosa. Flores solitarii sessiles. Calyx basi truncatus; sepala ovato-lanceolata acuminata valde trinervia, ultra nervos late scariosa. Petala late ovata, sepalis longiora, basi breviter unguiculata, apice rotundata, alba. Capsula globosa.

Forms squarrose green patches, on which the large white flowers are conspicuous.

Hab. Tibetan region of Sikkim Himalaya, at 4800 metres; but does not occur in British India.

115. *A. KANSUENSIS*, *Maxim. in Bull. Acad. Pétersb.* xxvi. p. 428 (1880); *Mél. Biol.* x. p. 579; *Fl. Tangutica*, p. 86, t. 14 (1889).

Densissime pulvinata, glabra. Caudex lignosus, polycephalus. Cauliculi 24 mm. simplices. Folia subtriquetra pungentia, turionum basi latiora scariosa scabro-serrulata, ramulorum florum ad apicem fere scariosa, supremis bractealibus decrescentibus. Pedicelli pilosi. Calyx basi rotundatus, haud incrassatus; sepala lanceolata obsolete subtrinervia late hyalinomarginata, acuta vel sæpius acuminata, apice recta. Petala obovata, calyce occultata. Ovarium globosum.

Hinc *A. monticolæ* persimilis, differt autem hæc foliis bractealibus tantum 4 dilatatis, flore sessili, pedicello glabro, petalis ex ungue distincto ovatis sepala distincte trinervia superantibus, ovario ovoideo neque globoso, flore paullo minore.

Hab. China: prov. of Szetschuan (*Potanin*, 1885), above Tachien-lu on the confines of Tibet (*A. E. Pratt*, 1890). Tibet: Amdo in prov. of Tangut, and prov. of Kansu (*Przewalski*, 1872).

Iconogr.—*Maxim. Fl. Tangutica*, l. c.

Sectio ii.

Calyx basi induratus. Flores cymosi vel solitarii.

Subsectio 1.—Caules floriferi simplices, remote foliati; turiones foliis angustis dense comati multum breviores. Flores cymosi. Petala sæpius sepalis longiora.

116. *A. SCARIOSA*, *Boiss. in Tchihat. Asie Min. Bot.* i. p. 234 (1860); *Fl. Orient.* i. p. 692.

Basi indurata, valde cæspitosa. Caudex crassus lignosus,

turiones caulesque floriferos edens. Caules 15 centim. Folia brevia stricta setaceo-subtriquetra scabrida, basi membranaceo-dilatata, apice obliquiter mucronata. Inflorescentia cymosocorymbosa 6-15 florum; cymis strictis glandulosis, bracteis lanceolatis scariosis. Sepala lanceolata acuta, dorso convexa, præter basin subvirentem omnino scarioso-alba. Petala oblongo-lineararia basi subattenuata, calyce breviora. Glandulæ subspathulatæ.

Hab. Turkish Armenia: between Gumuchkhane and Kerekli in prov. of Trebizond.

117. *A. GRAMINEA*, *C. A. Mey. Verz. Pfl. Cauc.* p. 220 (1831); *Boiss. Fl. Orient.* i. p. 692.

The leaves of the barren shoots are about 15 centim. long.

Geogr. limits.—*N.* Russian Armenia: Mt. Kara-bagh (*Szowits*, no. 322, ex. Herb. hort. Petropolit.).

S. & E. Tatuni, in prov. of Talysch, at 1300 metres above the Caspian Sea (1836).

W. Persian Armenia: Mt. Kara-dagh, in the district of Khoi.

SYN. *Eremogone graminea*, *C. A. Mey. ex Fisch. et Mey. Ind. Sem. hort. Petropol.* i. p. 7.

118. *A. BLEPHAROPHYLLA*, *Boiss. Fl. Orient.* i. p. 693 (1867); *Jacks. Ind. Kew.* i. p. 178.

Caules 15 centim., dense foliosi, cum turionibus vaginis carinatis ciliatis foliorum vetustorum plus minus vestiti. Folia turionum brevia setacea flexuosa, margine serrulato-scabra vel ciliata incrassata albo-cartilaginea, caulina plana trinervia setaceo-acuminata. Panicula glandulosa breviter thyrsoides conferta. Sepala ovato-oblonga obtusa glabra late viridia. Petala oblongo-lineararia, sepalis duplo longiora. Glandulæ breves lineares, apice subincrassatæ.

β. *breviflora, mihi.*

SYN. *A. graminea*, var. *parviflora*, *Fenzl, in Ledeb. Fl. Rossica*, i. p. 362.

A. Steveniana, *Boiss. Fl. Orient.* i. p. 692 (var. *β*).

Folia facie superiore vix concava, margine haud ciliata. Sepala oblonga, minus obtusa. Petala breviora.

Hab. Armenia, from Lake Gök-tchai in Russian Armenia to Mt. Bingöl-dagh in Turkish Armenia.

In Herb. Kew. are specimens collected by Calvert and Zohrab in 1867, labelled "*Gypsophila succulina*." These specimens are

referred by Dr. Stapf to *A. blepharophylla*. I know of no species of *Gypsophila* published under this name, and have seen no other specimens of the above species.

119. *A. GRIFFITHII*, *Boiss. Diagn. Pl. Or. nov. Ser. II. i.* p. 89 (1853); *Fl. Orient. i.* p. 697.

Basi suffruticosa, glabra vel parce breviterque puberulo-viscidula. Rami floriferi 4-5 centim., erecti sæpius 1-3-flori viscidi. Folia brevia setaceo-subulata pungenti-rigida apicem versus patenti-recurvata uninervia ciliolata, eorum axillis fasciculos foliorum edentibus. Bracteæ triangulares acuminatæ breves concave ovato-subulatæ. Calyx breviter ovatus, basi rotundatus; sepala coriacea glandulosa fere æqualia carinata oblonga breviter attenuato-mucronata intus concava basi obscure trinervia late hyalino-marginata. Petala obovata, calyce sesquilingiora. Capsula globosa vel late ovoidea, inclusa.

Accedit ad *A. Lessertianam* var. *minorem*, a quâ differt foliis magis tenuibus, ramis floriferis nec omnino scapiformibus, etiam sepalis mucronatis.

Boissier gives only a single locality for this species, Mt. Koh-i-Baba in Afghanistan, at an elevation of 4000 metres. It is now known to be a widely spread species, being found in several localities in West Central Asia.

Geogr. limits.—*N.* Russian Turkestan: Lake of Kul-i-Kalan (*Regel, exs. It. Turkestan., 1882; Komarow, Mat. Fl. Turkestan [1896].*)

S. & E. Kashmir: Dras Valley in Little Tibet.

W. Afghanistan: Kurrum Valley, Mt. Koh-i-Baba.

120. *A. ARMENIACA*, *Boiss. Diagn. Pl. Or. nov. Ser. I. i.* p. 48 (1842); *Fl. Orient. i.* p. 691.

A plant with the flowering stems rising about 15 centim. above the tuft, with fasciculate flowers not closely aggregated.

Hab. Turkish Armenia: dry hills round Baïburt in the prov. of Erzeroum, and rocky slopes at Teke near Gumuchkhane in the prov. of Trebizond (*Sintensis, It. Orientale, 1894, no. 6113.*)

Subsectio 2.—Caules breves, dense foliosi, simplices vel ramulosi.

Flores solitarii. Petala semper sepalis longiora.

121. *A. POLYTRICHOIDES*, *Edgew. in Hook. f. Fl. Brit. Ind. i.* p. 237 (1874).

Musciformis, densissime cæspitosa, cæspitibus hemisphæricis,

glabra. Radix prælonga robusta lignosa dura. Caules teretes, 2-10 centim. Folia subulata recurvata rigida pungentia basi late scarioso-vaginantia subsquarrosa, facie canaliculata, dorso convexa, margine incrassata obscure ciliata, præcipue ad basin versus, nitida. Flores minuti, breviter pedicellati, bracteis elongatis cuspidato-ovatis ad dimidium calycem attingentibus instructi. Calyx basi rotundatus; sepala elliptica obtusa obsolete trinervia, margine haud scariosa. Petala late obovata, apice rotundata. Capsula ovoidea.

β. perlevis, *Williams*.

SYN. *A. musciformis* [non Triana et Planch.], Edgew. *l. c.*

Sepala oblongo-lanceolata fere acuta membranaceo-marginata.

In his 'Fl. Tangutica,' Maximowicz points out that in the specimens of *A. musciformis* collected by Capt. Strachey, which he carefully examined, the flowers are white and are not sessile but shortly pedicellate, which makes the plant agree still more with typical *A. polytrichoides*. He also notes that the bracts are elongated, ovate and cuspidate, reaching to half length of the calyx. If *A. musciformis* were not reduced to this species, the name would have to be changed, as there is an earlier use of the name for a S. American species. Specimens have been collected at an altitude of 5900 metres, which is higher than that of any other species of *Arenaria*. It forms matted hard tufts, tougher than those of *A. pulvinata*; and there is a good specimen mounted in a glass case in the Kew Museum.

Hab. Tibet: Balch, Karakoram and the Parang Passes, south shore of Lake Mang-isa-Tso in N.W. Tibet (*Capt. Deasy's* Exped. to Tibet, 1896-97, no. 813); alpine region of Sikkim Himalaya on the Tibetan side. China: Ba-tang on the river Di-chu, and at Ta-chien-lu on the river Tung, in the prov. of Sze-chuen (*Kanitz*, Bot. Centr. Asiat. Exped. Szechenyi, in *Math. Naturwissensch. Ber. Ung.* iii. [1886]).

122. *A. PULVINATA*, *Edgew. in Hook. f. Fl. Brit. Ind.* i. p. 238 (1874); *Jacks. Ind. Kew.* i. p. 180.

Densissime et pulvinatim cæspitosa, cæspitibus subglobosis compactis, pallide vireus, subsquarrosa. Folia plana brevia subulato-recurvata mucronata, basi semi-tereti scarioso-vaginate, margine hispido-ciliata. Flores sessiles non bracteati. Calyx basi rotundatus; sepala ovato-lanceolata subacuta, nervis 3 approximatis, margine cartilagineo-scariosa. Petala obovata,

sepalis duplo longiora. Capsula ovoidea polysperma. Semina obovato-reniformia subglabra.

Hab. On the Tibet side of the Sikkim Himalaya, at 4500–5400 metres.

Of the species described in the 'Fl. of British India,' 21 are to be referred to *Arenaria* as defined in this Revision. Of these 21, however, six do not occur in India at all, but in Tibet, viz., *A. globiflora*, *A. oreophila*, *A. pulvinata*, *A. monticola*, *A. polytrichoides*, and *A. musciformis*. The last two are here united in one species. To these are now added three new Indian species—*A. ferruginea*, *A. kumaonensis*, and *A. tenella*.

A. pulvinata forms small subglobose densely compacted squarrose tufts: the stems bearing flowers only 6 mm. in diameter, not subtended by enlarged upper leaves in the form of bracts as in *A. monticola*. Of the other species of *Arenaria* described in the 'Fl. of British India,' the majority occur in the native and feudatory states, and cannot be rightly reckoned among *British* Indian species. These only will include the following:—*A. festucoides*, *A. serpyllifolia*, *A. nilghirensis*, *A. glanduligera*, *A. ciliolata*, *A. holosteoides*, *A. glandulosa*.

123. *A. GLOBIFLORA*, *Edgew. in Hook. f. Fl. Brit. Ind. i. p. 239* (1874); *Fenzl, in Ann. Wien. Mus. i. p. 63, t. 71* (1836) (*Dolophragma globiflorum*).

Don describes the flowers as rose-coloured, which the specimens do not bear out, and the stigmas as capitate, which is not the case, neither are remains of septa to be found in the capsules.

Hab. Gosai-Than in Tibet, in the alpine region of the Nepal Himalaya.

Iconogr.—*Fenzl, l. c.*

SYN. *Cherleria grandiflora*, D. Don, Prodr. Fl. Nepal. p. 214.

Dolophragma globiflorum, Fenzl, in Ann. Wien. Mus. i. p. 63, t. 71 (1836).

124. *A. DENSISSIMA*, *Edgew. in Hook. f. Fl. Brit. Ind. i. p. 239* (1874); *Fenzl, in Ann. Wien. Mus. i. p. 63, t. 71* (1836) (*Dolophragma juniperinum*).

The locality given in the Flora mentioned above is Gosai-Than, in the Nepal Himalaya; but this locality is neither in British India, nor in Nepal, but in Tibet. It was first recorded for India by Dr. George Watt in 1881 (exs. no. 5426); and was collected at the summit of Mt. Surkia-La in the Sikkim Hima-

laya, at 4150 metres (*Herb. Kew.*); also by Mr. C. B. Clarke above the Yak Pass at 5100 metres.

Iconogr.—*Ann. Wien. Mus.* i. p. 63, t. 71 (1836).

125. *A. KUMAONENSIS*, *Maxim. Fl. Tangutica*, i. p. 86 (1889).

Dense pulvinata. Folia e latiore scariosâ basi subulata triquetra pungentia glabra; ramulorum floriferorum latiora breviora fere tota scariosa, suprema bracteiformia decrescentia, omnia ciliata. Pedicelli viscido-villosi. Sepala uninervia hyalino-marginata. Petala alba elliptica obtusa, petalis parum longiora. Antheræ atræ. Ovarium globosum. Capsula inclusa, oblongo-ovata. Semina margine dense cristato-tuberculata, disco lævia.

A præcedenti longe distat aspectu, characteribus autem ad dignoscendum liquida: in prov. Tibetica hæud occurrens.

Hab. Himalayas: District of Kumaon, in the North-West Provinces (1884).

126. *A. TETRAGYNA*, *Willd. herb.* no. 8748, et ex *Schlecht. Gesellsch. naturf. Fr. Berl. Magaz.* vii. p. 201 (1813); *Rohrb. in Linnæa*, xxxvii. p. 256 (1871-72).

a. imbricata, *Fenzl*, ex *Rohrb. in Linnæa*, xxxvii. p. 256 (1871-72).

Caulis ramuli breves conferti, internodiis abbreviatis, glaberrimi. Folia valde approximata, subacuta, 6-8 mm. Flores breviter pedicellati, pedicellis glabris calyce sesquolongioribus.

Hab. The Andes of Ecuador: Mt. Antisana, at 4200-4500 metres.

β. laxa, *Fenzl*, l. c. p. 257.

Caules plus minus laxi diffusi, internodiis elongatis. Folia remota, nunc acutiusecula nunc obtusiusecula, longiora, usque ad 10 mm. Flores sepalis paullum longius pedicellati.

Lusus 1:—Caules et pedicelli glaberrimi.

Hab. Mexico, Peru, and Chile.

Lusus 2:—Caules unifariam pilis brevibus vestiti, pedicelli florum dense pilosi, rarius in eodem specimine glabrescentes.

Syn. *A. inconspicua*, *Poepp. Coll. Pl. Chil.* iii. p. 127, *Diar.* p. 746.

A. cryptopetala, *Kunze, Syn. Pl. Amer. Austr.* MSS.

Hab. Chile.

Herba polymorpha est, et *var. β* lusu altero ad *A. palustrem* accedit, a quâ tamen habitu multo laxiore, glandulis conspicuis, capsulæ formâ seminibusque satis differt.

Geogr. range.—*N. & W. Mexico.*

S. & E. Chile: Volcano of Antuco, in the Andes of Biobio.

Iconogr.—*H. B. et K. Nov. Gen. et Spec.* vi, p. 25, t. 517.

Subgenus III. PENTADENARIA.

Sectio i. GLOMERIFLORÆ.

Flores subsessiles, in cymis capitato-aggregatis vel glomerato-fasciculatis; flore centrali sæpius ebracteato. Glandulæ emarginatæ.

127. A. PRZEWALSKII, *Maxim. in Bull. Acad. Pétersb.* xxvi, p. 428 (1880); *Mél. Biol.* x, p. 578; *Hemsl. Ind. Fl. Sinens., in Journ. Linn. Soc.* xxiii, p. 70.

Cæspitosa, polycephala. Caudices adscendentes, foliis emortuis tortis mollibus tecti polyphylli. Folia margine scabra, plana, crasse cartilagineo-marginata, uninervia; turionum folia elongata linearia obtusa, caulina lanceolato-linearibus magis obtusa. Cauliculi glanduloso-pilosi. Cyma contracta triflora; flores alares infra basin bibracteolati. Calyx glanduloso-pilosus campanulatus; sepala emarginato-biloba. Petala unguiculata obovata, apice truncata, sepalis parum- vel sesquilingiora.

A. capillaris var. *formosa*, Fisch., huic persimilis, pluribus notis differt: folia omnia triquetra subulato-filiformia pungentia, pedicelli infra medium (nec ad apicem) bracteati et plures flores ibi ferentes, sepala haud emarginata, petala exungiculata ovali-oblonga, postremum filamenta subulata.

Hab. China: prov. of Kansu (*Przewalski*, 1872).

Iconogr.—*Maxim. Fl. Tangutica*, t. 15 (1889).

128. A. DIANTHOIDES, *Smith, Ic. Pl. ined.* p. 16, t. 16 (1789); *Boiss. Fl. Orient.* i, p. 691.

Distinguished from other species by its very long basal leaves, and by its petals like those of a species of *Dianthus*.

Geogr. limits.—*N. Russian Armenia:* near Ervain.

S. Persian Armenia: mountains of prov. of Aderbidjan.

E. Prov. of Talysch, in Trans-Caucasia, at 2150 metres.

W. Turkish Armenia: Mt. Tech-dagh and Mt. Bingöl-dagh, in prov. of Erzeroum (Tournefort's specimens).

Iconogr.—*Smith, l. c.*

Sectio ii. RARIFLORÆ.

Flores pedicellati, in cymas simplices aut compositas interdum depauperatas, vel per thyrsum brachiatum paniculæ-vel corymbiformem, dispositi, pedicellis calyci æquilongis vel longioribus suffulti; bracteæ ochraceæ subvagiuanes scariosæ. Glandulæ integerrimæ.

Subsectio 1.—Folia lineari-setacea vel graminea, imprimis turionum.
Semina lævia.

a. Sepala, præter nervum dorsalem viridem in mucronem haud excurrentem, flava vel albida.

129. *A. RIGIDA*, *Bieb. Fl. Taur. Cauc.* i. p. 346 (1808), iii. p. 309; *Ledeb. Fl. Rossica*, i. p. 361.

Geogr. limits.—*N.* S. Russia: gov. of Podolia, between Kosy and Jaorlik.

S. Roumania: prov. of Dobrudscha (ex *Kanitz*, *Fl. Roman.* suppl. p. 185).

E. S. Russia: gov. of Ekaterinoslav, near Paulovgrad (the original specimens).

W. Roumania: prov. of Moldavia (ex *Nym. Consp. Fl. Eur.* p. 113).

SYN. *A. androsacea*, *Fisch. ex Cand. Prodr.* i. p. 402.

A. Holostea (non *Bieb.*), *Beaupr. ex Cand. Prodr.* i. p. 402.

Eremogone rigida, *Fenzl, Verbreit. Alsin.* t. ad p. 46.

130. *A. GRAMINIFOLIA*, *Schrad. Hort. Götting.* i. p. 5, t. 5 (1809); *Ledeb. Fl. Rossica*, i. p. 363 (excl. var. a).

a. glabra, *mihi*.

(=β. grandiflora, *Ledeb. Fl. Rossica*, i. p. 364.)

Cymæ glaberrimæ, frequentius ternæ corymbosæ, quam plures thyrsoides-dispositæ, pedicellis alaribus inferioribus plus 12 mm. usque 48 mm. (inde patentioribus magisque sparsifloris). Calyx post anthesin 4–6 mm. longus.

β. pubescens, *Ledeb. Fl. Rossica*, i. p. 364.

Cymæ glanduloso-puberulæ ternæ, rarius plures vel solitariae, plerumque scaberrimæ.

Geogr. limits.—*N.* E. Siberia: riv. Vilini at Vilinisk (*Kruhse*).

E. Kamtschatka (*Eschscholtz*).

W. Lyck in Prussia.

S. S. Hungary: the Banat.

Iconogr.—*Schrad. l. c.*

SYN. *A. Biebersteinii*, Schlecht. in *Gesellsch. Naturf. Fr. Berl. Mag.* vii. p. 202 (1813) (var. β).

A. filifolia, Bieb. *Fl. Taur. Cauc.* i. p. 344 (var. β).

Eremogone graminifolia, Fenzl, *Verbreit. Alsin.* p. 37.

E. micrantha, Schur, *Enum. Pl. Transsilv.* p. 912.

A. ucrunica, Spreng in *Ersch. sec. Steud. Nomencl.* ed. 2, i. pp. 124, 127.

131. *A. KORINIANA*, *Fisch. ex Ledeb. Fl. Rossica*, i. p. 363 (1842); *Jacks. Ind. Kew.* i. p. 179.

Hab. East Russia, desert of Orenburg; S. Siberia, Mt. Alatau in Soungaria.

132. *A. OREOPHILA*, *Hook. f. Fl. Brit. Ind.* i. p. 238 (1874); *Jacks. Ind. Kew.* i. p. 180.

Dense caespitosa, caespitibus parvis subglobosis valde compactis, fere glabra. Caules simplices. Folia lineari-subulata recurvata e basi latâ vaginante semi-teretia acuta glabra, non carinata. Flores solitarii breviter pedicellati, pedicellis puberulis calyci æquilongis. Calyx basi rotundatus incrassato-induratus, sepala orbicularia concava subnervia coriacea ciliolata. Petala angusta, sepala duplo excedentia, obovato-spathulata apice rotundata. Capsula late ovoidea, coriacea. Semina pallida subauriformia.

The specimens collected by Sir J. D. Hooker have been so well examined that little more can be made out of them, nor can all the characters given be satisfactorily verified. Though included in the flora, the plant does not occur in British India, but was collected on the Tibetan side of the Himalayas at an elevation of 5350 metres. This is interesting as being the highest altitude at which a species of *Arenaria* had been found until last year, though Mr. C. B. Clarke had collected specimens of *A. densissima* at 5100 metres.

Hab. Tibetan Himalayas, in the Sikkim region.

133. *A. FERRUGINEA*, *Duthie, ined. in Pl. Kumaon*, no. 2762 (1884); in *Herb. Mus. Brit.*

Laxe caespitosa. Caules multum ramosi retrorsum pubescentes, inferne angulati, ramis teretibus. Folia lineari-subulata rigida patenti-recurva canaliculata acuminata, uninervia vel obsolete 3-nervia. Flores in cymas compositas trichotomas latas plus minus diffusas dispositi; pedicellis alaribus ad medium bracteatis. Bracteæ foliis similes sed minores. Calyx

incrassato-induratus; sepala lanceolata acuminata uninervia, late scarioso-marginata, apice recurva. Petala ovalia acuta unguiculata, sepalis breviora. Glandulæ quadratæ. Capsula ovoideoglobosa coriacea, valvis 3 bidentatis dehiscens, apice attenuata obtusa. Semina pauca compressa pallida subauriformia.

The quadrate glands at the base of 5 stamens determine the systematic position of the plant in the genus. Among Himalayan species, it is nearest to *A. oreophila*, but it is readily distinguished from this, as from the other four species in this small group, by the petals being shorter than the sepals and by its habit.

Hab. Kumaon: Kali Valley, on rocks near Byans, at 2800–3000 metres.

134. *A. TSCHUKTSCHORUM*, *Regel, in Bull. Soc. Nat. Mosc.* xxxv. i. p. 254 (1862), t. 9. f. 1.

Omnino glabra, glaucescens. Caudex crassus lignosus. Caules floriferi 10–20 centim., foliorum fere denudati, stricti vel flexuoso- vel subgeniculato-adscendentes, sæpe superne purpurascens, apice corymbum 3-pluriflorum umbelliformem simplicem vel ramosum gerentes. Folia subulata canaliculata rigida, nervo crasso percursa, in mucronem pungentem attenuata, præcipue basin versus margine minute denticulata, basi ipsâ brevissime connata, caulina remota. Corymbus 3-pluriflorus; pedicellis primariis supra medium vel basin versus bibracteatis; bracteæ lanceolato-lineares acuminatæ. Calyx basi rotundatus; sepala elliptica vel elliptico-oblonga obtusa, margine late hyalina. Petala obovata, calycem plus duplo superantia. Glandulæ quadratæ aurantiacæ. Capsula subinclusa. Semina compressa.

Hab. Land of the Tschuktschees: along the river Phillipow, and near the town of Nischni-Kalinsk.

Described from authentic specimens in Herb. Kew. ex Herb. Hort. Petropolit. The character of the glands and of the seeds, which determines its position in the genus, is not mentioned by Regel in his description, nor indicated in the figure of the plant cited below.

Iconogr.—*Regel, Pl. Raddeanæ, l. c.*

β. Sepala, nervo dorsali lato in mucronem herbaceum recurvopatulum excurrente, picta vel subherbacea.

135. *A. GYPSOPHILOIDES*, *Linn. Mant. Plant.* i. p. 71 (1767); *Ledeb. Fl. Rossica*, i. p. 365.

a. glabra, Ledeb. *Fl. Rossica*, i. p. 365.

Lusus 2 :—Calyx $2\frac{1}{2}$ –3 mm. ; sepala sæpe longe acuminata.

SYN. *A. gypsophiloides* var. *parviflora*, Boiss. *Fl. Orient.* i. p. 694.

β. viscosa, Ledeb. *Fl. Rossica*, i. p. 365.

This species is the plant described by Tournefort as “*Alsine orientalis Caryophylli folio, flore parvo albo.*” It is of the habit of a *Gypsophila*.

Geogr. limits.—N. Russian Armenia : Lake Gök-tchai.

S. & E. N. Persia ; at the base of Mt. Demavend, in the Elburz range.

W. Turkish Kurdistan : prov. of Diarbekir, between Diarbekir and Suwerek. (It was in this neighbourhood that Tournefort collected his specimens.)

SYN. *A. cucubaloides* (non Smith), C. A. Mey. *Verz. Pfl. Cauc.* p. 220.

A. dianthoides, Hort. ex Ledeb. *Fl. Ross.* i. p. 365.

Eremogone gypsophiloides, Fenzl, *Verbreit. Alsin.* t. ad p. 57.

136. *A. URSINA*, Robinson, in *Proc. Amer. Acad.* xxix. p. 294 (1894) ; Gray & Robinson, *Syn. Fl. N. Amer.* i. p. 240 (1897).

Radix crassa lignosa. Tota glauca. Caudex dense multiceps. Turiones compacte fasciculati vel rosulati. Caules floriferi pauci erecti ramosi teneri tenuiter glanduloso-pubescentes 4–7 centim. Folia turionum lineari-filiformia albo-punctulata apiculata glanduloso-ciliolata perbrevia, caulina pauca remota rigidiora. Sepala enervia late ovata nec acuta. Petala alba oblonga vix emarginata. Capsula calyce multum longior. Semina circiter 6.

This species has much the habit of *A. compacta*, but much more obtuse sepals ; it is very nearly related to *A. capillaris*, but differs in its condensed habit and in a waxy punctuation of the leaves. Mr. Robinson subsequently reduces his plant to a variety of *A. capillaris*, but none of the many forms of *A. capillaris* have glaucous leaves and emarginate petals.

Hab. California : dry hills in Bear Valley, San Bernardino Mtns.

137. *A. CARICIFOLIA*, Boiss. in *Tchihat. Pl. exsicc.* 1858, no. 943, et *Asie Min. Bot.* i. p. 235 (1860) ; *Fl. Orient.* i. p. 694.

Glabra. Caudex lignosus. Caules 45 centim., robusti ascendentes cum turionibus basi vaginato-squamati, crassi teretes ad nodos conspicue incrassati, superne paniculati multiflori.

Folia prælonga linearia subcanaliculata setaceo-acuminata pluri-nervia, margine cartilagineo-incrassata ciliolata-scabra; bracteæ lanceolatae. Panicula thyrsoides brevis lata multiflora. Sepala coriacea oblongo-lanceolata obtusa carinata viridia superne anguste rubello-membranacea. Petala oblongo-linearia longe attenuata in unguem, sepala 3-plo excedentia. Glandulæ quadratæ. Capsula ovata.

A species very distinct in the very long basal leaves like those of a species of *Carex*: in the specimens I have found them as much as 32 centim. long. It further differs from *A. gypso-philoides* in the flower being twice as large with more obtuse sepals.

Hab. South Armenia, between the villages of Avzapert and Uzunbazar (not marked in maps).

138. A. ROBOROWSKII, *Maxim. Fl. Tangutica*, p. 87, t. 29 (1889).

Densissime pulvinata. Cæspites orbiculares 12 centim. lati, radici fusiformi longissimæ insidentes. Cauliculi densissime conferti teretes supra basin aggregato-ramosi, basi foliis emarcidis dense obvallati, apice virides polyphylli. Folia cauliculi infima sub anthesi emarcida, in cauliculo sterili tamen virentia breviter in vaginam connata, sequentia sensim breviora et in vaginam altius connata, trinervia incrassato-marginata, omnia mucrone pungente distincto terminata, dorso carinata, margine crebre ciliata; folia ramulorum florigerorum breviora, suprema bractealia lanceolato-linearia. Calyx basi incrassatus quasi gibbosus; sepala lanceolata uni-subtrinervia. Petala elliptica acuta, calyce breviora. Stamina corollâ breviora; antheræ ochroleucæ. Glandulæ ovoidæ turgidæ. Ovarium globosum; styli recurvo-adpressi. Ovula numerosa.

Affinis *A. densissimæ*, quæ tamen differt foliis recurvatis omnino glabris, flore terminali et axillari breviter pedicellato, sepalis ovatis quam petala spathulato-linearia duplo brevioribus, staminibus corollam superantibus, stylis erectis.

Description verified from authentic specimens in Herb. Kew.

Hab. W. Tibet: R. Yang-tze (1884).

Iconogr.—*Maxim. l. c.*

139. *A. CAPILLARIS*, *Poir. Encycl. Méth.* vi. p. 380 (1804); *Ledeb. Fl. Rossica*, i. p. 367 (*cum A. formosa et A. Meyeri*).

Grex a. Folia subulato-setacea vel subcapillaria, rigida, etiam in statu sicco stricta.

a. typica (= *A. capillaris Poir. a., Regel et Tiling. Fl. Ajan.* p. 4, n. 63).

Glabra, glauca. Folia 25–50 mm. vel rarius longiora, margine glabra vel ciliolata. Caules 7–15 centim., uniflori vel plerumque cymâ triflorâ rarius 5-florâ terminati. Pedicelli graciles, deinde 12–35 mm. longi, medio bracteis 2 membranaceis parvis vestiti. Petala alba.

β. airæfolia, Fisch. (sp.) ex DC. Prodr. i. p. 402.

Cyma sepalaque glanduloso-pubescentia.

Lusus 1, pygmæa, Regel, Pl. Radd. p. 368 (1862).—Caules 4–10 centim., 1–3-flori interdum 5-flori, erecti vel adscendentes, basi glabri. Folia 12 mm., glaucescentia, margine plerumque ciliolata. Flores minores, pedicellis calycem paullo-pluries superantibus. Sepala ovato-lanceolata.

Lusus 2, glandulosa, Regel, l. c.—Caules 5–8 centim., ad basin glanduloso-pubescentes. Folia 23 mm., glaucescentia, mucronulo recto terminata. Cyma 1–3-flora, dense viscoso-pubescentia, pedicellis calycem subæquantibus vel vix eodem duplo longioribus. Petala calyce duplo circiter longiora.

SYN. A. viscosa, Fisch. ex Cand. Prodr. i. p. 403.

Lusus 3, communis, Regel, l. c.—Caules 7–18 centim., basi glabri. Folia 25–40 mm. Cyma 1–7-flora; pedicellis deinde gracilibus, calycem pluries superantibus. Variat floribus majoribus et minoribus: similis formæ typicæ, indumento tamen diversa.

Lusus 4, longifolia, Regel, l. c.—Caules 17–20 centim., basi glabri. Folia 70–95 mm., virescentia. Cyma evidentius laxa 5-pluriflora; pedicellis gracilibus, calyce demùm pluries longioribus. Petala ovato-oblonga, calyce duplo longiora.

γ. obtusifolia, Trautv. Pl. Sibir. bor. p. 34 (1877).

Glabra, glauca. Folia obtusa, apice subtruncata. Petala alba.

Hab. Between the river Olenek and the river Lena (August, 1875).

Grex b. Folia subulato-capillaria, viva plus minus curvata, emortua omnino persistentia stricta.

δ. kamtschatica, Regel, Pl. Radd. p. 372.

Cauliculi 7–20 centim., 1–8-flori. Folia 40–65 mm. Cyma et sepala glanduloso-pubescentia.

Grex c. Folia subulato-capillaria persistentia, viva plus minus curvata vel falcata, emortua flaccida varie contorta et deinde nervo filamentoso terminata.

e. formosa, *Fisch.* (sp.) in *DC. Prodr.* i. p. 402; *Ledeb. Fl. Rossica*, i. p. 366.

Cyma 1–8-flora, cum sepalis, glanduloso-pubescentia.

SYN. *A. nardifolia* var. *glandulosa*, *Ledeb. Fl. Altaic.* ii. p. 166.

A. formosa var. *glandulosa*, ex *Ledeb. Fl. Rossica*, i. p. 366.

A. lychnidea (non *Bieb.*), *Turcz. Cat. Baikal.* no. 253.

A. colorata, *Turcz. in Herb. Ledeb.*

Eremogone formosa, *Fenzl, Verbreit. Alsin.* p. 37.

E. airæfolia, *Fenzl, ex Steud. Nomencl. ed. 2, i. p. 566.*

Cauliculi 5–15 centim. Folia 25–70 mm., basi dilatata. Pedicelli calycem æquantes vel deinde pluries superantes. Sepala ovata. Petala plerumque late obovata, calycem duplo superantia.

Lusus 1, alpina, *Regel, l. c.*—Caulis 50 mm., 1–3-flori. Folia 24 mm. Sepala purpurascencia.

Lusus 2, vulgaris, *Regel, l. c.*—Caulis 7–20 centim., 1–8-flori.

Folia 45–70 mm. Flores sæpe maximi, speciosi; sepalis plus minus purpurascensibus.

ζ. nardifolia, *Ledeb.* (sp.) *Fl. Altaic.* ii. p. 166.

SYN. *A. formosa* var. *α. glabra*, *Ledeb. Fl. Rossica*, i. p. 366.

Varietas glabra. Folia 45–90 mm., margine ciliolata, ceterum glaberrima. Cyma 1–8-flora; flores sepius trichotomo-cymosi; bracteæ cucullatæ ovato-lanceolatæ, basi purpureæ. Petala plerumque lata obovata, calycem duplo superantia.

SYN. *Eremogone nardifolia*, *Fenzl, Verbreit. Alsin.* p. 37.

η. Meyeri, *Fenzl* (sp.) in *Ledeb. Fl. Rossica*, i. p. 368; *Maxim. Pl. Mongol.* p. 98 (1889).

Varietas nana glanduloso-puberula, pulvinato-cæspitans. Turiones elongati (nec ut in type abbreviatæ), totâ longitudine foliis emortuis imbricato-vaginati. Folia plerumque stellatim patentia. Cyma 3–10-flora corymbiformis. Sepala longe vel breviter mucronata. Petala cuneato-oblonga. Sec. Ledebour, hæc planta transitum ad sectionis *Euthalia* species foliis acerosis molitur, turionum autem foliis vegetis, minora axillaria fasciculata nunquam alentibus recedens.

Hab. Soungaria, N. Mongolia, and E. Siberia.

The grouping of the various forms of this polymorphous and very variable species is based upon E. von Regel's detailed examination of many specimens. This botanist, however, includes *A. lychnidea*, Bieb., in the species, which certainly does not belong to this subgenus, as the disk is not broken up into distinct glands: whereas, in *A. capillaris*, five short truncate glands are readily distinguishable at the base of the stamens. In the subdivision of the species as followed out here there are seven varieties which are associated into three 'greges' (or subspecies, as some would prefer perhaps to call them). Forms of lower grade in the discrimination of minor characters are united under some of the varieties. It is extremely difficult in a widely distributed and remarkably variable species such as this is to assess at their right value the grades of deviation from the type, even in a series of specimens from a limited area. Everyone who examines a series of such specimens is likely to form diverse views as to the value and importance of these deviations from the type, and would group these puzzling and inconstant forms differently, and probably as unsatisfactorily. As Ledebour points out, typical *A. capillaris*, which is widely distributed in Siberia, is a glabrous plant with short barren shoots and rigid glaucous leaves, with the flowers usually in trifloral cymes. This form is comparatively rare in N. America, where var. *ε. formosa*, Fisch., is the more common form, in which the leaves are curved or falcate, and the stem and inflorescence invested with a glandular pubescence; though var. *ζ. nardifolia*, Ledeb., is occasionally met with. The original specimens described by Poiret in Jussieu's herbarium were gathered by Patrin in Siberia. Poiret, after comparing the leaves with those of *Festuca ovina*, says of the flowers: "les fleurs forment presque une ombelle à l'extrémité des tiges, au nombre de deux, plus souvent trois, supportées par de longs pédoncules simples, presque égaux, uniflores, quelquefois dichotomes." Trautvetter describes a form with "foliis obtusis, apice subtruncatis" (*Pl. Sibir. bor.* p. 34 [1877]), which I scarcely know how to place among the others. It is, however, based on one small specimen, with leaves similar to those of *Alsine arctica*, found in August 1875 between the rivers Olenek and Lena in Siberia. Provisionally it is placed in *grex a*.

Geogr. range. From the Ural Mountains eastward to British

Columbia and the Western United States, and reaching as far north as the Arctic Circle.

Iconogr.—*Regel, Pl. Raddeanae, in Bull. Soc. Nat. Mosc.* 1862, pt. i. t. 8; (var. ζ) *Ledeb. Ic. Pl. Fl. Ross.* 6; *Hook. Fl. Bor.-Amer.* t. 32; *Reichb. Ic. Pl. Crit.* iv. t. 377; (var. η) *Ledeb. Ic. Pl. Fl. Ross.* 400.

SYN. (forma typica) *A. Larmanni*, Fisch. ex DC. Prodr. i. p. 404.

A. sibirica, Pers. Syn. Plant. i. p. 504.

Eremogone capillaris, Fenzl, Verbreit. Alsin. p. 37.

E. subulata, Fenzl, Verbreit. Alsin. p. 37.

Subsectio 2.—Folia imprimis caulina, lineari-setacea. Semina granulato-tuberculata.

140. *A. MACRADENIA*, *S. Wats. in Proc. Amer. Acad.* xvii. p. 367 (1881-82); *Robinson, in Proc. Amer. Acad.* xxix. p. 296 (1894).

Glabrescens, glaucescens. Caudex plus minus lignosus irregulariter tortuoso-multiceps. Caules 15-40 centim., valde nodosi. Folia rigida pungentia. Flores in cymam apertam dispositi. Sepala indurata late ovata subcarinata marginato-membranacea nec acuta. Petala obovato-oblonga, calyce multum longiora, basi subauriculata. Semina compressa oblongo-pyriformia.

So named from the well-developed staminal glands. In Gray and Robinson's 'Synopt. Fl. N. Amer.' reduced to a var. of *A. congesta*, but distinct in the large glands.

Geogr. range. W. United States: Utah, Arizona, California.

141. *A. FENDLERI*, *A. Gray, Pl. Fendl.* p. 13 (1849); *B. L. Robinson, in Proc. Amer. Acad.* xxix. p. 296 (1894).

Glaucua, superne glanduloso-puberula. Caules multi erecti, 10-40 centim. Folia basilaria setacea graminea, margine ciliolata vel glabra plus minus pungentia, 50-95 mm.; caulina connata subvaginantia. Inflorescentia dichotoma; cymæ pauci-multifloræ. Sepala lanceolata vel lineari-lanceolata acuminata glandulosa late scariosa, petala æquantia 5-nervia, apice recurva. Petala obovata. Capsula inclusa. Semina pyriforma.

β . *diffusa*, *Port. & Coult. Fl. Color.* p. 13 (1873).

Viridescens. Inflorescentia magis diffusa; floribus sæpius majoribus.

Hab. Rocky Mountains of Colorado and Wyoming.

Geogr. range—*N. & W.* British Columbia: Fraser River.

E. United States: Nebraska.

S. Los Angeles in California.

Mr. J. Macoun's specimens, gathered in 1879, mark the *N. & W.* limit.

Iconogr.—*Britton, Ill. Fl. Un. St. Can.* ii. p. 32, t. 1502 (1897).

Subsectio 3.—*Folia ovata vel subrotunda. Semina scabra.*

a. Petala sepalis longiora.

142. *A. SAXIFRAGA*, *Fenzl, in Gren. et Godr. Fl. de France*, i. p. 257 (1848); *Tanf. in Parl. Fl. Italiana*, ix. p. 538 (1892).

Nana, subpuberula, cæspitoso-diffusa, 4–8 interdum ad 11 centim. alta. Caudex prælongus polycephalus. Caules ramosi, ramis erectis vel procumbentibus teretibus, pilis transversis vestiti. Folia late ovata vel elliptico-lanceolata acuta uninervia, inferiora petiolata, media et superiora sessilia, patentia, nervo basin versus ciliatulo-puberulo. Flores solitarii, interdum in dichasium triflorum dispositi; bracteæ lanceolatæ patentēs. Sepala ovali-lanceolata acuta enervia, margine vix hyalino-membranacea. Petala alba lineato-venosa oblongo-obovata denticulata, sepalis duplo longiora. Ovarium globosum; styli superne a medio intus papilloso. Capsula oblongo-conica obtusa, calyce vix longior.

A. saxifraga, Friw. = *Alsine saxifraga, Boiss.* (sp. *Rumelica*).

Geogr. area.—The Italian peninsula, Sicily, Sardinia, and Corsica.

N. & W. The Alps of Piedmont (*Bertoloni*).

S. & E. Sicily (according to *Gussone*, who cites *Cupani*, 'Panphyton Siculum,' t. 129. fig. a [1713]).

Iconogr.—*Guss. Plant. Rar.* t. 37. fig. 1; *Reichb. Ic. Fl. Germ. Helv.* 4913.

SYN. Stellaria saxifraga, Bertol. Pl. Ital. rar. iii. p. 55.

Cerastium latifolium (non Linn.), Vitm. Ist. Erb. p. 50.

143. *A. CILIATA, Linn. Sp. Plant.* p. 425 (1753); *Willk. & Lange, Prodr. Fl. Hisp.* iii. p. 623.

α. typica, mihi.

Folia ovalia subsessilia. Flores 3–7 cymose dispositi apice ramorum; pedicelli 1–3-plo calyce longiores.

β. longipes, Fouc. & Rouy, Fl. de France, iii. p. 247 (1896).

Folia majora, late ovalia, in petiolum attenuata. Flores plerumque 1–4, apice ramorum; pedicelli 3–6-plo calyce longiores.

γ. *frigida*, Koch, *Deutschl. Fl.* iii. p. 267.

Folia ovali-lanceolata vel lanceolata. Flores sæpius tantum 1-2 apice ramorum; pedicelli 1-3-plo calyce longiores. Caules semper permulti.

SYN. *A. gothica* (non Fries), Gren. in Bull. Soc. Bot. France, 1869, p. 61.

δ. *norvegica*, Gunn. (sp.) Fl. Norveg. ii. p. 145, t. 9. ff. 7-9 (1772).

Fere glabra. Folia ovata haud ciliata. Pedicelli quam in typo breviores. Sepala subnervia glaberrima.

SYN. *A. humifusa*, Wahlenb. Fl. Lapp. p. 129 (1812).

Extends further north than any other species of *Arenaria*: found in Goose Land, in the island of Novaya Zemlya, during the 'Nordenskiöld' Expedition at lat. 72° N., also in Greenland, lat. 73-74° N. Found throughout the Arctic regions north of Europe and Siberia,—Iceland, N. Norway, Lapland, the island of Vaigatch, Arctic Russia, the territory of the Samoyedes, even to the rugged west coast of Spitzbergen. Authentic specimens of *A. ciliata* had not been examined from Spitzbergen, the present most northerly limit of any species of the genus, at the time of writing my former paper on *Arenaria**, where the northern limit is given as that of the island of Novaya Zemlya. Sir J. D. Hooker † says that the range of the species extends as far south as the island of Crete. This is due probably to the error in Sibthorp's 'Fl. Græca,' t. 438, where the plant figured as *Arenaria ciliata* is *A. gracilis* var. *cretica*. It extends no further south than Spain. In the mountains of Sligo, in the west of Ireland, the plant ascends to 500 metres; and there is a specimen from here preserved in Buddle's Herbarium under the name of "Lychnis alsinoides parva, flore albo minimo." On the Stelvio Pass, in the Rætian Alps, where the three frontiers of Switzerland, Austria, and Italy meet, specimens have been found, according to Parlatore, at 2800 metres. Near the bridle-path on the Col de Fenêtre of the Great St. Bernard, in the Swiss canton of Valais, specimens were found by M. Gaston Tissandier at 2750 metres. These are the highest altitudes in the Alps recorded for the species. It was from specimens gathered in the Stelvio Pass that Parlatore drew up his description of the species

* Bull. Herb. Boiss. iii. p. 597 (Nov. 1895).

† Stud. Fl. British Islands, ed. 3, p. 65.

in the 'Fl. Italiana.' In the Spanish Pyrenees, at Puerto de Canfranc, the plant ascends to 1350 metres.

The synonym of *A. multicaulis*, Linn. Sp. Plant. ed. II. p. 605, is included under *A. ciliata* in Sp. Plant. ed. I. p. 425. In the appendix to the former work, Linnæus says,—“Affinis *A. ciliatæ*. Folia non nervosa observavit Jacquinius.” Again, in 'Mant. Plant.' p. 386, he says,—“Foliis nervosis videtur *Arenaria ciliata* differre.”

Geogr. limits.—*N.* Advent Bay on west coast of Spitzbergen, lat. 78° N., var. δ (*A. F. Battye*, in Mr. Conway's Expedition, 1896—in flower 13 July).

S. Spain: the Escorial, in the prov. of New Castile (*Quer*, Fl. Española [1762–84]).

E. European Russia: island of Vaigatch in the Kara Sea (*Schrenck*).

W. Canada: Kicking Horse Pass, in the Rocky Mountains of the prov. of Alberta (*J. Macoun*), var. δ .

Iconogr.—(Var. *a*) *Fl. Danica*, t. 346, t. 1269; *Sow. Engl. Bot.* ed. 1, t. 1745; ed. 2, t. 646; ed. 3, t. 238 (very indifferent); *Reichb. Ic. Fl. Germ. Helv.* 4942; *Ic. Taurin.* xxiii. t. 31; *Séguier, Pl. Veron.* i. p. 421, t. 5. f. 2 (1745); *Haller, Hist. Stirp. Helv.* i. t. 17 (1768); *Lodd. Bot. Cab.* t. 659.—(Var. γ) *Wulf. ap. Jacq. Collect. Bot. Chem. Nat. Hist.* i. t. 17 (1786); *Reichb. Ic. Fl. Germ. Helv.* 4950.—(Var. δ) *Gunn. l. c.*; *Sow. Engl. Bot. Suppl.* t. 2852; ed. 3, t. 237.

The above include as many figures known to me as are worth citing. Those of 'English Botany,' ed. 3, are far inferior to any of the others, as might be expected from the general crudeness of the plates in this work, which compare very unfavourably with those of Continental illustrated floras. Those of var. γ are cited under *A. multicaulis*. The plant figured in 'Fl. Danica,' t. 346, was an Icelandic specimen.

Syn. *Alsine trifolia*, Gould, *ex Journ. Linn. Soc.* xi. p. 298 (1871).

Alsinnella ciliata, S. F. Gray, *Nat. Arrang. Br. Fl.* ii. p. 655.

Arenaria multicaulis, Linn. *Apocn. Acad.* i. p. 162 (var. γ).

144. *A. GOTHICA*, *Fries, Novit. Fl. Suec.* ii. p. 33 (1839); *Hartm. Skand. Flora*, ed. 11 (1879), p. 243.

a. *typica*, *Fouc. & Rouy, Fl. de France*, iii. p. 248 (1896).

Planta gracilis, 4–8 centim.

$\beta.$ fugax, *Fouc. & Rouy, l. c.*

SYN. *A. fugax*, J. Gay herb.

A. ciliata var. *fugax*, Gren. et Godr. Fl. de France, i. p. 359.

A. ciliata var. *laxior*, Gremli.

Planta robustior, 8–12 centim., caulibus numerosioribus.

Fries says, “radix omnino annua,” but there is no doubt, so far as the English specimens are concerned, that the plant is either annual or biennial, according to the locality. Dr. Nordstedt, in a letter to Mr. Arthur Bennett, says :—“I think this species varies much in habit; when seeds grow early in spring it is annual; when late in summer, biennial; and in favourable localities perennial, by means of winter-shoots.” Mr. W. Whitwell says (in Journ. Bot. 1889, p. 357) :—“With *A. serpyllifolia* it could scarcely be confounded. From *A. ciliata* it may be separated by the leaves being sparser, and not appressed to the stem in the lower part (as they usually are in *A. ciliata*); the veins are not nearly so prominent; the armature of the stem is much more like that of *A. serpyllifolia* than of *A. ciliata*; the capsules are larger and longer, and the seeds are larger. From *A. norvegica* it may be known by the whole surface of the plant being more hairy, with transparent gland-like hairs, the margins of the leaves more ciliated, with curved hairs; the seeds more compressed, smaller, and not so dark (or perhaps the present specimens have not fully ripened?).”

Hab. S. Sweden; England, West Yorkshire; Switzerland, lake of Joux.

Iconogr.—*Fl. Danica*, *Suppl.* t. 15 (1853).

145. *A. BALEARICA*, *Linn. Syst. Nat.* ed. XII. iii. app. p. 230 (1768); *Tunf. in Parl. Fl. Italiana*, ix. p. 541.

Hab. Sardinia, Corsica (up to 1250 metres), and Mallorca (from 400 to 1400 metres) in the Balearic Islands.

Iconogr.—*L' Hér. Stirp. Nov.* i. t. 15; *The Garden*, Jan. 1885.

SYN. *A. cæspitosa* (non Ehrh.), Salisb. Prodr. p. 299.

A. Corsica, Steud. Nomencl. ed. 2, i. p. 124.

146. *A. GLANDULIGERA*, *Edgew. in Hook. f. Fl. Brit. Ind.* i. p. 240 (1874); *Jacks. Ind. Kew.* i. p. 179.

Dense glanduloso-pubescens. Caules 2–5 centim., inferne glabri nitidi, numerosi suberecti. Folia pallide viridia utrinque glandulosa mollia plana, acuminata vel acuta, ovata vel elliptico-oblonga, nervis obscuris. Pedicelli tenues, erecti vel cernui. Calyx campanulatus, sepala linearia late membranaceo-marginata,

apice recurva. Petala obovata acuta, alba basi lilacina. Capsula inclusa.

Mr. Duthie's Garhwal specimens show the five glands most distinctly. None of the undamaged petals in the Kashmir specimens examined seemed to be rounded at the apex as stated in Edgeworth's description.

Hab. Alpine Himalaya, from Kashmir to Sikkim, up to 5450 metres.

β. Petala sepalis breviora, vel ea subæquantia.

147. A. BIFLORA, *Linn. Mant. Plant.* p. 71 (1767); *Tanf. in Parl. Fl. Italiana*, ix. p. 543.

Forma elongata, *Heer, in Herb. Polyt. Helvet.* (1867).

Laxior, caulibus magis elongatis.

β. apetala, *Vill. (sp.) Prosp. Fl. Dauph.* p. 48 (1779); *Hist. Pl. Dauph.* iii. p. 622, t. 48.

Corolla evanescentes.

Linnaeus's short description is:—"Caules procumbentes. Folia subrotunda seu obovata, lævia, obtusa. Pedunculi laterales, foliis duplo longiores, bifidi et biflori: bracteis 2, linearibus ad divisionem, ut et in altero pedicello. Calyces ovati. Petala alba. Capsulæ subglobosæ."

Geogr. limits.—N. Austrian Poland. S. Albania.

E. Transylvania. W. Dauphiny (var. β).

Iconogr.—*Jacq. Ic. Rar. Plant.* 83; *Ic. Taurin.* xv. t. 91. f. 4; *All. Fl. Pedem.* no. 1699, t. 44. f. 4, et t. 64. f. 4; *Reichb. Ic. Fl. Germ. Helv.* 4949.—(Var. β) *Vill. Hist. Pl. Dauph.* iii. p. 622, t. 48.

SYN. *Alsinanthus biflorus*, Desv. *Journ. Bot.* 1814.

Arenaria multicaulis, (non Linn.) Schur ex Simonk.

148. A. GAYANA, *Williams.*

Inferne subpubescens, superne glabra. Caules repentes graciles ramosissimi paullum angulati. Folia suborbicularia apice rotundata mucronulato-apiculata, enervia petiolata plana, basin versus parce ciliata. Flores pauci solitarii longe pedicellati. Calyx late campanulatus; sepala ovata obtusa obscure 3-nervia erecto-patentia, margine anguste hyalina. Petala obovata, calyce triente breviora. Antheræ albidæ. Capsula valvis 3 bidentatis dehiscens. Semina reniformi-globosa.—(A. balearica var. brachypetala, *J. Gay herb.* in *Herb. Kew.*)

Hab. Pastriciale in Corsica (*Serafino*, 1828).

Subgenus IV. DICRANILLA.

Sectio i. RADIANTES.

Petala calyce longiora. Stamina 10.

149. A. RADIANS, *Benth. Pl. Hartweg. Mexic.* p. 163 (1839-48); *Jameson, Syn. Plant. Æquat. i.* p. 45 (1865).

Viscidula: Radix prælonga. Folia lanceolata canaliculato-concava subcartilaginea glabra. Sepala lanceolata. Petala oblonga unguiculata radiato-patentia. Antheræ violaceæ. Styli 3; ovula circiter 10. Semina orbiculata.

From the available specimens, which are damaged, no further characters are to be made out. Jameson by a slip of the pen says that the sepals (petals?) are unguiculate.

Geogr. area. The Andes of Ecuador: Mt. Ilinissa and Mt. Chimborazo, near the line of perpetual snow, and at 1500 metres.

150. A. DICRANOIDES, *H. B. & K. Nov. Gen. et Spec.* vi. p. 34 (1823); *Jameson, Syn. Plant. Æquat. i.* p. 45 (1865).

Habit of *Dicranum glaucum*, Hedw., a moss. The type of this species is *Lobelia bryoides*, Willd. herb. no. 4011.

Hab. The Andes of Ecuador, Peru, and Bolivia.

SYN. Lobelia bryoides, Willd. herb. ex Roem. & Schult. Syst. Veg. v. p. 41 (1819).

Sectio ii. PYCNOPHYLLÆ.

Petala calyce multum breviora, vel nulla. Stamina 10.

151. A. BISULCA, *Rohrb. in Linnæa*, xxxvii. p. 248 (1871-72) (nomen); *Bartl. in Reliq. Haenk.* ii. p. 12 (1830), sub *Cherleria bisulca*.

Glabra vel tenuissime pubescens. Radix parce fibrosa. Caules valde ramosi, diffuso-cæspitiosi, undique procumbentes, tenuissime puberuli, inæquales, 10 centim. Rami ramulique partim æque procumbentes, partim (præsertim floriferi) erecti, approximati tetragoni parce pubescentes. Folia lanceolata acutato-mucronata nitida enervia, dorso convexo sulcis duobus angustis profundis notata, margine incrassata setulis brevibus ciliata, basi non attenuata, fere amplexicaulia necnon connata. Calyx coriaceus nitidus, basi subturbinatus; sepala ovato-lanceolata acuminata omnino glaberrima, extus sicut in foliis caulinis bisulcata. Petala lineari-oblonga, apice emarginata,

calyce duplo breviora. Antheræ subrotundæ. Styli 3 (interdum tantum 2). Capsula calyce inclusa. Semina 6-10.

So called from the two furrows on the dorsal surface of the leaves and sepals.

Hab. The Peruvian Andes; and Cerro del Campo-Grande in Argentina (*Grisebach* in *Götting. Abhandl.* 1879, p. 26).

152. A. BRYOIDES, *Willd. herb.* no. 8479, ex *Schlecht. in Gesellsch. naturf. Fr. Berlin. Mag.* vii. p. 201 (1813); *H. B. & K. Nov. Gen. et Spec.* vi. p. 33 (1823).

Habit of *Cherleria sedoides*. The specimens from Guatemala described by Mr. W. B. Hemsley do not seem to differ materially from the type, except in the somewhat tougher sepals.

β. macrophylla, *Fenzl, in herb. Haenke; ap. Rohrb. in Linnæa*, xxxvii. p. 250 (1871-72).

SYN. *A. serpens* var. *Orizaba*, *Rohrb. in Linnæa*, xxxvii. p. 271.

The specimens of this variety are labelled *Cherleria serpyllacea* Presl, in Haenke's herbarium. There is also an additional note that they were from the Peruvian Andes. Rohrbach is disposed to doubt that Haenke procured these specimens from Peru, and *a posteriori* does not admit the extension of the range of the species to South America. The leaves are larger than those of the type, but not so smoothly shining.

Hab. Mexico: no locality (*Ude* no. 1104, *Schaffner* no. 489, *H. Christie*, 1871), prov. of Cuernavaca, in the crater of Mt. Popocatepetl (*Aschenborn* no. 730), Mt. Toluca in the prov. of that name at 3600-4700 metres (*Heller* no. 329), prov. of Vera Cruz (*Linden* [1838], no. 938); Guatemala, Volcan de Fuego at 3900 metres and at the summit (*Salvin*).

Iconogr.—*Hemsl. Biol. Centr.-Amer., Bot.* v. t. 4. ff. 14-18.

153. A. PYCNOPHYLLA, *Rohrb. in Linnæa*, xxxvii. p. 250 (1871-72).

Caules multum ramosi; ramuli breves glabri. Folia coriacea late ovata fere obtusa, margine ciliata, ad basin versus membranacea, tantum 2 mm. longa. Sepala ovata obtusa late membranaceo-marginata, duo præfloratione exteriora margine ciliata, cetera glabra, tantum 2 mm. longa. Petala nulla. Capsula oblonga.

Species habitu valde insignis, fere *Pycnophyllum* in memoriam

revocans. Differt a priori habitu, foliorum et sepalorum formâ ac magnitudine, et corollæ defectu. E descriptione huic speciei affinis esse videtur etiam *A. Alpamarca*, quæ tamen differt foliis interdum non imbricatis, ovato-lanceolatis mucronatis, 4-6 mm. longis, floribus longe pedunculatis, staminibus 5 nec 10, quæque incertum est an ab *A. nitida* sat differat.

Hab. Bolivia, near Potosi.

154. *A. PYCNOPHYILLOIDES*, Pax, in *Engl. Jahrb.* xviii. p. 29 (1893).

Glabra. Folia lanceolata acuminata nitescentia subcoriacea, usque ad apicem dense ciliata, nervo mediano subtus valde prominente ciliato, supra plus minus concava. Sepala oblonga acuminata ciliata, late membranacea. Petala apice obtusa, minuta vel nulla. Ovarium depresso-globosum; styli 3.

β . compacta, Pax, *l. c.* p. 29.

A typo recedit ramis valde abbreviatis, dense imbricatifoliatis, cæspites humiles densas formans.

γ . Moritziana, Pax (sp.), *l. c.* p. 30.

A typo recedit ramulis inferne foliis delapsis nudis; foliis et sepalis perglabris.

The specimens on which this species is founded were identified with *A. bisulca* by Grisebach (*Symbol.* p. 26); but this plant has not the characteristic furrows in the leaves which distinguish *A. bisulca*, and the ovary is much broader.

Geogr. range.—Argentina, provs. of Rioja and Salta; Colombia, Mt. Paramo de Muchuchias.

SYN. *A. bisulca* (non Rohrb.), Griseb. *Symbol.* p. 26.

155. *A. BOLIVIANA*, Williams.

SYN. *A. conferta*, Wedd. in *Ann. Sc. Nat. sér. V. i.* 1864, p. 293 (non Boiss. 1842).

Caules multum ramosi, ramulis brevibus glabris. Folia oblongo-lanceolata, margine anguste membranaceo ciliata, ceterum glabra aut nervo mediano prominente vel interdum toto dorso hispida. Sepala ovato-oblonga, margine anguste scariosa, aut duo præfloratione exteriora margine ciliata aut rarius omnia dense villosa. Petala nulla. Capsula ovata, paullum infra medium in 3 valvas bifidas dehiscens. Semina minima lenticularia.

β. villosa (= *A. conferta*, *var. villosa*, *Wedd. l. c.*).

Hab. Bolivia, prov. Larecaja at 4500 metres; Peru, Mt. Cerro de Pasco, at 4400 metres.

Sectio iii. PEDUNCULOSÆ.

Petala calyce multum breviora, vel nulla. Stamina 5.

156. *A. PEDUNCULOSA*, *Wedd. in Ann. Sc. Nat.* 1864, p. 294; *Rohrb. in Linnæa*, xxxvii. p. 249 (1871-72).

Pusilla, glaberrima, 1-1½ centim. Folia subcoriacea ovato-oblonga acuta plana, basi connata ciliata. Sepala ovata, dorso parce puberula, margine anguste scariosa. Petala nulla. Capsula ovata exserta. Semina compressa.

Species *A. nitidæ* Peruvianæ affinis, sed diversa foliis dense imbricatis confertis minutis, sepalis ovatis neque lanceolatis apice conniventibus neque plane rectis, etiam floribus apetalis. In utrâque folia plana, tametsi Rohrbach aliter dicit.

Hab. Bolivia: Raico de Chuquiaguillo in prov. of La Paz.

157. *A. ALPAMARCÆ*, *A. Gray, Bot. Un. St. Explor. Exped.* i. p. 116 (1857); *Walp. Ann. Bot.* vii. p. 297 (1868).

Pusilla, glaberrima, 2-5 centim. Folia subcoriacea ovato-lanceolata cuspidata, basi connata ciliata. Sepala coriacea ovato-lanceolata acuta. Petala nulla. Capsula inclusa. Semina 5 vel 6, globulosa.

A larger plant than the preceding, distinguished from it by the included capsule and spherical seeds.

Hab. The Peruvian Andes.

Subgenus V. ARENARIASTRUM.

Sectio i. GOUFFEIA.

Flores minuti, cymoso-paniculati. Stamina 10. Capsula oblonga vel subglobosa, calyce inclusa.—Herba Europæa biennis tenuis diffusa, foliis linearibus vel setaceis.

158. *A. MASSILIENSIS*, *Fenzl, ex Gren. & Godr. Fl. de France*, i. p. 262 (1848); *DC. Fl. Franç., Suppl.* (1815) p. 609 (*Gouffea arenarioides*).

Hab. Siliceous soil in hilly localities of Provence: dept. of

Bouches-du-Rhône, Montredon, Saint-Loup, Carpiagne, near Toulouse; dept. of Var, environs of Toulon, Baon-de-quatre-heures, Montrieux, la Sainte-Baume.

Iconogr.—*Reichb. Ic. Plant. Crit.* iv. 399; *Willk. Ic. descr. Pl. Rar. Hisp.* i. t. 66; *Bory & Chaub. Fl. Peloponn.* n. 701, t. 24. f. 2 (*A. Gouffea, Chaub.*)—"immerito et ex confusione schedularum herb. Fauché in Græcia indicatur."

Sectio ii. LEPYRODICLIS.

Flores parvi, cymoso-paniculati. Stamina 10. Capsula inflatoglobosa, calyce inclusa.—Herbæ Asiaticæ proceræ flaccidæ annuæ, foliis lanceolatis vel oblongo-lanceolatis.

159. *A. HOLOSTEOIDES*, *Edgew. in Hook. f. Fl. Brit. Ind.* i. p. 241 (1874); *Boiss. Fl. Orient.* i. p. 668 (1867) (*Lepyrodiclis holosteoides*).

60–65 centim. Glabra vel glanduloso-puberula. Caulis elongatus, interdum pilis brevibus inspersus, sicco nitidus striatus, usque ad flores dichotome cymoso-paniculatus. Folia deflexa linearia vel lineari-oblonga vel etiam lanceolata, acuta scabrida tenuiter ciliata. Pedicelli cernui, (in typo) calyce longiores. Sepala lanceolata obtusa puberula membranaceo-marginata. Petala alba, obovata vel lineari-spathulata, basi angustata, calycem æquantia vel excedentia, apice retusa, faucem versus venis 3 longitudinaliter notata. Ovula 4. Semina scabra, pallide brunnea.

β. stellarioides, Williams.

SYN. Lepyrodiclis stellarioides, *Fisch. & Mey. in Schrenck, Enum. Pl. nov.* (in notâ) p. 93 (1841).

Sepala sub anthesi subpatentia. Petala dilute carnea, anguste lineari-spathulata, emarginata. Capsula minor, magis inclusa. Pedicelli florum calyce breviores.

γ. cerastioides, Williams.

SYN. Lepyrodiclis cerastioides, *Kar. & Kir. Enum. Pl. Soongar.* no. 167, in *Bull. Soc. Nat. Mosc.* xv. 1842, p. 170.

Pedicelli in planta juniore calyce breviores, in planta adulta plerumque illo longiores. Petala alba oblonga emarginata. Capsula minor, magis inclusa.

The variation in the length of the pedicels in these forms shows that the character is not to be relied on elsewhere in the genus as of any specific value.

δ. *paniculata*, *Williams*.

SYN. *Lepyrodiclis paniculata*, Stapf, in Denkschr. Akad. Wien, li. p. 287 (1896).

Glaberrima, glaucescens, ample et plus minus irregulariter paniculata. Folia lanceolata. Sepala late membranaceo-marginata. Petala alba lineari-oblonga emarginato-biloba.

Geogr. area.—Temperate Asia.

N. Chinese Turkestan : Soungaria.	} <i>ex Boiss. Fl. Orient.</i> p. 668.
S. Beluchistan.	
W. Turkey in Asia : prov. of Siwas.	
E. China : prov. of Kansu, north of the river Hoang-ho (<i>Piasezki</i> , <i>ex Journ. Linn. Soc.</i> xxiii. p. 70 [1886]).	

This is a species of wide distribution, and is found through Russian and Chinese Turkestan, Afghanistan, Beluchistan, and Persia to the eastern part of Asia Minor, on the west coast of the Caspian Sea and in Russian Armenia, in the Western Himalayas, Tibet, Central Mongolia, in the desert of Soungaria and across to the prov. of Kansu in China. At Hopar in Dardistan specimens were collected at 2800 metres (*W. M. Conway*, Exped. to Karakoram Glaciers, 1892), and in the neighbourhood of Gilgit south of the Hindu Kush at 2920 metres (*Dr. Giles*, no. 301, 1887), also in Baltistan in wheat-fields (*Duthie*, 1894.)

Iconogr.—*Cambess.* in *Jacquem. Plant. Rar. Ind. Or.* t. 30 (1842-44), *sub Gouffea crassiuscula*.

160. A. TENERA, *Edgew. in Hook. f. Fl. Brit. Ind.* i. p. 242 (1874); *Boiss. Diagn. Pl. Or. nov. ser. II.* i. p. 84 (1853) (*Lepyrodiclis tenera*).

Glabra vel pubescens, intricatim cæspitosa, 5-7 centim. Caules filiformes. Folia longe petiolata. Flores plerumque axillares, pedicellis divaricatis capillaribus suffulti. Sepala lanceolata vel ovato-oblonga acuta puberula membranaceo-marginata. Petala oblongo-linearria, apice integra, calycem excedentia. Styli (pro genere) prælongi. Ovula 4. Semina scabra acute tuberculata.

Facies *A. graveolentis*, sed longe distat; evidentius affinis est *A. longistylæ*, sed herba annua, toro vix concavo.

Hab. N.W. India, Kishtwar and Bemahal in Kashmir; E. Afghanistan, Pashat on the river Kunar (Kafiristan).

Sectio iii. BRACHYSTEMMA.

Flores numerosi, in paniculis axillaribus vel terminalibus. Stamina 10, quorum 5 ananthera. Capsula depresso-globosa, calycem non superans.—Herba Himalaica annua subscandens diffusa, foliis lanceolatis vel ovato-lanceolatis.

161. *A. NEPALENSIS*, *Spreng. Syst. Veg. Cur. Post.* p. 181 (1828); *D. Don, Prodr. Fl. Nepal.* p. 216 (1828) (*Brachystemma calycinum*).

a. himalaica, *Williams*.

Panicula glabra vel parce puberula. Folia ovato-lanceolata.

β. khasiana, *Williams*.

Panicula villosulo-pubescentis. Folia lanceolata (*Griffith*, in *Herb. Kew.*).

A climber, often covering trees to a height of six metres from the ground. It commonly occurs at from 300–450 metres in the Himalayas. The species is overlooked in Mr. W. B. Hemsley's 'Index Floræ Sinensis.'

Geogr. limits.—*N. & W. Nepal*.

S. Prov. of Assam: Munipur (*G. Watt*, 1882).

E. China: prov. of Yun-nan, var. β (*Dr. J. Anderson*, 1868).

Iconogr.—*Fenzl, in Endl. Atakta*, t. 16 (*Brachystemma calycinum*).

Subgenus VI. ODONTOSTEMMA.

Sectio i. BARBATA.

Flores dichotomo-corymbosi, pedicellis elongatis erectis suffulti; bractæ foliaceæ.

162. *A. BARBATA*, *Franch. in Bull. Soc. Bot. France*, xxxiii. p. 430 (1886); *Pl. Delavay*. p. 93.

Caulis 15–25 centim., sæpius solitarius, e medio divaricataramosus, dense glandulosus, viscidus. Folia pallide virentia, subtus glauca, oblonga vel oblongo-obovata obtusa, longe ciliata. Sepala lanceolata glanduloso-pubescentia. Petala rosea laciniata, calyce sæpius subduple longiora. Ovula plura (6–7).

A species characterized by its leaves fringed with long white cilia.

Hab. China: prov. of Yun-nan, at the foot of Mt. Yang-in-chan, 2500 metres above Lankong (1885).

Sectio ii. YUNNANENSES.

Flores cymosi, pedicellis sub anthesi erectis mox deflexis suffulti
bracteæ foliaceæ.

163. *A. YUNNANENSIS*, *Franch. in Bull. Soc. Bot. France*, xxxiii. p. 431 (1886); *Pl. Delavay*. p. 94.

Ramosa, diffusa, pallide virens. Caules graciles inferne glabrescentes, superne pubescentes et tenuissime glandulosi. Folia glabrescentia vel ad nervum et margine ciliata, utrâque facie punctis elevatis asperulata, inferiora breviter sed distincte petiolata, e basi attenuatâ oblonga vel lanceolata, obtusa cum mucronulo, superiora sessilia magis ovata. Pedicelli graciles glandulosi. Sepala lanceolata acuminata glanduloso-pilosa. Petala alba oblonga vel obovata, tenuiter apice fimbriata, calyce vix duplo longiora. Antheræ violaceæ. Semina 3-4, angulata.

β. trichophora, *Franch. (sp.) l. c.* p. 431.

Folia hispidula piloso-glandulosa. Inflorescentia paniculato-pyramidata. Ovula plura.

γ. angustifolia, *Franch. Pl. Delavay*. p. 95.

Folia anguste lanceolata acuta, pilis homomorphis omnibus glandulosis vestita. Inflorescentia ampla.

In habit this variety is different from var. *β*. The leaves are narrower and are provided with hairs which are uniform in structure; they are very short, pluricellular, ringed with brown, and glandular. In the type, on the leaves and sepals, these hairs are found mingled with others which are whitish, formed of two or three much longer cells, and acute, such as are found in *A. glandulosa*, the next species. Var. *β* is very similar to this next species, but is more robust, and has larger and more numerous flowers.

Hab. China, prov. of Yun-nan: Mt. Pengay-tze above Houang-kiapin, and Mt. Hee-chan-men above Lankong.

164. *A. GLANDULOSA*, *Williams*.

SYN. *Odontostemma glandulosum*, Benth. ex G. Don, Gen. Syst. Bot. i. p. 449 (1831).

A. Benthami, Edgew. in Hook. f. Fl. Brit. India, i. p. 242 (1874), non Fenzl (1840).

Caulis graciles ramosissimi glanduloso-pubescentes, pilis patentibus articulatis. Folia inferiora petiolata, superiora sessilia, utràque facie pubescentia, margine ciliata, vix obtusa. Flores nutantes. Sepala oblongo- vel lineari-lanceolata, apicibus recurva. Petala alba obovato-spathulata lacerata. Antheræ ovales luteæ.

Hab. Temperate Himalaya: Kumaon and Sikkim.

165. *A. DEBILIS*, *Hook. f. Fl. Brit. Ind.* i. p. 242 (1874); *Franch. in Bull. Soc. Bot. France*, xxxiii. (1886) p. 432.

Caulis sæpius solitarius, simplex vel parce ramosus, glanduloso-pilosus, gracilis debilis. Folia oblonga vel oblongo-ovata, obtusa, utràque facie pubescentia, margine ciliata. Flores solitarii vel in cymis paucifloris; pedicellis divaricatis debilibus gracilibus. Sepala lineari-lanceolata acuta. Petala rosea obovata denticulata.

Very like a small form of the preceding, but smaller in all its parts; the leaves more obtuse; the flowers not 6 mm. across; petals broader and not lacerate, merely irregularly toothed at the tip; filaments much shorter.

Hab. Sikkim: alpine Himalaya, 4200-4800 metres.

166. *A. DELAVAYI*, *Franch. in Bull. Soc. Bot. France*, xxxiii. p. 432 (1886).

Caulis breves ramosi intricati, pilis brevibus glanduloso-hispidulis inspersi. Folia vix obtusa, oblonga, inferiora petiolata, superiora subsessilia. Pedicelli glandulosi, inferiores axillares solitarii, superiores 3-5 cymosi. Calyx basi rotundatus, leviter glandulosus; sepala lanceolata acuta, apicibus nunc recurva. Petala alba late obovata, nunc fere rotundata, laciniata. Antheræ ovatæ luteæ. Ovarium multiovulatum.

Hab. China: prov. of Yun-nan, summit of Mt. Tsang-chan, above Tali, at 4000 metres (1884).

167. *A. QUADRIDENTATA*, *Williams*.

SYN. *Lepyrodichis quadridentata*, Maxim. Fl. Tangutica, p. 84, t. 31 (1889).

4-6 centim., intricata, cæspitem sat densum formans. Caulis tener decumbens a basi divaricato-ramosissimus viscido-pubescent. Folia dense pilosa breviter petiolata, lanceolato-lineariter vel lanceolata, acuminata vel acuta. Sepala oblonga obtusa. Petala obovata quadridentata, dentibus ovatis vel lanceolatis, sepalis longiora. Ovula 4-5. Semina obtuse tuberculata.

Hab. China: E. Kansu and N. Szechuen.

Iconogr.—*Maxim. l. c.*

Subgenus VII. MACROGYNE.

168. *A. LONGISTYLA*, *Franch. in Bull. Soc. Bot. France*, xxxiii. p. 433 (1886); *Pl. Delavay*. p. 96, t. 24 B.

Radix gracilis, multiceps. Caules tenues diffusi bifarie pubescentes. Folia oblongo-lineariter, apice mucronulata, basi dilatata laxè connata, parce ciliolata. Pedicelli axillares elongati glanduloso-pubescentes. Calyx basi truncatus; sepala inferne glandulifera, lanceolata, abruptè mucronata, margine late albido-membranacea, post anthesin ad basin leviter gibbosa, mox complicata. Petala alba calycem vix superantia, e basi cuneatâ distinctè unguiculata obovato-oblonga. Antheræ luteæ subglobosæ. Styli subulati, calycem longè superantes. Ovula 4-5.

This species is very near *Thylacospermum*, and is a connecting link between it and *Arenaria*. The subgenus *Macrogyne* differs from *Thylacospermum* only in the calyx, which is not tubular, the receptacle being only slightly concave, and in the length of the styles.

Hab. China: prov. of Yun-nan, on Mt. Li-kiang, at an altitude of 4000 metres (1886).

Iconogr.—*Franch. l. c.*

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cæspitosa, Phil. (serpens var. andicola).
cæspitosa, Salisb. (balearica).
cantabrica, Amo (serpyllifolia var. gracillima).
capillacea, All. (grandiflora).
capillacea, Willd. herb. (capillaris).
capillaris, Poir., 414.
capillipes, Boiss., 357.
capitata, Lam., 364.
caricifolia, Boiss., 412.
cassia, Boiss., 368.
catamarcensis, Pax, 384.
cephalotes, Bieb., 391.
cerastioides, Pers. (purpurascens).
cerastioides, Poir. (spathulata).
ciliaris, Losc., 359.
ciliata, Linn., 418.
ciliata, Sibth. & Sm. (gracilis var. cretica).
ciliolata, Edgew. & Hook. f., 373.
cinerea, DC., 350.
colorata, Turcz. (capillaris).
compacta, Coville, 396.
conferta, Boiss., 360.
conferta, Wedd. (boliviana).
congesta, Nutt., 392.

Arenaria conica, Boiss., 370.
conimbriensis, Brot., 342.
controversa, Boiss., 344.
corsica, Steud. (balearica).
cretica, Spreng. (gracilis var. *cretica*).
cryptopetala, Kunze (tetragyna).
cucubaloides, O. A. Mey. (gypsophiloides).
cucubaloides, Sm., 396.
dahurica, Fisch. (juncea).
debilis, Hook. f., 431.
decussata, Salisb. (tetraquetra, Boiss.).
decussata, Willd. herb. (lycopodioides).
deftexa, Decus. (graveolens).
Delavayi, Franch., 431.
densa, Kit. (gracilis).
densissima, Edgew., 406.
dianthoides, hort. ex Ledeb. (gypsophiloides).
dianthoides, Sm., 408.
dieranoides, H. B. & K., 423.
diffusa, Ell. (lanuginosa).
digyna, Willd. herb. (serpens).
drypidea, Boiss., 399.
emarginata, Brot., 342.
erinacea, Boiss., 361.
fastigiata, Phil. (palustris var. patagonica).
Fendleri, A. Gray, 417.
ferruginea, *Duthie*, ined., 410.
festucoides, Benth. in Royle, 401.
filicaulia, Fenzl in Griseb., 363.
filifolia, Breh. (graminifolia).
formosa, Fisch. (capillaris var. formosa).
Franklinii, Dougl. ex Hook., 392.
Gayana, Williams, 422.
glanduligera, Edgew., 421.
glandulosa, Williams, 431.
globiflora, Edgew., 406.
glutinosa, Boiss. (Ledebouriana var. glutinosa).
gorgonea, J. A. Schmidt, 355.
gothica, Fries, 420.
gothica, Gren. (ciliata var. laxior).
Gouffea, Chaub. (massiliensis).
Gouffea, Puel (controversa).
gracilis, Waldst. & Kit., 354.
græca, Boiss. (graveolens var. *græca*).
graminea, C. A. Mey., 403.
graminea, Steud. (grandiflora).
graminea var. *parviflora*, Fenzl (blepharophylla).
graminifolia, Schrad., 409.
graminifolia, var. β , Ledeb. (saxatilis).
graminifolia, var. *a. glabra*, Fleisch. & Lindern. (saxatilis).
grandiflora, Coss. (incrassata).

Arenaria grandiflora, Linn., 347.
grandiflora, Tornab. (leptocladus).
graveolens, Schreb., 362.
Griffithii, Boiss., 404.
Guicciardii, Heldr., 371.
Gulielmi-Waldemarii, Klotzsch (festucoides).
gypsophiloides, Linn., 411.
gypsophiloides, Stev. (cucubaloides).
gypsophiloides, Willd. herb. (juncea).
Halaosyi, Bald., 376.
hirta, Sieb. (gracilis var. *cretica*).
hispanica, Spreng. (spathulata).
hispida, Linn., 345.
hispida, Salzm. (racemosa).
hispida, St. Amans (controversa).
Holostea, Beaupr. (rigida).
Holostea, Bieb., 394.
holosteoides, Edgew., 427.
Hookeri, Nutt., 393.
humifusa, Wahlenb. (ciliata var. norvegica).
Huteri, Kern., 351.
imbriata, Lag. Rodr. (tetraquetra, Boiss.).
inconspicua, Poepp. (tetragyna).
incrassata, Lange, 360.
intricata, Duf. (montana var. intricata).
isaurica, Boiss., 396.
Jamesoniana, Rohrb., 333.
juncea, Bieb., 397.
juniperina, Thuill. (grandiflora var. triflora).
juniperina, Vill. (grandiflora var. multiflora).
Jussæi, St.-Hil. (lanuginosa).
kansuensis, Maxim., 402.
Koriniana, Fisch., 410.
Kotschyana, Fenzl (tmolea var. Kotschyana).
kumaonensis, Maxim., 407.
lanuginosa, Rohrb., 377.
laricifolia, Lapeyr. (grandiflora).
laxa, Fisch. (grandiflora).
Laxmanni, Fisch. (capillaris).
Ledebouriana, Fenzl, 400.
leptocladus, Guss., 367.
Lessertiana, Fenzl, 401.
lesurina, Loret, 346.
libanotica, Kotschy, 354.
Liebmanniana, Rohrb., 358.
ligericina, Lec. & Lamot. (lesurina).
lencarifolia, Poir. (montana).
liniflora, Willd. herb. (grandiflora).
Lloydii, Jord. (serpyllifolia var. macrocarpa).
longifolia, Bieb., 399.
longifolia, DC. (saxatilis).
longistyla, Franch., 432.

- Arenaria Loscosii*, *Taxid.*, 359.
lychnidea, *Bieb.*, 395.
lycopodioides, *Willd. herb.*, 384.
macradenia, *S. Wats.*, 417.
macrosepala, *Boiss.*, 370.
Mandoniana, *Wedd.*, 389.
Marschleusii, Koch (*serpyllifolia*
var. alpina).
massiliensis, *Fenzl*, 426.
megalantha, *Rohrb.*, 379.
melandryoides, *Edgew.*, 374.
Meyeri, Fenzl (*capillaris* *var.*
Meyeri).
microphylla, *Phil.*, 387.
minutiflora, *Losc.* (*leptoclados*).
mixta, *Lapeyr.* (*grandiflora* *var.*
mixta).
modesta, *Duf.*, 356.
montana, *All.* (*grandiflora*).
montana, *Linn.*, 346.
monticola, *Buekl.* (*Benthami*).
monticola, *Edgew.*, 402.
Moritziana, *Fax* (*pycnophylloides*
var. Moritziana).
multicaulis, *Linn.* (*ciliata* *var.*
frigida).
multicaulis, *Phil.* (*serpens* *var. an-*
dicola).
multicaulis, *Schur* (*biflora* *var.*
apetala).
muralis, *Edgew. ex J. F. Watson*
(festuroides).
muralis, *Sieb.* (*graveolens*).
musciformis, *Edgew.* (*polytrichoi-*
des).
musciformis, *Triana & Planch.*,
 376.
muscoides, *H. B. & K.*, 376.
nana, *Boiss. & Heldr.*, 371.
nana, *Willd. herb.* (*muscoides*).
napuligera, *Franch.*, 345.
nardifolia, *Ledeb.* (*capillaris* *var.*
nardifolia).
nemorosa, *H. B. & K.* (*lanuginosa*).
nepalensis, *Spreng.*, 429.
nevadensis, *Boiss.*, 369.
nilghirensis, *Fenzl* (*Balansæ*).
nilghirensis, *Wight & Arn.*, 343.
nitida, *Rohrb.*, 375.
norvegica, *Gunn.* (*ciliata* *var. nor-*
vegica).
obtusiflora, *Kunze*, 344.
orbicularis, *Vis.*, 370.
orbiculata, *Royle*, 356.
Orbignyana, *Wedd.*, 384.
oreophila, *Hook. f.*, 410.
otitoides, *Adams* (*saxatilis*).
ovalifolia, *Somm. & Lev.*, 372.
oxypetala, *Sibth. & Sm.*, 357.
palustris, *Naud.*, 387.
- Arenaria pamphylica*, *Boiss. & Heldr.*,
 357.
papillosa, *Steud.* (*graveolens*).
paradoxa, *Bartl.* (*lanuginosa*).
parviflora, *Jacks.* [*sphalm.*] (*parvi-*
folia).
parvifolia, *Benth.*, 382.
patagonica, *Phil.* (*palustris* *var.*
patagonica).
patula, *Martr.* (*serpyllifolia* *var.*
patula).
pedunculosa, *Wedd.*, 426.
pentandra, *Maxim.*, 373.
persica, *Boiss.* (*Lessertiana*).
peruviana, *Poepp.* (*lanuginosa*).
Peyritschii, *Rohrb.*, 389.
pleurantha, *Phil.*, 381.
Poeppigiana, *Rohrb.*, 390.
polynemifolia, *Boiss.*, 393.
polytrichoides, *Edgew.*, 404.
Pomeli, *Munby*, 343.
procera, *Spreng.* (*saxatilis*).
Przewalskii, *Maxim.*, 408.
pseudarmeriastrum, *Rouy*, 365.
pubescens, *Urv.* (*graveolens*).
pulvinata, *Edgew.*, 405.
pungens, *Clem.*, 393.
pungens, *Steph.* (*capillaris*).
purpurascens, *Ram.*, 390.
pusilla, *Stapf* (*pamphylica*).
pycnophylla, *Rohrb.*, 424.
pycnophylloides, *Par.*, 425.
pyrenaica, *Steud.* (*montana*).
quadridentata, *Williams*, 432.
querioides, *Pourr.* (*incrassata*, *cap-*
tata ?).
racemosa, *Willk.*, 361.
radians, *Benth.*, 423.
Redowskii, *Cham. & Schlecht.*, 353.
reptans, *Hemsl.*, 383.
retusa, *Boiss.*, 356.
rhodia, *Boiss.* (*graveolens*).
rigida, *Bieb.*, 409.
rivularis, *Phil.* (*serpens* *var. andi-*
cola).
Roborowskii, *Maxim.*, 413.
Rohrbachiana, *Garcke*, 384.
rosea, *Salzm.* (*emarginata* *var.*
Salzmanni).
rotundifolia, *Bieb.*, 352.
Roylei, *Fenzl* (*festuroides*).
ruscifolia, *Req.* (*cinerea*).
sabulinea, *Griseb.*, 358.
Salzmanni, *Presl* (*racemosa*).
saponarioides, *Boiss. & Bal.* (*macro-*
sepala *var. minor*).
saxatilis, *Bout. herb. ex Willd. &*
Lange (*obtusiflora*).
saxatilis, *Lapeyr.* (*grandiflora* *var.*
multiflora).

Arenaria saxatilis, Linn., 397.
Saxifraga, Fenzl, 418.
saxosa, A. Gray, 388.
scabra, Vahl (lanuginosa).
scariosa, Boiss., 402.
scopulorum, H. B. & K. (serpens).
scopulorum, Schlecht. (lanuginosa).
serpens, H. B. & K., 385.
serpens var. *Orizabæ*, Rohrb. (bryoides).
serpyllifolia, Bourg. (nevadensis).
serpyllifolia, Guss. (leptoclados).
serpyllifolia var. *tenuior*, Koch (leptoclados).
serpyllifolia, auct. ital. (serpyllifolia).
serpyllifolia, Linn., 365.
serpylloides, C. Gay. (serpens).
setacea, Fisch. (lychnidea).
setacea, Thuill. (capillaris).
setosa, Willd. (capillaris).
sibirica, Pers. (capillaris).
sipylea, Boiss. (graveolens var. *glabrescens*).
soratensis, Rohrb., 381.
sordida, Chaub. (emarginata).
spathulata, Desf., 389.
sphaerocarpa Martr. (non Tenore), (serpyllifolia var. *patula*).
sphaerocarpa, Tenore (serpyllifolia var. *scabra*).
squalida, Dur. (emarginata var. *Salzmanni*).
stenophylla, Ledeb. (*saxatilis*).
Stevensiana, Boiss. (blepharophylla var. *brevisflora*, Williams).
stolonifera, Vill. (*grandiflora* var. *stolonifera*).
Stracheyi, Edgew., 374.
Stuebelii, Hieron., 388.
stygia, Boiss. (*gracilis* var. *stygia*).
subulata, Ser. (capillaris).
Szowitzii, Boiss., 395.
tenella, Duthie, ined., 356.
tenera, Edgew., 428.
tenuis, J. Gay (controversa).
tetragyna, Willd. herb. ap. Schlecht., 407.
tetraquetra, All. (capitata).
tetraquetra, Boiss., 361.
tetraquetra var. *aggregata*, Reichb. (capitata).
tetraquetra (exel. var. β .), Linn., *Mant. Plant.* (capitata).
tetrasticha, Boiss., 401.
tmolea, Boiss., 352.
tomentosa, Willk., 354.
transsilvanica, Simk. (rotundifolia).
tremula, Boiss., 367.
trichophora, Franch. (yunnanensis).

Arenaria trichotoma, Boiss. (Ledebouriana var. *parviflora*, Boiss.).
triflora, Linn. (*grandiflora* var. *triflora*).
Tschucktschorum, Regel, 411.
ucranica, Spreng. (graminifolia).
uralensis, Pall. (serpyllifolia var. *viscidula*).
ursina, Robinson, 412.
valentina, Boiss., 350.
varia, Dulac (serpyllifolia).
viscida, Hall. f. (serpyllifolia).
viscosa, Fisch. (capillaris).
Wallichiana, Ser. (serpyllifolia).
yunnanensis, Franch., 430.
Bigelowia elongata, Rafin. (lanuginosa).
montana, Rafin. (montana).
Brachystemma calycinum, D. Don (nepalensis).
Brewerina suffrutescens, A. Gray (congesta var. *suffrutescens*).
Cerastium arenarioides, Crantz (spatulata).
latifolium, Vitm. (*Saxifraga*).
purpurascens, Fenzl (purpurascens).
Cherleria bisulca, Bartl. (bisulca).
grandiflora, D. Don (globiflora).
juniperina, D. Don (densissima).
nitida, Bartl. (nitida).
Dolophragma globiflorum, Fenzl (globiflora).
juniperinum, Fenzl (densissima).
Dufourea purpurascens, Gren. (purpurascens).
Eremogone airæfolia, Fenzl (capillaris var. *airæfolia*).
capillaris, Fenzl (capillaris).
cephalotes, Fenzl (cephalotes).
cucubaloides, Hohen. (cucubaloides).
davurica, Fenzl (juncea).
formosa, Fenzl (capillaris var. *formosa*).
graminea, C. A. Mey. (graminea).
graminifolia, Fenzl (graminifolia).
gypsophiloides, Fenzl (gypsophiloides).
Holostea, Rupr. (Holostea).
juncea, Fenzl (juncea).
longifolia, Fenzl (*saxatilis*).
lychnidea, Rupr. (lychnidea).
micrantha, Schur (graminifolia).
nardifolia, Fenzl (capillaris var. *nardifolia*).
otitoides, Fenzl (*saxatilis*).
procera, Reichb. (*saxatilis*).
pungens, Fenzl (pungens).
rigida, Fenzl (rigida).
stenophylla, Fisch. & Mey. (*saxatilis*).

- Eremogone subulata*, Fenzl (*capillaris*).
Euthalia rotundifolia, Rupr. (*rotundifolia*).
serpyllifolia, Rupr. (*serpyllifolia*).
Gouffea arenarioides, Rob. & Cast. (*massiliensis*).
crassiuscula, Cambess. (*holosteoides*).
holosteoides, C. A. Mey. (*holosteoides*).
Gypsophila aggregata, Linn. (*capitata*).
succulina, Calv. et Zohrab, 1867 (*blepharophylla*), 403.
Lepyrوديκis cerastioides, Kar. & Kir. (*holosteoides var. cerastioides*).
holosteoides, Fenzl (*holosteoides*).
paniculata, Stapf (*holosteoides var. paniculata*, *Williams*).
quadridentata, Maxim. (*quadridentata*, *Williams*).
stellarioides, Fisch. & Mey. (*holosteoides var. stellarioides*, *Williams*).
tenera, Boiss. (*tenera*).
Lobelia bryoides, Willd. herb. (*dicronoides*).
Micropetalum lanuginosum, Pers. (*lanuginosa*).
- Mehringia nemorosa*, Fenzl (*lanuginosa*).
umbrosa, A. Gray (*saxosa*).
Odontostemma glandulosum, Benth. (*glandulosa*, *Williams*).
Petteria graminifolia, Reichb. (*saxatilis*).
Plinthine aggregata, Reichb. (*capitata*).
tetraquetra, Reichb. (*tetraquetra var. pyrenaica*).
Spergula ciliaris, Brot. (*conimbriensis*).
Spergulastrum lanuginosum, Michx. (*lanuginosa*).
Stellaria aculeata, Scop. (*grandiflora*).
Arenaria, Linn. herb. (*spathulata*).
elongata, Nutt. (*lanuginosa*).
Kingii, S. Wats. (*congesta var. Kingii*).
lanuginosa, Torr. & Gray (*lanuginosa*).
longepedunculata, Baldw. (*lanuginosa*).
muralis, Link (*capitata*).
pubescens, Willd. herb. (*lanuginosa*).
saxatilis, Scop. (*saxatilis*).
Saxifraga, Bertol. (*Saxifraga*).
serpyllifolia, Scop. (*serpyllifolia*).

The Comparative Anatomy of certain Genera of the Cycadaceæ*.

By W. C. WORSDELL, F.L.S.

(PLATE 20.)

[Read 3rd February, 1898.]

INTRODUCTION.

MATERIAL of various Cycadaceous plants having at different times within the past year or two been placed at my disposal, I made a careful investigation of the anatomical structure of the plants concerned. The greater part of the material afforded little of a novel character, but one or two of the plants examined exhibited interesting and striking structures. It was considered worth while to describe in a single paper each plant in succession which I had investigated, although the structure of some of these differs little from what has already been described in other

* From the Jodrell Laboratory, Royal Gardens, Kew.