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ASTRAGALUS IN ARGENTINA, BOLIVIA AND CHILE

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Continued from p. 374

39. *Astragalus Monteroi*, sp. nov.

Herba prostrata; caulibus 2–4 dm. longis 1–2 mm. crassis sparse inconspicueque strigosis sparse longeque ramosis foliosis, internodiis 3–5 cm. longis; foliis superioribus paulo reductis; rhachibus foliorum 3–5 cm. longis sparse strigosis partibus basalibus efoliatis 0–15 mm. longis; stipulis chartaceis ocreatis 2.5–5 mm. longis, lobis 1–2.5 mm. longis; foliolis 6–9 jugatis carnosulis obcordatis vel oblongo-obcordatis supra medium vel medium versus latioribus apice retusis basi acutis supra glabris subtus glabris vel praesertim in margine et costa strigosis costatis sed enervatis 5–14 mm. longis 4–7 mm. latis 0.5–1 mm. longe petiolulatis; pedunculis 3–6 cm. longis cum floribus 8–20 congestis terminatis; calycibus 4–5 mm. longis sparsissime strigosis tubo 2–2.5 mm. longo lobis 1–2 mm. longis angustis pedicello 1–2 mm. longo; vexillo 9–10 mm. longo 8 mm. lato apice retuso 1–2 mm. longe unguiculato medio albo et caeruleo-striato alibi caeruleo; alis flavescentibus quam carina 1 cm. longa ultra medium caerulea 2–2.5 mm. brevioribus; ovario glaberrimo; leguminibus glabris pendulis congestis 11–14 mm. longis oblongis acuminatis supra acutis subtus planis 3–4 mm. crassis, a latere viso supra leviter concavis et subtus valde concavis.

CHILE. Cautin: Puerto Saavedra, 3 m. alt., Feb. 30, 1932, *G. Montero 1161* (type, Gray Herb.); Llaïma, Jan. 1925, *Claude Joseph 3118* (US); Budi, Feb. 1928, *Claude Joseph 4878* (US).

In gross habit and in corolla structure the present species much suggests the coarse forms of *A. palenae* (i.e. the var. *grandiflora* Speg.). The fruit of *A. Monteroi*, however, is very different from that of *A. palenae* and very much more like that found in *A. amatus* of the coast of central Chile. The closest relative of *A. Monteroi* is evidently *A. amatus*. From this species it is quickly distinguished by its glabrous ovary and fruit. It is a coarser and much larger plant with much larger more fleshy leaves. The species seems to be very well marked.

40. *Astragalus amatus* Clos in Gay, Fl. Chile 2: 115 (1846).—Type given as from Porfiro, on road from La Serena to Arqueros, 1433 m. alt., Gay 269.
- Astragalus procumbens* Hooker & Arnott, Bot. Beechey Voy. 18 (1830), and Bot. Misc. 3: 186 (1832); Hooker, Bot. Mag. 60: t. 3263 (1835); Reiche, Anal. Univ. Chile 97: 540 (1897), and Fl. Chile 2: 83 (1898).—Not Miller (1768).—Given as collected by Lay and Collie at "Conception," Chile.
- Phaca tricolor* Clos in Gay, Fl. Chile 2: 105 (1846).—Based upon collections (devoid of geographical data) said to have come from the coast of Coquimbo and Aconcagua.
- Astragalus tricolor* (Clos) Reiche, Anal. Univ. Chile 97: 550 (1897), and Fl. Chile 2: 93 (1898). Not Bunge (1868–69).
- Astragalus ferrugineus* Clos in Gay, Fl. Chile 2: 114 (1846); Weddell, Chlor. Andina 2: 262 (1861); Reiche, Anal. Univ. Chile 97: 567 (1897), and Fl. Chile 2: 110 (1898).—Based upon material (mixed and probably mislabeled) given as from near Cauquenes, Gay 237.
- Astragalus leucomallus* Philippi, Linnaea 30: 186 (1859).—Based upon material from coast near Topocalma, prov. Colchagua, Gay 527 and Volckmann.
- Phaca brachyptera* Philippi, Linnaea 33: 44 (1864).—Type collected near Catemu, prov. Aconcagua, Philippi.
- Astragalus brachypterus* (Phil.) Reiche, Anal. Univ. Chile 97: 541 (1897), and Fl. Chile 2: 84 (1898).—Not Fischer (1853).
- Astragalus litoreus* Philippi, Linnaea 33: 46 (1864); Reiche, Anal. Univ. Chile 97: 540 (1897), and Fl. Chile 2: 83 (1898).—Type collected on the coast near Coronel, 1861, *F. Philippi*.
- Tragacantha brevialata* Kuntze, Rev. Gen. 2: 940 (1891).—A new name based upon *P. brachyptera* Phil. (1864); *A. brachyptera* Reiche (1897), not Fischer (1853).
- Astragalus chilensis* Sheldon, Minnesota Bot. Studies 1: 157 (1894).—A new name based upon *A. procumbens* H. & A. (1830), not Miller (1768).
- Astragalus subandinus* Spegazzini, Anal. Mus. Nac. Buenos Aires ser. 2, 4: 264 (1902).—A new name based upon *P. brachyptera* Phil.; *A. brachypterus* Reiche (1897), not Fischer (1853).

RANGE: West-central Chile, from the province of Concepcion north to the province of Coquimbo, along the ocean and east into the coastal mountains.

CHILE. Coquimbo: hills of decomposed basanite near Porfiro, road between La Serena and Arqueros, 1433 m. alt., Gay 269 (Paris, type of *A. amatus*); Coquimbo, Cuming 881 (K); Andocollo, Oct. 1926, Claude Joseph 4533 (US); Est. Fray Jorge, 215 m. alt., Skottsberg 786 (Stock, Gottenburg); Fray Jorge, 1935, Muñoz 137 and 165 (G); Punta del Viento, Fray Jorge, 400 m. alt., 1925, Werdermann 916 (G, BD); Cuesta de Cavilolén, ca. 30 km. s. w. of Illapel, steep banks, standard blue-purple, wings white, 500 m. alt., Worth & Morrison 16465 (G). Aconcagua: Zapallar, Sept. 17, 1917, Johow (G); Cerro de la Cruz, Zapallar, Behn (Behn); Punta de Quintero, cliffs, Poeppig 189/307 (BM, BD); Quintero, Werdermann 1 (G, BD); mountains [above Catemu] Philippi (BD, isotype of *P. brachyptera*); Concon, Poeppig 190/257 and 188/211 (BD, Paris); Playa de Concon, sand, 1937, Jaffuel & Pirion 3946 (G); Viña del Mar, dunes, 1830, Bertero 1824 (G, NY, BD, Paris); Valle de Marga Marga, 40 km. inland, 250 m. alt., 1929, Jaffuel 247 and 3021 (G); Las Zorras, 1917, Skottsberg 1038 (Stock, Gottenburg); Playa Ancha, 1829, Bertero 823 (Paris); hillside, Queb. Jaime, Valpo., Nov. 1895, Brenning 129 (BD); El Alto, hillside, 1830, Bertero 1821 (G, Paris); Laguna Verde, 1930, Garaventa 2122 and 2129 (G). Santiago: San Antonio, dunes, Sept. 1829, Gay 469 (Paris). Colchagua: Matanzas, March 1894, Philippi (G, LP); near stream, Cauquenes, Feb. 1831, Gay 237 (Paris, type of *A. ferrugineus*). Talca: Llico, Dec. 1861, ex Philippi (LP); Iloca, Feb. 1931, Fuentes (G). Concepcion: Coronel, sea-shore, Feb. 1861, *F. Philippi* (G, isotype of *A. litoreus*); Coronel, ex Philippi as *A. litoreus* (BD); Talcahuano, Dec. 1861, herb. Reed (K); Quiriquina, Nov. 1924,

Claude Joseph 2855 (US); San Miguel, Nov. 1933, *Barros* 137 (G); Concepcion, *Cuming* 137 (K); Concepcion, Sept. 1895, *Neger* (BD); prov. Concepcion, ex Philippi as *A. litoreus* (Boiss, Stock); San Vicente, Dec. 1894, *Philippi* (G). Indefinite: "Chile," *Gay sine no.* and *Gay* 584 (Paris, type of *P. tricolor*); "Chile," *Gay* as *P. tricolor* (G, K, BD).

Assembled here under the name *A. amatus* is a very variable group of plants of western Chile, found from the provinces of Concepcion to Coquimbo, and characterized by having the wings of the corolla conspicuously shorter than the keel. The group of forms is very readily recognizable and has a close relative only in *A. Monteroi* of the coast of southern Chile. Possibly it may be a complex of local species. The material available to me, however, is inadequate for an attempted analysis of it at this time.

Certain of the phases of *A. amatus* deserve special comment. There is an erect plant of the coastal mountains, somewhat back from the ocean in the province of Aconcagua, which has small ovate or oblong leaflets which are markedly and gradually diminished in size upwardly along each leaf-rhachis. Its corollas appear to be a darker blue than in the forms from other regions. This plant is typical *A. amatus* and is that described as *P. brachyptera* by Philippi. I have seen collections of it from Porfiro, Andacollo and Catemu.

The other forms of *A. amatus*, sensu lat., are decumbent or prostrate and appear to grow near the ocean or in the coastal hills under more marked maritime influence. The most striking of these spreading forms is a white-tomentose plant with coarse stems and thickish broad ovate leaflets which appears to be restricted to sands and dunes along the ocean. This extreme form has been described as *A. leucomallus* Phil. Though very conspicuous in its extreme development the tomentose plant seems to intergrade with the common, excessively variable and more mesophytic forms of the fields and slopes back from the sea. These latter vary in coarseness of stems and in size and shape of the leaves. Their leaflets may be subcordate to linear or narrowly elliptic, appressed villous to nearly glabrous, 3–15 mm. long, 2–6 mm. broad, and their apices from obtuse to retuse. They present, accordingly, considerable variation in gross aspect. To this complex of forms belong the names, *A. procumbens* H. & A., *A. litoreus* Phil. and *A. tricolor* Clos, the first to the much collected form north and south of Valparaiso, the two latter names to the small-leaved glabrescent slender-stemmed laxly decumbent phase which prevails in the region about Concepcion.

The type of *A. procumbens* H. & A., which I could not find at Kew, is said to have been collected at Concepcion by Lay and Collie. It is said to have elliptic retuse leaflets which are "tomentoso-hirsutis" or "sericeo-villosus." I have seen no such plant from near Concepcion, where the glabrescent forms such as *A. tricolor* and *A. litoreus* seem to predominate or, at least, have been most collected. The original description of *A. procumbens* fits best the plants found on the slopes about Valparaiso.

The type of *A. amatus* Clos is a mixture of two very different forms. The label on the type collection (*Gay 269*) gives the source of the plants as Porfiro, 1000 m. alt., in the mountains northwest of Coquimbo. Of the two forms mixed under *Gay 269*, one is indistinguishable from the spreading densely white-tomentose plant of the coastal sands which Philippi later called *A. leucomallus*. The other plant, erect, cinereous and appressed villous (rather than tomentose) and bearing more numerous (9–15) smaller strongly truncate or retuse leaflets, is most like the type of *A. brachypterus* (Phil.) Reiche. This latter is the form which has the numerous leaflets noticeably reduced in size up each leaf-rhachis and the one known only away from the ocean in the coastal hills of Coquimbo and Aconcagua. In his discussion of *A. amatus* Clos distinguishes these two forms, mentioning first the erect plant of the interior and second the spreading white-tomentose plant of the coastal sands. In his description of the species, however, the tomentose dune-form seems to be somewhat emphasized. In this connection it may be noted that, at Paris, Clos has identified *Bertero 1821* as "*A. amatus*." This particular collection by Bertero is the tomentose dune plant. Since, however, Clos identified other very similar collections of the white-tomentose dune-form as "*A. procumbens*," I cannot attach any importance to his identification of the collection of Bertero mentioned.

Not only are the collections of "*A. amatus*" mixed in the herbarium at Paris, but so are the duplicate collections of the species distributed to other herbaria. For example, at Berlin there are two sheets of "*A. amatus*," one is entirely the tomentose dune plant and the other is a mixture of *A. nudus* and *A. vesiculosus*. The sheet of "*A. amatus*" at New York is the tomentose dune plant. At the Gray Herbarium the sheet of "*A. amatus*" is a mixture of the erect plant of the interior (i.e., *A. brachypterus*) and *A. nudus*. Similar mixtures are found in other herbaria. It may be noted here that the material of the dune-form forming a part of the mixed type of *A. ferruginosus*, in appearance, discoloration, maturity, manner of preparation, etc., is so very much like that mixed in the type collection of *A. amatus*, that I am confident that they were collected and prepared at the same time and are parts of a single dissociated collection. This would mean that the material of this particular collection of the coastal dune-form was not only divorced from its proper label but was also separated and improperly associated with collections of other forms of *A. amatus* from different localities. There is plenty of evidence that some of Gay's collections did get mixed. In the present case of "*A. amatus*" it seems clear that the label on the type at Paris could apply only to the plant of the interior (i.e., *A. brachypterus*) collected at Porfiro, and that the material of the white-tomentose dune form must be extraneous. Hence, because in his publication Clos discussed the erect plant of the interior before mentioning the spreading plant of the dunes, and since there is every reason for believing that the plant of the interior, rather than the coastal dune form, will be found at

Porfiro, the locality given on the associated label, I believe that the erect plant of the interior should be accepted as the typical element in the complex type of *A. amatus*.

The type collection of *A. ferrugineus*, at Paris, is a mislabeled mixture. The type-sheet contains a plant of the tomentose dune form (i.e., *A. leucomallus*) and one of the slender glabrate forms similar to those found about Concepcion (i.e., *A. tricolor* and *A. litoreus*). These are obviously parts of two different collections made at different places. The label is, with the exception of the plant-name added by Clos, entirely written by Gay. It reads, "237, Provincia Colchagua, Astragalus ferrugineus Clos ad rivulos, Cauquenes, februario 1831, fl. septembri, etc., frequens, t. basaltique, (Chili)." During February 1831 Gay was exploring along the Rio Cachopual and visited Baños de Cauquenes and the Estancia de Cauquenes in the province of Colchagua. This area, at the base of the cordilleras, however, is far beyond the known range of the coastal *A. amatus* and its forms. They are not known, nor to be expected, east of the coastal mountains, within 100 km. of Estancia de Cauquenes. The material on the type-sheet, hence, represents parts of two different collections (probably from the dunes near Valparaiso and from the coast near Concepcion), which are improperly associated with the label belonging to an unknown third plant. Though Clos, in his description of *A. ferrugineus*, seems to be concerned only with the tomentose dune form, the type collection is so badly mixed that I believe the species had best be discarded as a nomen confusum.

The type material of *P. tricolor*, at Paris, consists of two sheets devoid of any precise geographical data. This type-material and the original description agree well with plants collected in the coastal area of the province of Concepcion. When *A. tricolor* was described, however, it was given as growing near the coast in the provinces of Coquimbo and Aconcagua. Among the many collections which I have seen from the coast of Aconcagua and Coquimbo none are similar to the original material of *A. tricolor*. I am confident that the type-material of *A. tricolor* really came from the region about Concepcion.

41. *Astragalus valparadisiensis* Spegazzini, Anal. Mus. Nac. Buenos Aires ser. 2, 4: 264 (1902).—A renaming of *A. trifoliatus* Phil.

Astragalus trifoliatus Philippi, Linnaea 28: 681 (1857); Reiche, Anal. Univ. Chile 97: 543 (1897), and Fl. Chile 2: 86 (1898). Not Boiss. (1843).—Type originally said to be from the Andes of the province of Santiago. Reiche, however, gives it as from "Algarrobo," on the coast of Aconcagua.

CHILE. Aconcagua: Valparaiso, ex Philippi dedit. 1876, as *A. trifoliatus* (BD, Del); Valparaiso, no collector given, as *A. trifoliatus* (Speg.).

I know this plant only from descriptions and from the collections, all evidently duplicates of one gathering, above cited. It is a very distinctive plant with its trifoliate leaves, coarse loose stipular sheathes and very dense abundant long silky golden indument. It is to be noted that in the literature Philippi and Reiche differ as to the origin of this species, the

former giving it as from the cordilleras, the latter as from the coast near Valparaiso. The specimens distributed by Philippi, however, are labeled as from Valparaiso, and this is probably correct. The general habit of the plant suggests an inhabitant of dunes and a close examination of the specimens reveals the presence of clean white sand in the stipular sheathes and among the hairs of the indument. No fruit of the species is known. The original collection shows flowers at anthesis. These much suggest those of *A. nudus* and I suspect that is the closest relative of *A. valparadisiensis*.

42. *Astragalus cachinalensis* Philippi, Fl. Atac. 15 (1860); Reiche, Anal. Univ. Chile 97: 547 (1897), and Fl. Chile 2: 90 (1898); Johnston, Contr. Gray Herb. 85: 52 (1929).—Type collected at Cachinal de la Costa, *Philippi*.

RANGE: Fog-bathed hills and cliffs along the coast of prov. Antofagasta, northern Chile.

CHILE. Antofagasta: Cachinal de la Costa, *Philippi* as *A. cachinalensis* (BD, isotype); near Aguada Grande ("Cachinal de la Costa" of Philippi), 1925, *Johnston* 5825 (G, US, K); near Aguada Cachina, 1925 *Johnston* 5740 (G); El Rincon near Paposo, 1925, *Johnston* 5497 (G, US); Aguada Panul, 1925, *Johnston* 5431 (G); near Aguada Miguel Diaz, 1925, *Johnston* 5349 (G, US).

A plant with slender elongate trailing leafy stems and very large flowers. The bluish standard becomes 12–18 mm. long. The keel is cream-colored and tipped with bluish. The petals become yellowish when dry. The species is a very distinct one and is restricted to the fog-bathed slopes along the southern half of the coast of the province of Antofagasta. It is obviously an isolated outlying relative of *A. amatus* of central Chile.

43. *Astragalus nudus* Clos in Gay, Fl. Chile 2: 115 (1846); Reiche, Anal. Univ. Chile 97: 546 (1897), and Fl. Chile 2: 89 (1898).—Based upon two collections, dunes near La Serena, *Gay* 15, and between La Serena and Arqueros, 1300 m. alt., *Gay* 270.

RANGE: Known only from the region about Coquimbo and along the coast in southern Atacama.

CHILE. Coquimbo: Rare, hills of decomposed basanite (near Porfiro), road between La Serena and Arqueros, 1300 m. alt., *Gay* 270 (Paris, type); Herradura, 1917, *Skottsberg* 1057 (Stock); scattered on dunes near ocean, La Serena, Sept. 1836, *Gay* 15 (Paris); Isla Guacolda, Huasco, on sand of island, perennial, standard lavender and white, wings white, Oct. 26, 1938, *Worth & Morrison* 16224 (G); Chile, *Gay* as *A. nudus* and *A. procumbens* (K); Chile, *Gay* as *A. amatus*, in pt. (BD); Chile, *Gay* as *A. procumbens* (G, NY).

The corolla of *A. nudus* dries yellowish except for the distal half of the keel which is purplish or blue. When fresh the standard is probably pale bluish and the wings cream-colored. The whole plant is densely strigose and canescent. The stems appear to be erect or ascending. The relationships of the species are with *A. valparadisiensis* and, particularly, with *A. Dodti*. I have not seen the completely mature fruit of this species.

44. *Astragalus Dodti* Philippi, Linnaea 33: 48 (1864), Anal. Univ. Chile 27: 343 (1865), and Anal. Univ. Chile 84: 28 (1893); Reiche, Anal. Univ. Chile 97: 545 (1897), and Fl. Chile 2: 88 (1898).—This species was based upon flowering plants from near Copiapo, *Dodt*, and upon fruiting plants from Arqueros, *Gay*.

Astragalus Rengifoi Philippi, Anal. Univ. Chile 84: 25 (1893); Reiche, Anal. Univ. Chile 97: 544 (1897), and Fl. Chile 2: 87 (1898).—Based upon material collected near Chañarcillo, Sept. 1876.

Astragalus melanogonatus Johnston, Contr. Gray Herb. 85: 52 (1929).—Type from Punta Reyes, prov. Antofagasta, *Johnston 5353*.

RANGE: Gravelly and sandy soils on the coastal desert of Atacama and Antofagasta.

CHILE. Antofagasta: Antofagasta, 1925, *Johnston 3632* (G, US); Punta Reyes near Miguel Diaz, 1925, *Johnston 5353* (G, type of *A. melanogonatus*). Atacama: Morro de Copiapo, southwest of Caldera, sandy washes above beach, flowers pinkish white, Oct. 21, 1938, *Worth & Morrison 16183* (G); Caldera, *Gigoux* (G); Caldera, 1885, *Borchers* (BM); Monte Amargo, 200 m. alt., 1924, *Werdermann 458* (G, K, BD); near Copiapo, Sept. 1854, *Lechler 2805* (K); Chañarcillo, Sept. 1876, *ex Philippi* (G, LP, isotypes of *A. Rengifoi*). Indefinite: Desert of Atacama, *Geisse, sub Morong 98* (NY) and *Morong 1165* (G, NY, US, K); Atacama Desert, *ex Philippi* as *A. Rengifoi* (BD, US); ? Vicuña, Oct. 1926, *Claude Joseph 4597* (US).

This species is prevailing annual and erect. It is very closely related to *A. nudus* and possibly may not be separable from that more southern species. The legumes are strongly compressed and have nearly parallel sides. They may be permanently strigose or become glabrescent. The corollas of *A. Dodti* and *A. nudus* are very similar in size and form, but the coloration in the latter species is more intense. *Astragalus Dodti* and *A. Rengifoi* are evidently conspecific. The more northern form described as *A. melanogonatus* is essentially similar differing chiefly in the broader, oblong rather than linear, leaflets.

45. *Astragalus Berteri* Colla, Mem. R. Accad. Sci. Torino 37: 55, t. 9 (1832), and Pl. Rarior. Bertero. 19, t. 9 (1831?); Reiche, Anal. Univ. Chile 97: 546 (1897), and Fl. Chile 2: 89 (1898).—Based upon material given as from "locis aridis de la Leona secus rivum Cachapual," collected by Bertero.

Astragalus prostratus Hooker & Arnott, Bot. Voy. Beechey 18 (1830), and Bot. Misc. 3: 187 (1832). Not Scop. (1786–88).—Based upon collections from Concepcion, *Lay* and *Collie*.

Astragalus alberjilla Steudel, Nom. ed. 2, 1: 159 (1840), nomen.—Given as based upon *Bertero 65* from prov. Colchagua.

Phaca grata Clos in Gay, Fl. Chile 2: 92 (1846).—Type collected in "Chile" by Gay.

Astragalus gratus (Clos) Reiche, Anal. Univ. Chile 87: 570 (1897), and Fl. Chile 2: 113 (1898).

Astragalus filifolius Clos in Gay, Fl. Chile 2: 111 (1846).—Type collected between La Serena and Arqueros, Oct. 1833, *Gay 141*.

Phaca elongata Philippi, Linnaea 33: 43 (1864).—"In Andibus de Chillan dictus reperitur."

Astragalus elongatus (Phil.) Reiche, Anal. Univ. Chile 97: 568 (1897), and Fl. Chile 2: 111 (1898). Not Willd. (1803).

Phaca concinna Philippi, Linnaea 33: 44 (1864).—"In montibus elatus praedii Catemu prov. Aconcagua inveni."

Astragalus concinnus (Phil.) Reiche, Anal. Univ. Chile 97: 568 (1897), and Fl. Chile 2: 111 (1897).

Astragalus cauquenensis Philippi, Anal. Univ. Chile 41: 691 (1872).—Type from Baños de Cauquenes, prov. Colchagua.

Astragalus puncanus Philippi, Anal. Univ. Chile 84: 30 (1893).—Based upon collections from Cerro de Caracol near Concepcion, Jan. 1887, *Philippi*, and from Hac. de Almendoro, Araucania.

Tragacantha longior Kuntze, Rev. Gen. 2: 941 (1891).—Based upon *P. elongata* Phil. *Astragalus elongatus* (Phil.) Reiche, not Willd. (1803).

Astragalus Rhudolphi Spegazzini, Anal. Mus. Nac. Buenos Aires ser. 2, 4: 265 (1902).—Based upon *P. elongata* Phil., not *Astragalus elongatus* Willd. (1803).

RANGE: Central Chile, along the coast and east to the base of the cordilleras, from Coquimbo south to Concepcion.

CHILE. Atacama: Caldera, Oct. 1894, *Gigoux 10* (G). Coquimbo: Rivadavia, 900 m., Sept. 17, 1936, *Montero 2849* (G); rare on dry hills along road between La Serena and Arqueros, Oct. 1833, *Gay 141* (Paris, type of *A. filifolius*); prov. Coquimbo, *Gay* as *A. filifolius* (G); Loma Fray Jorge, 1917, *Skottsberg 1467* (Stock). Aconcagua: Las Palmas de Pedegua, 1300 m. alt., Sept. 1933, *Grandjot* (Grandjot); indefinite [Hac. Catemu], ex *Philippi* as *P. concinna* (BD, Stock); Valparaiso, *Cuming 736* (K). Santiago: Colina, 1825, *Macrae* (K); Baños de Colina, *Bridges* (K); Curacavi, Oct. 1898, *Castillo 14* (G). Colchagua: near Rio Cachapoal, Sept. 1928, *Bertero 65* (NY, Del); along Rio Cachapoal near San Joaquin, Oct. 1829, *Bertero 65* (Paris, type of *A. alberjilla*); indefinite, *Bertero* as *A. Berteri* (BD); Rancagua, ex *Philippi*, no. 212, as *A. amatus* (BD); Baños de Cauquenes, 1867, *Philippi* as *A. cauquenensis* (BD); Cauquenes, Oct. 1922, *Claude Joseph 1824* (US). Talca: Talca, Oct. 1921, *Claude Joseph 1670* (US). Nuble: Cordillera Chillan, Dec. 1855, *Germain* (Santiago, ? type of *P. elongata*); General Cruz, arenales del Itata, 101 m. alt., 1934, *Montero 1925* (G). Concepcion: Tome, Nov. 1925, *Claude Joseph 4035* (US); Concepcion, *Beechey Voy.* (K, type of *A. prostratus*); Concepcion, *Reed* (K); San Miguel, Nov. 1933, *Barros 124* (G); slopes of Cerro Caracol, Concepcion, 1895, *Brenning* (BD); prostrate on summit of Cerro Caracol, 1903, *Scott Elliot 115* (BM); near falls of Rio Laja, 200 m. alt., open pasture land, *West 5093* (Univ. Calif.). Indefinite: "Chile," *Gay* (Paris, type of *A. gratus*); Loncoche, Sept. 1926, *Claude Joseph 4320* (US).

As here treated *A. Berteri* is almost certainly an aggregate of several species or good geographical varieties. The specimens available to me have been not only too few in number but also too deficient in fruiting structures for me to propose a segregation of this complex.

The type of *A. Berteri* was collected by Bertero on Cerro de la Leon near the Rio Cachapoal in 1830, and is no doubt similar to other collections at this locality made in 1828 and 1829 and distributed under his number 65. This number, however, is an aggregate consisting of *A. orthocarpus* and two forms of *A. Berteri*, one of the latter with strigose, the other with glabrous ovary. Colla describes the fruit as "glabriuscula," rather than glaberrima, and we may assume he had the fruiting plant from Bertero, found most widely in herbaria under Bertero 65, in which, though the fruit appears to be glabrous, it is actually sparsely strigose when viewed under a lens. Colla described the fruit as triquetrous, but his illustration and Bertero's specimens show the lower suture to be distinctly inflexed and the lateral faces of the pod plane and almost parallel. The herbage is silky strigose. This typical form of the species, ranging along the base of the cordilleras, appears to have synonyms in *P. grata*, *A. alberjilla*, *P. concinna*, *P. cauquenensis* and *A. elongatus*.

Growing in the coastal area, from Concepcion to Coquimbo and Atacama, is another form of this aggregate. This is usually glabrescent. It has well developed very slender stems bearing elongate peduncles frequently twice as long as the subtending leaf. The leaflets are usually

very slender. In southern plants they may become emarginate at the apex. The following names apply to this coastal form: *A. prostratus*, *A. filifolius*, and *A. puncanus*.

These two principal forms, that along the coast and that in the drier interior, vary much in the form, color, proportions and size of the corolla-parts. I suspect that a thorough study of the corollas will aid in delimiting segregates from this complex. I have made a prolonged attempt to find characters which would sharply separate the coastal and interior plants and so reduce some of the obvious complexity of the species. My inability to achieve this I am now convinced is due to the fact that not two but probably four or five species or varieties are involved. However, the following attempt to contrast the coastal and interior forms may be of interest:

Plant erect or the short stems decumbent only at the base, cinereous to canescent with abundant appressed hairs; pods usually deltoid in cross-section, broadly inflexed below; montane.....*A. Berteri typicus*

Plant loosely decumbent with slender elongate spreading stems, green or cinereous with sparse appressed hairs or subglabrous; pods laterally much compressed, narrowly sagittate in cross-section, deeply and narrowly intruded below; coastal....."*A. filifolius*"

46. *Astragalus Germaini* Philippi, *Linnaea* 28: 621 (1857); Reiche, *Anal. Univ. Chile* 97: 547 (1897), and *Fl. Chile* 2: 90 (1898).—Type from Las Arañas, Cord. Santiago, *Philippi*.
Astragalus Segethi Philippi, *Linnaea* 33: 47 (1864).—Type from Las Arañas, Cord. Santiago, *Philippi*.
Astragalus dilectus Philippi, *Anal. Univ. Chile* 41: 690 (1872).—Type from Andes de Talcarehue, prov. Colchagua.
Astragalus Closianus Philippi, *Anal. Univ. Chile* 41: 691 (1872).—Type from near Baños de Cauquenes, prov. Colchagua, Oct. 1867, *Philippi*.
Astragalus Dessaueri Philippi, *Anal. Univ. Chile* 84: 26 (1893).—Type from Cerro de las Viscachas, Est. Cauquene, prov. Colchagua, *de Dessauer*.
Astragalus alfalfalis Philippi, *Anal. Univ. Chile* 84: 29 (1893).—Type from Valle del Rio Colorado, prov. Santiago, 1700 m. alt., Jan. 1888, *Philippi*.
Astragalus azureus Philippi ex Reiche, *Anal. Univ. Chile* 97: 548 (1897), and *Fl. Chile* 2: 91 (1898).—Type from the cordillera de Curico.
Astragalus Germaini var. *azureus* Philippi ex Fries, *Nova Acta R. Soc. Sci. Upsala* ser. IV, 11: 135 (1905).

RANGE: Cordilleras of Santiago, Colchagua and Curico.

CHILE. Santiago: Cord. de Santiago, *ex Philippi* as *A. Germaini* (BD); mountains east of Santiago, 900 m. alt., Nov. 23, 1900, *Hastings* 191 (US); Queltehues, 1700 m. alt., 1927, *Montero* 324 (K); Queb. del Manzano, Valle del Maipo, Nov. 4, 1930, *Pirion* 1242 and 1243 (G); El Manzano, Nov. 1937, *Espinosa* 17 (G); Divisadero de Lagunillos near San Jose de Maipo, 1936, *Looser* 3612 (G). Colchagua: Valle del Clarillo, 1200 m. alt., Nov. 1933, *Grandjot* (Grandjot).

A species evidently related to *A. Berteri* but readily distinguished by its firm glabrous triquetrous fruit, its usually obtuse or retuse leaflets, and its montane distribution. In having a triquetrous fruit with a broad flat lower face *A. Germaini* is similar to *A. carinatus* of the eastern slopes of the Andes.

47. *Astragalus Garbancillo*, Cavanilles, Icon. et Descr. Pl. 1: 59, t. 85 (1791).—Based upon collections from the puna near Tarma and from the prov. Huarochiri, Peru, and upon material cultivated at Madrid.
Astragalus unifultus L'Heritier, Stirp. Nov. 6: 168 (1791–92).—Type from Peru, Dombey.
Astragalus Benthamianus Gillies ex Hooker & Arnott, Bot. Misc. 3: 187 (1832).—Type from El Alto de las Manantiales, Mendoza, Gillies.
Astragalus minor Clos in Gay, Fl. Chile 2: 107 (1846).—Type given as from Arqueros, prov. Coquimbo, Chile, Gay, but probably from Peru.
Astragalus Mandoni Rusby, Mem. Torrey Bot. Club 3: 19 (1893).—Based upon Bolivian collections, Sorata, Mandon 709 and Mt. Tunari, Bang 1022.
Astragalus Garbancillo var. *Mandoni* (Rusby) Macbride, Field Mus. Pub. Bot. 8: 100 (1930).

This is the most widely distributed and the most commonly collected species of South American *Astragalus*. It ranges at middle altitudes from central Peru southward to the Tucuman and Mendoza areas in Argentina. In central Peru it has been collected in the departments of Libertad, Ancash, Junin, Huanuco, Huancavalica and Lima at 2000 to 3500 m. altitude. In southern Peru it is known from the departments of Puna and Cuzco. In Bolivia it is best known and has been much collected about La Paz and Lake Titicaca. From there it ranges southward through eastern Oruro and southern Cochabamba and on through central and eastern Potosi, Camargo and Tarija into Argentina. Much of its range in Bolivia is hence in the Yungas. The plant evidently affects the more mesophytic and more dissected country east of the puna. Within Argentina it extends through Los Andes, Jujuy and Salta reaching to Tucuman (2000–3400 m. alt.), and further southward through Catamarca, La Rioja (Sierra Famatina) and San Juan (Leoncito, Echegary; Cord. Colamgüil, 3150 m. alt., Perez Moreau 30/109) to its southern limit in northern Mendoza (Portez. de los Chilcas, 2000 m. alt., Semper 4261; Alto de las Manantiales, Gillies). With the exception of one very questionable specimen, there is no record of the species in Chile. It reaches the Pacific Slope only in central Peru.

Within our area *A. Garbancillo* is very distinct and has no close relative. The difficulties in delimiting the species are confined to central Peru where it appears to have given rise to the evidently related *A. Pickeringii* Gray, *A. alienus* Gray and possibly also *A. romasanus* Ulbrich, cf. Johnston, Jour. Arnold Arb. 19: 92–95 (1938). Throughout its wide range *A. Garbancillo* is rather variable. Some of its variations seem to be vaguely correlated with geography, but none of them definitely enough to warrant any nomenclatorial recognition at the present time.

The type collection of *A. unifultus* is a plant with the stems pallid and strigose. It much resembles the common form found in the department of Junin. I suspect that it probably came from that section of central Peru. Judging from the original description and illustration of *A. Garbancillo*, it must be a very similar plant from the same region. Plants very similar to the type of *A. unifultus* are the common and usual form of the species in western Bolivia and Argentina.

The name *A. Garbancillo* Cav. appears to have six months or even a year priority over *A. unifolius* L'Herit. The former was published in volume one of Cavanilles' *Icones*, which is dated in the preface Jan. 1791, and was apparently issued the same year. This date has never been questioned. L'Heritier's species, however, appeared in the sixth fascicle of his *Stirpes Novae*, which, though bearing the title-page date 1785, was actually issued much later. Britten & Woodward, *Jour. Bot.* 43: 267-68 (1902), accept the date of the sixth fascicle as being doubtfully December 1891. A contemporary reviewer, Usteri, *Neue Annalen der Botanik*, pt. 2, p. 11 (1794), however, states that this fascicle "quanquam titulus annum editionis 1785 prae se ferat, non tamen nisi medio anno 1792 evulgatus est." Hence there seems good reason for accepting Cavanilles' binomial as the prior name.

The commonest form of *A. Garbancillo* in northern Bolivia and southern Peru is a rather slender more or less fruticulose plant with the stems and herbage green and rather sparsely strigose. One of the extremes of this form has been described as *A. Mandoni*. I have seen similar forms from various parts of the range of the species.

When it was published, *A. minor* was given as having been collected by Gay at Arqueros, a mining region at the base of the cordilleras northeast of Coquimbo, Chile. The type at Paris, however, is associated merely with a printed label indicating that the plant was collected by Gay in Chile. The single specimen is in flower. The stems are slender, erect and thinly strigose. The leaves are also sparsely strigose. The whole aspect of the plant is that of the forms of the species found in southern Peru, a region where Gay is known to have also collected. I believe that the type of *A. minor* is another example of the many cases of mixed and confused collections to be found among Gay's Chilean plants. I do not believe that the type was collected in Chile.

The type of *A. Benthamianus* is one of the two collections of *A. Garbancillo* which I have seen from Mendoza, at the southern limit of the species. The specimens are mature ones with ripe fruit and withered corollas. The coarse stems appear to have been white and strigose when young.

Besides the slender green form and the stouter white-strigose typical form of *A. Garbancillo* there is another variation that deserves some comment. The flowers of the species usually average about 15 mm. in length. In northern Argentina and southern Bolivia there are certain excessively vigorous luxuriant forms which produce flowers 20 mm. long or more. These plants may be green or white-strigose. Characteristic specimens of this vigorous plant have been seen from the mountains of Tucuman (*Lorentz & Hieronymus* 694; *Venturi* 4661), from the province of Jujuy (*Hofsten* 754) and from the department of Tarija (*Fiebrig* 2469a). This coarse, large-flowered plant may possibly merit a name.

The poisonous qualities of this species have long been known. Awschalom, *Lab. Quimica Analitica*, Univ. Tucuman, Pub. no. 1: 1-29 (1928), has studied the species and has identified the saponin.

48. *Astragalus arequipensis* Vogel, Verhandl. K. Leop.-Carol. Akad. Naturf. 19: suppl. 17 (1843).—Type from near Arequipa, 3000 m. alt., *Meyen*.
Astragalus Orbignyanus Weddell, Chlor. Andina 2: 260 (1861).—Type from the prov. Carangas, *d'Orbigny* 1437.
Astragalus drepanophorus Grisebach, Abh. K. Gess. Wiss. Göttingen 24: 102 (1879).—Type from La Cienega, Tucuman, 1874, *Hieronymus & Lorentz*.
Astragalus bolivianus Philippi, Cat. Pl. Itin. Tarapaca 15 (1891); Reiche, Anal. Univ. Chile 97: 539 (1897), and Fl. Chile 2: 82 (1898).—Described from *collections from Quebrada de Calalaste, Miñique, and Sitani, 3500–3700 m. alt.
Astragalus sinocarpus Rusby, Mem. Torrey Bot. Club 3: 19 (1893).—Type from near La Paz, 1890, *Bang* 174.

RANGE: High mountains of northern Argentina northward over the Bolivian plateau to southern Peru.

PERU. Arequipa: Arequipa, *Meyen* (BD, type of *A. arequipensis*); near Arequipa 2000–2500 m. alt., 1923, *Guenther & Buchtien* 1107, 1109, 1113 and 1115 (Hamb); between Arequipa and Puna Lagunillas, 4300 m. alt., 1934, *Hammarlund* 73 (Stock); between Arequipa and Puna Sumbay, 4060 m. alt., 1933, *Hammarlund* 79 (Stock). Puno: Chuquibambillo, 3950 m. alt., 1925, *Pennell* 13351 (G, US, FM); Azangaro, June 1854, *Lechler* 3243 (K); Occa Pampa, Huancané, 3250 m. alt., 1919, *Shepard* 83 (G, US); Pucará, 1902, *Weberbauer* 438A (BD); Puno, *Martenet* 575 (Paris); Juliaca, May 16, 1902, *Williams* 2513 (US).

BOLIVIA. La Paz: Guarina, 1865, *Raimondi* 10515 (BD); prov. Omasuyos, 3900–4000 m. alt., *Mandon* 710 (G, K, BM, Del); near La Paz, 3000 m. alt., 1890, *Bang* 174 (NY, type of *A. sinocarpus*; G, US, K, BM, BD); between Palca and La Paz, 4000 m. alt., 1910, *Pflanz* 373 (BD); Valle de ChuquiagUILlo east of La Paz, 3500–4000 m. alt., 1906, *Hauthal* 224 (BD); Isla del Sol, Titicaca, 3840 m. alt., *Buchtien* 2870 (US); Tiahuanaco, 1903, *Hill* 120 (K); near Viacha, 3900 m. alt., 1907, *Buchtien* 625 (US, BD); Paz de Azacucho, Corocoro, 1846, *Weddell* 4338 (Paris). Oruro: Paza, 4100 m. alt., 1908, *Buchtien* 1812 (US, BD); Prov. Carangas, west of Oruro, *d'Orbigny* 1437 (Paris, type of *A. Orbignyanus*). Potosí: Quechisla, prov. Nor Chichas, 3400 m. alt., 1932, *Cardenas* 305 (US); Lagunillas, 3800 m. alt., 1933, *Cardenas* 381 (US); Uyuni, Oct. 3, 1894, *Kuntze* (NY, US, BD); Chiguana, 3700 m. alt., 1921, *Asplund* 6127 (US) and 3077 (Upsala). Chuquisaca: mountains between Pomabamba and Comargo, *Weddell* 3981B (Paris). Tarija: Calderillo, 3100 m. alt., Jan. 6, 1904, *Fiebrig* 2469 in pt. (BD).

CHILE. Arica: Ancara, Cord. Volcan Tacora, ca. 4300 m. alt., April 1926, *Werdermann* 1119 (G, K, BD).

ARGENTINA. Los Andes: Calalaste, Jan. 1885, *Philippi* (US, K, BD, isotypes of *A. bolivianus*); Mina Concordia, Feb. 26, 1927, *Castellanos* 28/824 (G). Jujuy: puna near Yavi, May 1873, *Lorentz & Hieronymus* 702 (BD); Moreno, 3500 m. alt., 1901, *Fries* 759 (Stock). Salta: Cerro de Cachi, 3500–4000 m. alt., *Venturi* 6700 and 6706 (US); Cuesta de Arca to Trancas, Jan. 1897, *Spegazzini* (LP). Catamarca: Yutuyaco, dept. Andalgalá, *Jorgensen* 1629 (G); Chucula, Feb. 2, 1930, *Castellanos* 30/520 (G). Tucuman: La Cienega, 1874, *Hieronymus & Lorentz* 663 (US, FM, BD, isotype of *A. drepanophorus*) and 693 (FM, K, BD); La Cienega, dept. Tañi, 2800 m. alt., 1933, *Burkart* 5390 (G); La Queñua, dept. Tañi, 3000 m. alt., Jan. 1930, *Parodi* 10769 (G) and *Burkart* 5389 (G); Lara, Jan. 1912, *Rodriguez* 261 (G); Est. Las Pavas, dept. Chicligasta, 3500 m. alt., *Venturi* 4710 (G, US). La Rioja: Corral Colorado, Sierra Famatina, Feb. 12, 1879, *Hieronymus & Niederlein* (BD). San Juan: Las Cabeceras de Leoncito, Jan. 1876, *Echegaray* (BD).

The leaves of this species are large and coarse and much surpass the inflorescence. The flowers are small, congested and short-pedunculate. The stems have short internodes and are usually less than a decimeter long, and usually spreading. The calyx is black hairy. The triquetrous

fruit is characteristically lunate in outline and inside has a well developed membranous false septum. The synonyms I have listed all evidently belong to trivial phases of this readily recognized species. The species has only two close relatives, *A. Brackenridgei* Gray (cf. Johnston, Jour. Arnold Arb. 19: 95. 1938) of central Peru and *A. cryptanthus* Wedd. of the Bolivian Plateau. It is quite possible that the former is only a geographical variant and that the latter is only a freak glabrescent form of the present species.

49. *Astragalus cryptanthus* Weddell, Chlor. Andina 2: 258 (1861).—Type from la quebrada de las Lagunas de Potosi, *d'Orbigny* 1435.

BOLIVIA. Potosi: near snow-line, Queb. de las Lagunas de Potosi, *d'Orbigny* 1435 (Paris, type). La Paz: La Paz, Aug. 24, 1901, *Williams* 2351 (US, NY).

CHILE. Arica: Chislluma, Cord. de Volcan Tacora, ca. 4500 m. alt., *Werdermann* 1159 (G, K, BD).

This peculiar plant is evidently related to *A. arequipensis* and may be only a very peculiar form of it. It is apparently rare for I have seen only three different collections, all remarkably similar though from widely separated stations, and all from within the range of *A. arequipensis*. The plants are distinguished from *A. arequipensis* by their bright green color and very sparse indument. The stems also tend to be more elongate and the small leaves somewhat more succulent. The fruit is glabrous and may be lunate or may be short and oblong as in the related *A. Brackenridgei* of central Peru.

50. *Astragalus Sanctae-Crucis* Spegazzini, Rev. Fac. Agron. y Vet. La Plata 3: 505 (1897).—Type from Monte Leon near the Rio Santa Cruz, Patagonia, *Spegazzini*.

RANGE: Along the coast of Patagonia in sands and gravel.

ARGENTINA. Santa Cruz: Minerales, 200 m. alt., Oct. 28 and Nov. 20, 1929, *Donat* 196 (G, NY, K); Monte Leon near Santa Cruz, in gravel, 1882, *Spegazzini* (type, La Plata). Chubut: campo near Cabo Raso, *Fischer* (LP). Rio Negro: Viedma, medianos del Faro, Nov. 14, 1928, *Castellanos* 28/1139 (G). Buenos Aires: Necochea, dunes, Jan. 4, 1930, *Cabrera* 1303 (G); Punta Negra, 15 km. s. of Necochea, shifting sand near seashore, corolla blue, base of petals white, Dec. 12, 1938, *Eyerdam*, *Beetle & Grondona* 23728 (G).

Without any close affinities in South America, this plant probably has its closest relatives in the group of *A. Nuttallianus* of North America. It is prostrate and has very elongate straight subcylindrical strict pods. The false septum is well developed and nearly divides the fruit into two cells.

51. *Astragalus orthocarpus*, nom. nov.

Phaca oligantha Philippi, Linnaea 33: 42 (1864).—Type from the base of the cordillera in the prov. Colchagua, Chile.

Astragalus oliganthus (Phil.) Reiche, Anal. Univ. Chile 97: 567 (1897), and Fl. Chile 2: 110 (1898). Not Kar. & Kir. (1842).

RANGE: Known only from the province of Colchagua, Chile, at the base of the cordilleras.

CHILE. Colchagua: Monte de la Leon, *Bertero* 65 (BM, Boiss, Paris); without locality, *Bridges* (G, K, BM, BD) and *ex Philippi* as *P. oligantha* (BD, Del, Boiss, Stock); Centinela, 400 m. alt., 1928, *Montero* 1382 (G).

A species readily confused with *A. Berteri* and perhaps most closely related to it. It may be distinguished from *A. Berteri* by its erect or ascending, short and stout, rather plump legumes. In habit the plant seems to be more slender than its relative, having elongate leafy prostrate or decumbent stems and apparently slightly smaller flowers. The fruit has convex valves which become tough and hard. The lower suture is situated in a broad shallow depression. Flowering plants of *A. orthocarpus* and *A. Berteri* are distinguished with difficulty. Among the species listed as synonyms of *A. Berteri* there are several founded on flowering plants which conceivably may be proved to belong to the present plant and so provide it with an older name.

52. *Astragalus Domeykoanus* (Phil.) Reiche, Anal. Univ. Chile 97: 550 (1897), and Fl. Chile 2: 93 (1898).

Phaca Domeykoana Philippi, Anal. Univ. Chile 84: 18 (1893).—Type from Turrieta, prov. Talca, lat. 35° 30' S., Feb. 1879, *F. Philippi*.

Phaca orites Philippi, Anal. Univ. Chile 84: 24 (1893).—Type from Gualletué, cord. prov. Cautin, Feb. 1887, *Rahmer*.

Astragalus orites (Phil.) Reiche, Anal. Univ. Chile 97: 551 (1897), and Fl. Chile 2: 94 (1898).

Tragacantha procumbens var. *glabrescens* Kuntze, Rev. Gen. 3: 73 (1898).—Based upon specimen from "Patagonia," *Moreno & Tonini* 727.

RANGE: Along the cordilleras from Talca and Neuquen southward to southern Patagonia.

CHILE. Talca: Turrieta, Cordilleras east of Talca, Feb. 1897, *F. Philippi* (LP, isotype of *A. Domeykoanus*). Maule: Cord. de Maule, *Germain* (K, BM); Andes de Antuco, 2400 m. alt., 1828, *Poeppig* (Munich); Cord. de Linares, ex *Philippi* 215 (BD). Cautin: Araucania, ex *Philippi* as *P. araucanus* (K, BD; ?isotypes of *P. orites*).

ARGENTINA. Neuquen: Pino Hachado, 1920, *Parodi* 2284 (Parodi); Cajon de Pino Hachado, Sept. 1900, *Spegazzini* (LP); Cerro Colohuincul, moist sandy hillside, 1500–1800 m. alt., Dec. 17, 1926, *Comber* 878 (K); Polcahue, 1200 m. alt. Jan. 16, 1926, *Comber* 458 (K); Valle Escondida, iron-bog in valley, 1800 m. alt., *Comber* 279 (K); Lagunas Lui Cullin, *Comber* 1169 (K); Sierra Mamuil Malal, 1800 m. alt., Jan. 3, 1927, *Comber* 926 (K). Rio Negro: Bariloche, Cerro Gutierrez, 1500 m. alt., Feb. 28, 1905, *Buchtien* 23 (US, K). Chubut: mountains near Carren-leofu, 1901, *Illin* (LP); Valle de la Laguna Blanca, Dec. 20, 1901, *Koslowsky* 187 (K); Valle de la Lago Blanco, Dec. 1903, *no collector given* (LP). Santa Cruz: near Lago Argentino, 1000 m. alt., Jan. 30, 1905, *Dusen* 5765 (Stock); Lago Posadas, 800 m. alt., Dec. 20, 1908, *Skottsberg* 760 (Stock). Indefinite: Patagonia, *Moreno & Tonini* 727 (NY, type of var. *glabrescens*).

This species is very closely related to the poorly understood *A. compliatus* of the andes of Mendoza. It may be no more than a variety of that species with sparsely and inconspicuously strigose or glabrous leaflets. It has obcordate or retuse obovate-oblong leaflets that are normally folded along the midrib. In texture they are rather thick and fleshy. The fruit is apparently rather variable. Most specimens have sparsely black-strigose pods about 8 mm. long which are either distinctly triangular in cross-section or are more or less compressed. They have a distinctly intruded lower suture. In some specimens the pods are not only larger (10–14 mm. long) and of more fragile texture, but are also less angular

and more or less inflated. The fruit is then broadly lenticular in cross-section with the lower margin only weakly flattened. I am unable to correlate these surprising variations in fruit with any other structural variations of the plant or with geography.

The type-collection of *A. Domeykoanus* is in the flowering condition and has no fruit. It is very similar to other collections from the cordilleras of south-central Chile which have short angulate pods that are contracted apically into a short beak. These plants are all low and spreading and come from near the continental divide.

The type of *P. orites* comes from the headwaters of the Rio Bio Bio. The fruit is of the short angulate type. The leaflets though rather large are characteristically glabrous, deeply notched and evidently folded as in true *A. Domeykoanus*, but the stems are about 2 dm. long and appear to be erect. These differences in leaf-size and growth-habit may well be ecological.

The type sheet of *T. procumbens* var. *glabrescens*, labeled merely as from Patagonia, is a mixture of *A. Domeykoanus* and *A. Cruckshanksii*. The specimen of the former is practically glabrous; that of the latter is evidently strigose. Since the material of *A. Domeykoanus* is more appropriately covered by the epithet "*glabrescens*," I am of the opinion that Kuntze's variety had best be treated as a synonym of the present species.

53. *Astragalus complicatus* Gillies ex Hooker & Arnott, Bot. Misc. 3: 187 (1832).

— Type from El Cerro de la Polcura, Gillies.

RANGE: Known only from the type locality.

ARGENTINA. Mendoza: El Cerro de la Polcura, andes of Mendoza, Gillies, (K, type).

This species is known only from a single collection made over a hundred years ago. It is evidently related to *A. Domeykoanus*, which ranges widely along the Andes further south. It differs from the southern plants only in its distinctly strigose foliage. The type came from a locality 200 to 300 km. north of the most northern known station of its relative. The relationship between the two species is so clear that I shall not be surprised if new collections from Mendoza prove that the species cannot be separated by the characters given. The name *A. complicatus*, being the oldest, must then be applied to the larger specific concept.

54. *Astragalus punae*, sp. nov.

Planta cinerea; caulibus pluribus decumbentibus 6–8 cm. longis simplicibus vel basim versus longi-ramosis sparse plus minusve adpresse villosis ca. 1.5 mm. crassis; foliis pilis 0.5–1 mm. longis sinuatis leviter adpressis griseo-vestitis; rhachibus 3–5 cm. longis infra medium nudis; foliolis 9–11-jugatis plicatis, 4–7 mm. longis ca. 2 mm. latis oblongis vel oblongo-ellipticis supra plus minusve glabris subtus villosis apice obtusis vel truncatis saepe emarginatis; stipulis 4–5 mm. longis membranaceis sparse strigosis; racemis 5–10-floris capitato-congestis 0.7–1 cm. diametro saepe in axillis foliorum superiorum subsessilibus (0–5 mm. longe pedunculatis); bracteis lanceolatis 3–4 mm. longis; calycibus sessilibus 3–4 mm. longis

subtomentosis, lobis linearibus 1–1.5 mm. longis; vexillo 6 mm. longo, lamina 2.5 mm. lata apice emarginata; alis 5 mm. longis quam carina 1.5 mm. longioribus; leguminibus ascendentibus 4–5 mm. longis 2 mm. crassis 2–2.5 mm. altis dense albiterque villosis 4-seminatis unilocularibus, intus septum membranaceum haud gerentibus, a latere viso margine superiore rectis et margine inferiore convexis, apice acutis, basi rotundis, sutura inferiore evidenter 0.7–1 mm. profundeque introflexa.

ARGENTINA. Puna de Atacama, "Garbancillo de la Puna," *herb. Spegazzini*, no. 2111, sub "*A. bolivianus*?" (La Plata, type).

For this very distinct species, which I know only from the type, I can suggest no close relative. In habit it somewhat suggests a slender villous form of *A. arequipensis*, but it is certainly not a close relative of that species. It also suggests some of the coarse forms of *A. micranthellus* and possibly may be closely related to that species. The subsessile dense axillary clusters of flowers, the villous indument, and the small ovoid villous pods are outstanding characters of *A. punae*. The fruit is not tough in texture. It completely lacks a false septum.

55. *Astragalus micranthellus* Weddell, *Chlor. Andina* 2: 262 (1861).—Original collections from near Puno, Peru, *Weddell* 4503, and from near La Laguna de Potosi, *d'Orbigny* 1436.

Astragalus capitellus Britton, *Bull. Torrey Bot. Club* 16: 260 (1889).—Type from near La Paz, *Rusby* 1005.

Tragacantha arequibensis var. *minima* Kuntze, *Rev. Gen.* 3: 73 (1898).—Type from between Uyuni and Machacamarca, Bolivia, *Kuntze*.

Tragacantha arequibensis var. *tenuifoliola* Kuntze, *Rev. Gen.* 3: 73 (1898).—Type from near Tiraque, *Kuntze*.

Astragalus patancanus Ulbrich, *Bot. Jahrb.* 37: 417 (1906).—Type from Puna Patanca, Tarija, *Fiebrig* 2612.

RANGE: High altitudes, on punas, from southernmost Peru, across Bolivia, to northern Argentina.

PERU. Puno: near Juliaca, 1903, *Hill* 127 and 128 (K); near Puno, *Weddell* 4503 (Paris, type of *A. micranthellus*). Arequipa: near Arequipa, 2000–2500 m. alt., 1923, *Guenther & Buchtien* (Hamb). Moquegua: Ubina, March 1864, *Raimondi* 11725 (BD).

BOLIVIA. La Paz: La Paz, 3000–4100 m. alt., *Buchtien* 2872 (US), *Buchtien* 626 (US, BD) and *Rusby* 1005 (NY, type of *A. capitellus*); Potopoto near La Paz, 3790 m. alt., 1861, *Mandon* (K, BM, Del, Stock); Guaqui plateau, 3750 m. alt., 1903, *Hill* 125 (K); Viacha, 3900 m. alt., Jan. 29, 1921, *Asplund* 2110 and 2122 (Upsala); Guaqui, 3900 m. alt., Jan. 31, 1921, *Asplund* 2221 (Upsala); Corocoro, 4000 m. alt., Feb. 15, 1921, *Asplund* 2440 (Upsala); Ulloma, 3800 m. alt., Feb. 21, 1921, *Asplund* 2554 (Upsala); Charaña, 4050 m. alt., March 1, 1921, *Asplund* 2670 (Upsala); between San Pablo and Achacachi, 1903, *Hill* 129 (K). Oruro: Hacienda Huanacroma near Eucaliptus, prov. Cercado, 3800 m. alt., 1934, *Hammarlund* 111 (NY, Stock); Challapata, 3800 m. alt., March 31, 1921, *Asplund* 3282 (Upsala). Cochabamba: Tiraque, Sierra de Santa Cruz, 3000 m. alt., April 1–4, 1892, *Kuntze* (NY, type of var. *tenuifolia*). Potosi: near La Laguna de Potosi, *d'Orbigny* 1436 (Paris, cotype of *A. micranthellus*); Potosi, 4000 m. alt., 1933, *Cardenas* 366 (US); Quechisla, prov. Nor Chicas, 1931, *Cardenas* 82 (G); puna between Uyuni and Machacamarca, March 11, 1892, *Kuntze* (NY, type of var. *minima*); Uyuni, 3700 m. alt., March 25, 1921, *Asplund* 6144 (US) and 3149 (Upsala); Atocha, 3700 m. alt., March 20, 1921, *Asplund* 2999 (Upsala). Sucre: Muyaquiri, prov. Cinti, 1934, *Hammarlund* 386 (Stock). Tarija: Escayadu, 3500 m. alt., 1904, *Fiebrig* 3498E

(BD); Puna Patanca, 3700 m. alt., 1904, *Fiebrig 2612* (BD, type of *A. patancanus*; G, K, Paris).

ARGENTINA. Jujuy: Cerro de Chani, 4000 m. alt., 1929, *Venturi 8526* (US); Moreno, 3500 m. alt., *Fries 809* (Stock); north of Tres Cruces, 1921, *Castellanos 53* (G); Santa Catalina, 3650–4100 m. alt., 1901, *Claren 11465* in pt., *11476*, *11419* and *11499* in pt. (Stock). Salta: Cerro de Cachi, 4000–4500 m. alt., 1927, *Venturi 6681* and *6694* (US). Catamarca: Cerro Negro, dept. Andalgalá, 3500 m. alt., *Joergensen 1628* (G, US), *1629* (G). Tucuman: Lara, Trancas, 1912, *Rodriguez 339* (G).

The plants associated here are slender stemmed, depressed, and prostrate or spreading. The small flowers are clustered on peduncles shorter than the subtending leaf. The pods are 5–13 mm. long, sparsely strigose and laterally compressed. The valves of the fruit are flattened and usually about 3 mm. broad. The lower suture is strongly intruded. Under favorable conditions the widely spreading stems may become 1–2 dm. long and loosely branched. Most plants, however, have prostrate stems only 5–10 cm. long. Some of the plants from extreme environments at high altitudes become very reduced and compacted, becoming somewhat caespitose or somewhat pulvinate (e.g. *Venturi 6694*).

Most of the collections treated as *A. atacamensis* by Fries, Nova Acta R. Soc. Sci. Upsala IV, 1¹: 134 (1905), actually belong to *A. micranthellus*. Among the collections cited by Fries, *A. micranthellus* appears in several mixtures; with *A. Bustillosii* (no. 11465), with *A. minimus* (no. 916) and *A. crymophilus* (no. 11499 sub "*A. modestus*"). Hosseus, Bol. Acad. Nac. Cordoba 26: 157 (1921) has noted some of these mixtures and misidentifications.

56. *Astragalus triflorus* (DC.) Gray, Plant. Wright. 2: 45 (1853), as to name-bringing synonym only.

Phaca triflora DeCandolle, Astrag. 62, t. 1 (1802).—Type given as collected in Peru by Dombey.

Astragalus viciiformis Ulbrich, Bot. Jahrb. 37: 550 (1906).—Type from near Mollendo, *Weberbauer 1504*.

RANGE: Coastal hills, in the Loma Formation, from central Peru to northern Chile.

PERU. Lima: Cerro San Augustin, 300–400 m. alt., 1909, *Weberbauer 5241* (BD); Tablada de Lurin, *Mathews 1005* (K, BM). Arequipa: Lomas de Capac, near Chala, Oct. 1863, *Raimondi 11648* (BD); Loma del Toro, near Atico, Nov. 1863, *Raimondi 11593* (BD); Mollendo, sandy flat at lower edge of the fertile belt, 1902, *Weberbauer 1504* (BD, type of *A. viciiformis*); Mollendo, *Johnston 3569* (G, K) and *Hitchcock 22364* (US); Mejia, 30–40 m. alt., 1923, *Guenther & Buchtien 273* and *272B* (Hamb); Cachendo, 900–1000 m. alt., *Guenther & Buchtien 272B* and *274* (Hamb); Posco, 575 m. alt., 1923, *Guenther & Buchtien 272* (Hamb). Moquegua: Torata, 2200–2300 m. alt., *Weberbauer 7418* (US, K, BD). Indefinite: Peru, *Dombey* (Paris, type of *P. triflora*).

CHILE. Tarapaca: Iquique, *Werdermann 754* (G, K, BM, BD). Antofagasta: Tocopilla, *Johnston 3621* (G) and *Jaffuel 1008* (G); Antofagasta, *Jaffuel 1146* (G).

This very distinct species, a small slender annual of the coastal hills of Peru and northern Chile, was one of the very first members of its genus to have been described from South America. Though the original

plate and description are accurate, the species has been discredited and misunderstood and its name consistently misapplied. DeCandolle based his *P. triflora* upon specimens collected by Dombey in Peru, probably near Lima. The original plate is a careful drawing of a specimen now preserved at Paris! The species is unquestionably the same as that described over a hundred years later as *A. viciiformis* Ulbr!

Much of the confusion enveloping our plant for over a century may be traced back to Kunth, H. B. K. Nov. Gen. 6: 495 (1824). That botanist gave an excellent description and illustration of a plant which Humboldt & Bonpland had collected on the volcano of Jorullo in Mexico and published them under the newly proposed name, *Phaca Candolliana*. He associated that name with the following synonymy, "*Phaca triflora* Decand. Astrag. p. 62. t. 1 (auct. Mu. Paris). Persoon Synops. 2. p. 331." The Mexican plant is very different from the coastal annual of Peru and Chile. Kunth, however, seems to have thought them to be conspecific and various subsequent authors have inferred that the name he coined, *P. Candolliana*, was merely a substitute name for the "Inappropriate and misleading" *P. triflora* DC. Even DeCandolle so considered it, for in his Prodrumus, 2: 273 (1825), he gives *P. Candolliana* HBK as a synonym of *P. triflora* DC. Most authors have agreed with Jones, Astrag. 105 (1923), that the names *P. Candolliana* and *P. triflora* were not only "intended to be the same" but were originally applied to conspecific plants as well. The prevailing opinion seems to have been that DeCandolle's description and plate were crude and poor (Jones calls them "fanciful") and that his material may have come, not from Peru, but rather from Mexico. This is, of course, thoroughly incorrect and not in accord with the facts. DeCandolle's plate is a good representation of his species, which, we now know, did come from Peru.

There are good reasons for considering that the name *P. Candolliana* HBK. was intended as a substitute for DeCandolle's binomial, *P. triflora*. Personally, however, I feel that Kunth's binomial can well be restricted to the Mexican plant he figured and described. This has been recently done by Rydberg, No. Amer. Fl. 24: 350 (1929).

The accepted name for our plant of Chile and Peru was published by Gray, l.c., as follows: "*A. (Phaca) triflorus*. *Phaca triflora*, DC. Astrag. t. 1 & Prodr. 2. 273. *P. Candolliana*, H. B. K. Nov. Gen. & Sp. 6. p. 495. t. 586." It is evident that Gray accepted *P. triflora* and *P. Candolliana* as conspecific and as applying to the Mexican species as well as to the Texan plant he had in hand. This, of course, was incorrect, but since his nomenclatorial transfer is clearly and expressly founded upon *Phaca triflora* DC, even though he misunderstood DeCandolle's concept, the resulting combination, *Astragalus triflorus* (DC.) Gray must apply to our plant of Chile and Peru. Some authors, however, have insisted that the binomial *A. triflorus* must be applied to the plant of Texas which Gray was discussing when he made the combination, but this is clearly counter to the rules of nomenclature. This confusion of "species-

concept" and "nomenclature" reached its extreme with Sheldon, Minnesota Bot. Studies 1: 140 (1894), who cited "*A. triflorus* A. Gray. Pl. Wr. 2: 45. 1853. excl. syn." as a synonym of *A. Candollianus* (HBK.) Sheldon and proposed the combination "*A. triflorus* (DC.) Sheldon" for our *Phaca triflora* DC. of South America. The two most recent monographers have agreed in treating *A. triflorus* Gray as based upon *Phaca triflora* DC. Jones, Astrag. 105 (1923) considered it to be a species of both North and South America, while Rydberg, No. Amer. Fl. 24: 350 (1929), treated it as exclusively South American.

57. *Astragalus Famatinae*, sp. nov.

Planta perennis plus minusve argenteo-strigosa; caulibus gracilibus rigidiusculis prostratis 5–18 cm. longis 0.5–1 mm. crassis foliosis (internodiis 0.5–5 cm. longis) e caudice multiceptali radice valida profunda coronato erumpentibus; rhachi folii 5–20 mm. longa supra medium vel usque ad basim foliolata supra canaliculata; foliolis 4–5-jugatis 2–9 mm. longis 1–2 mm. latis ellipticis vel anguste oblongis plus minusve plicatis margine saepe paulo involutis apice rotundis vel obtusis rariter emarginatis subtus strigosis supra plus minusve glabris; stipulis 2–3 mm. longis strigosis ocreatis; racemis axillaribus densifloris 8–12 mm. diametro; pedunculo 1–3 cm. longo folio suffulciente saepe evidenter longiore; floribus saepe 10–15 capitato-congestis; calycibus 2–3 mm. longis, lobis 0.5–1 mm. longis pilis nigris et albis strigosis; pedicellis 0.5–1.5 mm. longis; bracteis 0.5–1 mm. longis oblongis; vexillo corollae 5–7 mm. longo, lamina 3–4 mm. lata; alis 4.5–6.5 mm. longis quam carina 2 mm. longioribus; ovario strigoso; leguminibus oblongis compressis vel prismaticis ca. 1 cm. longis 3–3.5 mm. altis 2–3 mm. crassis sparsissime strigosis 8–10 seminatis, a latere viso utrinque marginibus convexis, sutura inferiore late vel anguste introflexis, intus septum membranaceum ca. 0.5 mm. altum gerentibus.

ARGENTINA. La Rioja: La Incrucijada, Sierra Famatina, 1879, *Hieronymus & Niederlein* 482 (type, Berlin); Los Berros, Sierra Famatina, 1879, *Hieronymus & Niederlein* 586 (BD). San Juan: Quebrada del Salto, Cord. de Colangüil, Jan. 15, 1930, *Perez Moreau* 30/98 (G).

Although with a gross aspect more suggestive of *A. micranthellus*, this well marked species seems to be much more closely related to the habitually dissimilar *A. tarijensis*. The fruit has a somewhat tough texture and seems to be more or less prismatic with the lower face flattened or shallowly and broadly introflexed. Some of the fruit on the type has the lower suture strongly and deeply intruded, but this may be the result of lateral pressure on the fruit when the specimens were pressed. There is a narrow but evident membranous false septum inside the fruit. The fruit of *A. Famatinae*, hence, has a different form (prismatic and oblong) and a firmer texture, as well as a false septum, which distinguishes it from the fruit of *A. micranthellus*. The plant is furthermore clothed with a coarser and somewhat silvery strigosity and hence differs from *A. micranthellus* in indument. The thicker, densely strigose leaflets with entire or only obscurely emarginate apices, and the firmer texture of the pods, readily distinguish *A. Famatinae* from all forms of *A. tarijensis*.

The type of the species has been cited by Hosseus, Bol. Acad. Nac. Cordoba 36: 152 (1921), as *A. modestus*. This is certainly incorrect. Hosseus has cited another specimen (no. 535) collected by Hieronymus & Niederlein in the Sierra Famatina. This latter, only a young specimen at anthesis, I examined as a duplicate in Berlin. In my notes this is assigned to "*A. micranthellus*," but now for various reasons I would wish to re-examine the collection before accepting that identification.

The material cited from San Juan is questionably referred to *A. Famatinae*. It represents a plant evidently related to that of the Sierra Famatina but has stems only 0.5–1 cm. long and has much contracted internodes. The leaves are consequently somewhat tufted and the inflorescence almost scapose. I believe it is a reduced plant conspecific with those from La Rioja. The material of it, however, is very fragmentary and its present disposition must be considered tentative.

58. *Astragalus tarijensis* Weddell, Chlor. Andina 2: 262 (1861).—Type from between Puna Iscaïachi and Valle de Tarija, Bolivia, *Weddell 4021*.

Astragalus Hieronymi Ulbrich, Bot. Jahrb. 37: 418 (1906).—Based upon collections from Cienega, Tucuman, *Lorentz & Hieronymus 580* and Calderillo, Tarija, *Fiebrig 2882*.

RANGE: Mountains of northwestern Argentina and adjacent Bolivia, mostly above 3000 m. altitude.

BOLIVIA. Tarija: Calderillo, 3400 m. alt., 1904, *Fiebrig 2882* (FM, BD, cotype of *A. Hieronymi*); along the descent from Puna de Iscaïachi into Valle de Tarija, 2500–3000 m. alt., Jan. 29–31, 1846, *Weddell 4021* (type of *A. tarijensis*, Paris).

ARGENTINA. Jujuy: Tilcara, 3000–3200 m. alt., *Venturi 6698* and *7421* (US); Cerro La Soledad, 3500 m. alt., 1928, *Venturi 9029* (G, US). Salta: between Cuesta del Arca and Trancas, Dec. 1896, *Spegazzini* (LP); Pampa Grande, Jan. 1897, *Spegazzini* (LP); La Laguna, Sierra del Cajon, 3900 m. alt., Jan. 1914, *Rodriguez 1317* (G). Catamarca: Cerro Negro, Feb. 9, 1916, *Joergensen 1887* (G, US); C. de Aconquija, 3800 m. alt., Marth 15, 1917, *Joergensen 1337* (US); Cerro del Campo Grande, Jan. 1874, *Schickendantz 256* (BD); Granadillas, Nov. 1877, *Schickendantz 88* (BD); Laguna del Tesoro, 4600 m. alt., 1925, *Venturi 6629* (US); Sierra de Anconquija, 4400 m. alt., 1926, *Venturi 6623* (US). Tucuman: Lara, Trancas, Jan. 27, 1912, *Rodriguez 280* (G); Cumbres Calchaquies, Tafi, 4000–4400 m. alt., *Burkart 5402* and *5387* (G) and *Parodi 10846* (G); La Queñua, 3000 m. alt., *Burkart 5397* (G); La Puerta, 4000 m. alt., *Burkart 5395*, *5396* and *5388* (G); Peñas Azules, 3400–3500 m. alt., *Burkart 5398* (G) and *Parodi 10911* (G); Cerro de San Jose, 2700 m. alt., *Venturi 3644* (G, US, LP); La Cienega, *Lorentz & Hieronymus 580* (K, BD, type of *A. Hieronymi*); Estan. Las Pavas, Chicligasta, 3000 m. alt., *Venturi 4681* and *6622* (US); Estan. Santa Rosas, 3800–4400 m. alt., *Venturi 3183* (G, US), *4007* (US) and *4749* (G, US, LP). La Rioja: Estacion 6, Camino a La Mejicana, Sierra Famatina, 3300 m. alt., Feb. 1927, *Parodi 7954* (G).

The types of *A. tarijensis* and *A. Hieronymi* are very similar in aspect and details. They are evidently conspecific and representative of the most common form of this very variable species. This common form has slender well developed ascending stems, green folded narrowly obcordate leaflets, black-strigose calyces, lanceolate bracts and strigose ovary. There are, unfortunately, frequent departures from this distinctive typical form. At very high altitudes the leafy stems become very short and the plant matted. The apex of the leaflets, usually broadly retuse, may

become rounded and only weakly emarginate, or even entire and actually acute. In outline the leaflets are commonly obcordate or oblong-obcordate. Some plants, evidently forms of *A. tarijensis*, have distinctly oblong, elliptic or even lanceolate leaflets. Most forms of the species have practically glabrous herbage of a characteristic dark green color. But I am also forced to admit in the species some plants having the herbage somewhat cinereous with evident scattered appressed hairs. When the common form of the species varies in only one of the details mentioned, its affinities are not obscured. When, however, several of these aberrant tendencies are exhibited in one plant its general appearance becomes very changed and quite different from that of the typical form. After a consideration of these puzzling forms I have finally been forced to place them under *A. tarijensis* as chance combinations of aberrant characters. They occur within the range of the normal form of the species and are usually represented by single collections. A study of a large series of *A. tarijensis* makes it clear that they are merely variants of this unstable species.

59. *Astragalus Weddellianus* (Kuntze), comb. nov.

Astragalus modestus Weddell, Chlor. Andina 2: 262 (1861). Not Boiss. & Hohen, (1849).—Type from Cuesta de Periguani east of Camargo, *Weddell* 3932.

Tragacantha Weddelliana Kuntze, Rev. Gen. 2: 942 (1891)—Based upon *A. modesta* Wedd.

Astragalus Pilgeri Macbride, Field Mus. Pub. Bot. 11: 25 (1931).—Type from Paucartambo, Cuzco, *Herrera* 2315.

Astragalus punensis Macbride, Field Mus. Pub. Bot. 13 [Fl. Peru 3:]: 400 (1943).—Type from Macusani and Hac. Salcedo, dept. Puna, *Soukup* 549.

RANGE: Rare from southern Peru to northwestern Argentina.

PERU. Cuzco: Hacienda Chuchapaya, Valle del Paucartambo, 3800 m. alt., Feb. 1929, *Herrera* 2315 (FM, type of *A. Pilgeri*). Puno: indefinite locality, *Soukup* 429 (G) and 549 (G, isotype of *A. punensis*).

BOLIVIA. La Paz: Rinconada, 4200 m. alt., Dec. 16, 1920, *Asplund* 1804 (Upsala); Desaguadero, 3900 m. alt., Feb. 3, 1921, *Asplund* 6142 (US); Guaqui to Desaguadero, 3850 m. alt., Feb. 3, 1921, *Asplund* 2319 (Upsala). Potosi: between San Sebastian and Potosi, 4060 m. alt., Nov. 1932, *Cardenas* 281 (G, US). Chuquisaca: Cuesta de Periguani, between Pomabamba and Camargo, prov. Cinti, 3500 m. alt., Jan. 11–13, 1846, *Weddell* 3932 (type of *A. modestus*, Paris).

ARGENTINA. Tucuman: puna between La Puerta and Los Cardones, Cumbre Calchaquies, Tafi, 4400 m. alt., Jan. 30, 1933, *Burkart* 5384 and 5408 (G). Catamarca: Reales Blancos, Feb. 3, 1930, *Castellanos* 30/488 (G).

Assembled here under the name *A. Weddellianus* is a variable group of plants all evidently related to *A. tarijensis* and differing from it only in the reduced habit of growth, glabrous ovary and fruit, and generally more northern distribution. These distinctions are weak and perhaps the plants can be accommodated under *A. tarijensis* as further variants of that variable species.

The type of *A. modestus* has leafy stems 1–2 cm. long, 2–4-flowered peduncles 5–10 mm. long, practically glabrous stems and leaves, and 6–8-jugate elliptic-oblong leaflets. The type of *A. Pilgeri* is sparsely and persistently strigose but is otherwise similar to the type of *A. modestus*. The cited collections of *Asplund* and *Cardenas* have more reduced stems

and peduncles than in the type of *A. Pilgeri* but agree with it in other details including pubescence. The collections from Argentina have glabrous herbage and so more closely resemble the type of *A. modestus*. The cited material from Puna, including the type of *A. punensis*, is glabrous and differs in its larger corollas and deeper calyx from other collections examined. Possibly further collecting may prove it to be a distinguishable entity worthy of recognition.

60. *Astragalus Bustillosii* Clos in Gay, Fl. Chile 2: 117 (1846); Wedd. Chlor. Andina 2: 257 (1861). — Type from Cordillera de la Patos, Gay 489.
Phaca depauperata Phil. Fl. Atac. 14 (1860). — Based upon collections from Ag. Veras, and Puquios, *Philippi*.
Astragalus depauperatus (Phil.) Reiche, Anal. Univ. Chile 97: 537 (1897), and Fl. Chile 2: 80 (1898). Not Ledeb. (1831).
Phaca saxifraga Phil. Cat. Pl. Itin. Tarapaca 14 (1891). — Type from Peñon, prov. Atacama, *Philippi*.
Astragalus brachycalyx Phil. Cat. Pl. Itin. Tarapaca 15 (1891); Reiche, Anal. Univ. Chile 97: 538 (1897), and Fl. Chile 2: 81 (1898). Not Fischer (1853). — Type from Near Machuca, prov. Antofagasta, *Philippi*.
Tragacantha atacamensis Kuntze, Rev. Gen. 2: 940 (1891). — Based upon *P. depauperata* Phil.
Astragalus atacamensis (Kuntze) Fries Nova Acta R. Soc. Sci. Upsala, ser. IV, 11: 134 (1905).
Astragalus tarapacanus Speg. Anal. Mus. Nac. Buenos Aires II, 4: 264 (1902). — Based upon *A. brachycalyx* Phil., not Fischer.

RANGE: Moist gravels at high altitudes from Antofagasta and Jujuy south to Tucuman, Mendoza and Coquimbo.

CHILE. Antofagasta: Machuca, lat. 22° 36', *Philippi* (Santiago, type of *A. brachycalyx*). Atacama: Peñon, lat. 26° 50', Jan. 1885, *Philippi* as *P. saxifraga* (US, K, BD); Desert of Atacama, *Philippi* as *P. depauperata* (K, BD, Boiss); Laguna Grande, 3400 m. alt., 1926, *Johnston 5940* (G, US, K); Laguna Chica, 3200 m. alt., 1926, *Johnston 5970* (G, US, Stock); Laguna Valeriano, 4000 m. alt., 1926, *Johnston 6041* (G, US, K, Stock). Coquimbo: Baños del Toro, Jan. 1904, *Reiche* (G); Cord. de Doña Rosa, *herb. Reed* (K); Cord de Los Patos, 3000 m. Jan. 1837, Gay 489 (Paris, type of *A. Bustillosii*); Polcura, Cord. de Illapel, Jan. 1888, *Philippi* (G); Chile, Gay (G).

ARGENTINA. Jujuy: Santa Catalina, 3650 m. alt., 1901, *Claren 11465* in pt. (Stock). Salta: Queb. Quesera, ca. 3500 m. alt., 1932, *Keidel 1* (LP); Cerro de Cachi, 3600 m. alt., 1927, *Venturi 6705* (US). Tucuman: Tafi del Valle, fl. violet, 1907, *herb. Spegazzini 2028* (LP). San Juan: Vega de la Sepultura, Valle Cura, ca. 3800 m. alt., Jan. 7, 1930, *Perez Moreau 30/95* (G). Mendoza: Puente del Inca, March 1908, *herb. Spegazzini 2029* (LP); below Paso de la Cruz Piedra, 3000 m. alt., *Kuntze* (NY).

Among the South American species of the genus *A. Bustillosii* is unique in the possession of slender rhizomes. The slender stems of the plant elongate and spread through the moist sand or gravel in which it grows. A single plant can form a large area of turf. It much resembles *A. minimus* in habit, foliage, and gross aspect and perhaps it is related to that species. It is quickly distinguished from this possible relative, however, by its very different underground parts, its larger flowers, and very different fruit. The pods are strongly compressed laterally and flattened. The lower suture is inflexed only near the base of the pod and the false

septum is absent or only very weakly developed. The valves are commonly 10–13 mm. long and 5–7 mm. broad. The pedicels and peduncles are only slightly more developed than in *A. minimus*. The species is a rather stable one and has a range which lies to the south and west of *A. minimus*. With the possible exception of *A. brachycalyx* Phil., the species I have listed above are all clear synonyms. Through the kindness of Prof. Espinoza I have examined part of the type of *A. brachycalyx*. It appears to be a depauperate plant of *A. Bustillosii* from an unfavorable habitat. The material is scanty and shows only a single immature fruit but seems to fall reasonably well into the present species.

61. *Astragalus uniflorus* DC. Astrag. 243, t. 50 (1802), and Prodr. 2: 306 (1825); Weberb. in Engler & Drude, Veg. Erde 12: 209, fig. 45 (1911).—Type collected by Dombey at Huasa-Huasi, Peru.

Astragalus Herzogii Ulbrich, Mededell. Rijks Herb. 27: 53 (1915).—Type from Valle de Choquecota, Cord. Quimza Cruz, Bolivia, *Herzog* 2340.

RANGE: High mountains of central Peru south to the Bolivian Plateau.

PERU. Junin: Hacienda Arapa near Yauli, 4400 m. alt., 1902, *Weberbauer* 290 (BD, basis of Weberbauer's illustration!); Oroya, 4300 m. alt., 1903, *Weberbauer* 2620 (BD); Alpamina Mines, 1904, *Weberbauer* 5111 (BD); Cerro de Pasco, ca. 4200 m. alt., 1923, *Macbride* 3066 (FM); Huasa Huasi, 1779, *Dombey* (Paris, type). Apurimac: crest of Socollaccas Pass, 4000 m. alt., open puna among grass, fl. lavender, Nov. 11, 1935, *West* 3829 (UC). Cuzco: La Raya, ca. 4300 m. alt., 1925, *Pennell* 13526 (FM.)

BOLIVIA. La Paz: Huaycho to Molo, 4200 m. alt., 1903, *Hill* 123 (K); Sorata, 3900 m. alt., Feb. 1886, *Rusby* 1925 (NY); near Sorata, 3800 m. alt., Nov. 1857, *Mandon* 713 (G, K, BM, BD, Boiss, Del, Paris); hills above Ancoraimes, 4050 m. alt., 1904, *Hill* 124 (K); near top of Huallata Pass, 4233 m. alt., *Conway* 39 (K); Corocoro, 4400 m. alt., Feb. 16, 1921, *Asplund* 2487 (Upsala); Palca to La Paz, 4200–4700 m. alt., *Pflanz* 136 and 226 (BD); La Paz to Palca and Illimani, 3600–4800 m. alt., *Hauthal* 317 and 325 (BD); Laguna la Apacheta, Illimani, 4670 m. alt., *Stübel* 24a and 29a (BD); Cord. Quimza Cruz, valley of the Choquecota, 4300 m. alt., Oct. 1911, *Herzog* 2340 (BD, type of *A. Herzogii*). Oruro: Cord. de Azanaque, 4400 m. alt., Dec. 26, 1926, *Troll* 2995 (BD). Chuquisaca: Cuesta de Periguani between Pomabamba and Comargo, prov. Cinti, Jan. 11–13, 1846, *Weddell* 3934 (Paris). Cochabamba: Cord. de la Llave, prov. Ayopaya, 4000 m. alt., Dec. 1846, *Weddell* 4137 and 4138 (Paris). Indefinite: *Bang* 1792 (G) and 1879 (G, NY, US).

A low caespitose plant of high altitudes with glabrous herbage and large, usually brightly colored reddish purple flowers. Collectors, attracted only by its conspicuous flowers, have failed to collect the fruit of this species. Among all the collections examined only three (*Asplund* 2487, *Bang* 1879 and *Rusby* 1925) show the fruit. The legume is a remarkable one. It is glabrous, rugulose and completely 2-celled with a coarse septum almost as tough and firm as the valves, and is rigidly inflated and dorsi-ventrally somewhat compressed so that measurements across it about equal those for its total length and exceed its dorsi-ventral measurements. Hence it becomes 4–9 mm. long and thick and only about 3–7 mm. high. Viewed from below the legume appears didymous, being obtuse or rounded at the base, broadly retuse at the apex, and having a narrow deeply inflexed lower suture. The valves are flattened on the back and sides and

hence are somewhat rectangular. The flowers are solitary on peduncles that become 5–10 mm. long in fruit. The pedicels are 1–2 mm. long. The calyx-tube is elongate.

The species is best known from the department of La Paz in Bolivia. This Bolivian plant, of which a form has been described as *A. Herzogii*, is clearly conspecific with the original *A. uniflorus* of the western Andes of Peru. The collection at Paris labeled "in altis et frigidis, Huasa-Huasi, 1779, Dombey," is apparently the basis for the plate, as well as for the description originally given by De Candolle. The species is a very distinct one and is readily recognized.

62. *Astragalus Venturii*, sp. nov.

Planta perennis caespitosa; ramis 2–4 mm. crassis stipulis ocreaceis aureis strictis obtectis e caudice horizontali laxo ramoso orientibus; ramis foliatis perbrevibus 5–10 mm. longis, internodiis stipulis brevioribus; foliis vix numerosis ascendentibus, rhachi 6–20 mm. longa, foliolis saepe 2–3-(rariter 4-) jugatis 2–7 mm. longis 2–3 mm. latis oblanceolatis pilos adpressos vix abundantes strigosos non rariter subflavescentes gerentibus; pedunculo laxo 1–2-flori 3–12 mm. longo; pedicello 1–2 mm. longo; calycibus 4–5 mm. longis sparse strigosis pilos nigrescentes non rariter gerentibus, lobis subulatis 1–2 mm. longis saepe nigro-strigosis; vexillo ca. 7 mm. longo (lamina 5–6 mm. lata) quam carina 3 mm. et alis 1 mm. longiore; ovario glabro; leguminibus glabris compressis unilocularibus (vix septatis) margine inferiore saepe plus minusve inflexis, valvulis 4–7 mm. longis et 2.5–5 mm. latis.

ARGENTINA. Jujuy: Tilcara, 3200 m. alt., fl. blue, Feb. 1927, *Venturi* 7417 (type, U. S. Nat. Herb.); Tilcara, 3200 m. alt., Feb. 1927, *Venturi* 7411 (US); Cerro La Solidar, dept. Humahuaca, 3500 m. alt., fl. blue, Jan. 1927, *Venturi* 9018 (G, US). Salta: Cerro de Cachi, fl. bluish, March 1927, *Venturi* 6674 (US); Cerro de Cachi, 4400 m. alt., fl. violet, March 1927, *Venturi* 6691 (US). Tucuman: Sierra del Cajon, dept. Tafi, 3500 m. alt., fl. violet, May 1926, *Venturi* 7609 (US). Catamarca: Sierra del Anconquiya, dept. Santa Maria, 4600 m. alt., fl. violet, Jan. 1926, *Venturi* 7605 (US).

The relationship of this plant is uncertain. Among the caespitose species of northwestern Argentina it is quickly distinguished by the yellowish green color imparted to the plant by the yellowish stipules that ensheath the caudex and, partially, by the yellowish hairs on the herbage. The only species readily confused with the species is *A. Burkartii*. The available material is not fully mature and is inadequate for the proper description of its fruiting structures. The immature legumes are variable, some appearing to have both sutures prominent while others have the lower suture strongly intruded.

63. *Astragalus confinis*, sp. nov.

Planta perennis caespitosa; ramulis caudicis paucis gracilibus horizontalibus 1–2 mm. crassis; ramulis foliatis 5–12 mm. longis paucis dense albo-strigosis, internodiis 2–5 mm. longis; foliis pallide strigosis, rhachi 2–5 mm. longa, foliolis 2–4-jugatis oblongi-linearibus 3–10 mm. longis 1–2 mm. latis margine involutis, stipulis 2–4 mm. longis strigosis laxo vel vix imbricatis; pedunculis 1–4 cm. longis apice 2–5-floris; pedicellis 1 mm.

longis; vexillo 6–7 mm. longo (lamina 3–4 mm. lata) quam carina obtusa ca. 2.5 mm. et quam alis 1 mm. longioribus; calyce 3–4 mm. longo pallide strigoso, lobis triangulari-lanceolatis 1–1.5 mm. longis; ovario glabro; leguminibus glabris ca. 8 mm. longis 3–4 mm. latis margine inferiori inflexis, septo membranaceo angustissimo inconspicue.

PERU. Arequipa: near Arequipa, 2000–2500 m. alt., Feb. 13, 1923, *Guenther & Buchtien 1082* (Hamb); Arequipa, 2300 m. alt., Feb. 11, 1923, *Guenther & Buchtien 1081* (type, Hamburg).

CHILE. Tarapaca: between Pachica and Aico, 2400 m. alt., April 15, 1927, *Troll 3305* (BD).

A species evidently related to *A. hypsogenus* of northwestern Argentina and adjacent Bolivia from which it differs sharply in its fewer leaflets, sparser indument, slightly smaller flowers, and glabrous ovary and fruit. Furthermore, the leafy stems seem to be more elongate than in its southern relative. Except for the rudimentary septum and lack of hairs, the fruit of *A. confinis* is very similar to that of its relative.

64. *Astragalus hypsogenus*, sp. nov.

Planta caespitosa; caudice gracili saepe laxe longeque ramoso, ramulis 1–2 mm. crassis cum stipulis 3–6 mm. longis imbricatis sparse strigosis vestitis; foliis pallide strigosis saepe sericeis sed non rariter subglabrescentibus, rhachi 2–5 cm. longa, foliolis lanceolatis vel oblongis plicatis vel margine involutis 3–17 mm. longis 2–3 mm. latis 4–7-jugatis distantibus apice acutis; pedunculis 2–6 cm. longis apice 2–10-floris; pedicellis 1–2 mm. longis; calyce ca. 5 mm. longe strigoso pilis non rariter nigris vestito, lobis 1–2 mm. longis; vexillo 8–10 mm. longo (lamina 4–6 mm. lata apice emarginata) quam carina 3–4 mm. et quam alis angustis 1 mm. longiore; leguminibus saepe sublunatis strigosis 10–15 mm. longis 3–5 mm. altis margine inferiore plus minusve introflexis margine superiore a latere viso plus minusve leviter concavis, septo nullo.

BOLIVIA. Potosi: Atocha, 3700 m. alt., March 19, 1921, *Asplund 6135* (US) and 2974 (Upsala).

ARGENTINA. Jujuy: Esquina Blanca, Feb. 13, 1921, *Castellanos 32* (G); Cerro Incahuasi, dept. Cochinoa, 4500 m. alt., fl. light blue, 1930, *Venturi 10126* (type, Gray Herb.; isotypes, US, BM, Stock); Laguna Tres Cruces, *Claren 11695* (Stock); Moreno, 3800 m. alt., 1901, *Fries 821a* (Stock); Abra del Palamar, 3600 m. alt., 1901, *Fries 821* (Stock); Sierra del Aguila, 3700 m. alt., fl. bluish, 1929, *Venturi 8694* (US); Santa Catalina, 3650 m. alt., *Claren 11442* (Stock). Los Andes: Chorrillos, March, 1930, *Budin 12* (G); San Antonio de los Cobres, Feb. 25, 1927, *Castellanos 27/823* (G). Salta: Punta Cienega, Queb. del Toro, 3350 m. alt., Feb. 1932, *Keidel 4* (LP); Cerro de Cachi, 4000 m. alt., fl. bluish, March 1927, *Venturi 6675* (US). Tucuman: between Estan. Santa Rosa and La Cueva, dept. Chicligasta, 3600 m. alt., fl. violaceous, Jan. 1926, *Venturi 7606* (US).

A very distinct species with evident relationships only with *A. confinis* and *A. crymophilus*. Among the species of northwestern Argentina it is readily recognized by its tufts of silvery strigose leaves and its pedunculate subumbellate cluster of flowers. In general appearance the fruit of *A. hypsogenus* is suggestive of a small fruit of *A. arequipensis*. The upper edge is somewhat concave in lateral outline and the apex is acute. The lower part of the fruit is either flattened or inflexed. There is no false septum developed within the pod. Among the collections cited above

those by Fries and by Claren have been identified by Fries, *Nova Acta R. Soc. Sci. Upsala* ser. IV, 1¹: 135–36 (1904), as *A. modestus* and *A. bellus*.

65. *Astragalus crymophilus*, sp. nov.

Planta caespitosa; caudice denso breviter ascendenterque congesti-ramoso; ramulis caudicis 3–10 mm. longis stipulis glabris membranaceis imbricatis dense vestitis; foliis argenteis dense sericeo-strigosis, rhachi 2–5 mm. longa infra medium nuda, foliolis 2–3-jugatis linearibus plicatis distantibus 8–19 mm. longis 1–2 mm. latis; pedunculo 2–15 mm. longo sericeo-strigoso apice 2–6-flore; pedicellis 0.5–1 mm. longis; calycibus 2.5–3 mm. longis sericeo-strigosis, lobis ca. 1 mm. longis linearibus vel lanceolatis tubo campanulato subaequilongis; vexillo 5–6 mm. longo, lamina 2–3 mm. lata obovata apice emarginata quam alis angustis 1 mm. et quam carina obtusa 2 mm. longiori; ovario albiters strigoso; legumine oblongo compresso strigoso 6–8 mm. longo 2–4 mm. alto 1–2 mm. crasso, margine superiori a latere viso recto vel leviter convexo, margine inferiori valde introflexo, septo interiore membranaceo angusto 0–0.5 mm. alto inconspicuo; ovulis 10–12.

BOLIVIA: Uyuni, dept. Potosi, 3700 m. alt., March 1923, *Asplund* 6134 (type, U. S. Nat. Herb.) and 3148 (Upsala); Puna Patanca, dept. Tarija, 3800 m. alt., March 27, 1904, *Fiebrig* 2912 (G, US, K, BM, BD).

ARGENTINA: Mina Perdida, dept. S. Catalina, Jujuy, 4100 m. alt., Jan. 25–26, 1901, *Claren* 11499 in pt. (Stock).

A well marked species most closely related to *A. hypsogenus*, from which it differs in its denser more silvery indument, fewer linear leaflets, oblong rather than lunate pods and narrow but definite false septum within the fruit. The collection from Jujuy consists of a single plant mixed with a reduced form of *A. micranthellus*. Fries determined and reported the collection as *A. modestus*.

66. *Astragalus pusillus* Vogel, Verhandl. K. Leop.-Carol. Akad. Naturf. 19: suppl. 19 (1843); Weddell, Chlor. Andina 2: 259 (1861). — Type from Alto de Toledo, Peru, *Meyen*.

RANGE: High altitudes from southern Peru southward across the Bolivian plateau to the mountains of northwestern Argentina.

PERU. Puno: Poto, prov. Sandia, 4500 m. alt., 1902, *Weberbauer* 993 (BD); cordilleras near lake Ayapata, *Lechler* 1730 (K); Azangaro, June 1854, *Lechler* 3242 (K); Crucero, 1920, *Stordy* (K); Pucará, 3700 m. alt., *Weberbauer* 438 and 440a (BD); Moho, 1848, *Weddell* 4414 (Paris). Arequipa: above Chivay, prov. Caylloma, 4200 m. alt., 1914, *Weberbauer* 6896 (BD, FM); Alto de Toledo, 4650 m. alt., 1831, *Meyen* (BD, type); near Arequipa, 2200–2500 m. alt., 1923, *Guenther & Buchtien* 1114, 1117, 1118 and 1120 (Hamb). Moquegua: Coalaque near Lagunillas, 4400 m. alt., 1923, *Guenther & Buchtien* 1866 (Hamb).

CHILE. Arica: Cord. de Volcan Tocora, Ancara, 4300 m. alt., *Werdermann* 1128 (G, BD, US).

BOLIVIA. La Paz: Achachachi, Ancorairnes and Guatata, 4000–4200 m. alt., 1857–58, *Mandon* 712 (G, K, BM, BD, Del, Paris, Stock); La Paz, 4100 m. alt., *Buchtien* 64/624 (K, BD, US); Lancha, between La Paz and Coroica, 5000 m. alt., *Mandon* 718 (K); La Lancha, Canyon of the Chuquiagillo, 1851, *Weddell* (Paris); Cerro Quimsachata, 13 km. s. of Tiaguanaco, 4200 m. alt., *West* 6379 (UC); Challa-velina, Feb. 9, 1927, *Troll* 3055 (BD); Ulloma, 3900 m. alt., Feb. 2, 1927, *Troll* 3119

(BD); Ulloma, 3850 m. alt., Feb. 21, 1921, *Asplund* 4423 (Upsala); Mina La Union, 4400 m. alt., May 4, 1927, *Troll* 1939 (BD); Charaña, 4000 m. alt., March 1, 1921, *Asplund* 6143 (US) and 2671 in pt. (Upsala); Corocoro, 4300 m. alt., Feb. 16, 1921, *Asplund* 2485 (Upsala); Calacoto, 3800 m. alt., March 7, 1921, *Asplund* 4432 (Upsala). Potosi: Totorapalca, prov. Linares, 3400 m. alt., 1934, *Hammarlund* 426 (Stock); Potosi, 4000 m. alt., 1932-33, *Cardenas* 165 (G) and 466 (US). Indefinite: near Coldero, Andes of Pelechuco, 4800 m. alt., April 1865, *Pearce* (BM); prov. de Carangas, Bolivia, *d'Orbigny* 1438 (Paris).

ARGENTINA. Salto: Los Potreros, south of Nevado del Castillo, March 1873, *Hieronymus & Lorentz* 56 (BD, K, FM).

Bolivian material of this well marked species has been frequently confused with *A. peruvianus*. The latter, however, is readily distinguished by its smaller fruit, its persistent silvery indument, its narrow acute to rounded leaflets, and its usually firm tight yellowish stipular sheaths that commonly form an evident collar about the leaf-rosette. The real relationships of our present species, however, seem to be with the habitally dissimilar *A. arequipensis*. Its sparsely villous pods are ca. 5 mm. long and 3 mm. broad. The lower suture is inflexed and there is a false septum. One of the most distinctive developments of *A. pusillus* is its compacted inflorescence. Terminating the branches of the multicapital caudex and nestling in the center of the rosette of rather coarse leaves, sessile flowers are to be found intermixed with bracts and broad white papery stipular-sheaths. The foliage is villous becoming glabrescent in age. The indument is not lustrous. The leaflets are oblong to obcordate, retuse, and 2-5 mm. broad. The plant is one of the peculiar habit-types characteristic of the Bolivian altiplano.

The only Argentine material I have seen comes from southern Salta. Hosseus, Bol. Acad. Nac. Cien. Cordoba 26: 154, fig. 27 (1922), however, reports *A. pusillus* from the Sierra Famatina, La Rioja, on the basis of six collections which he compared and found conspecific with the material obtained in Salta by Lorentz & Hieronymus (no. 56).

67. *Astragalus Urbanianus* Ulbrich, Bot. Jahrb. 37: 422 (1906); Fiebrig, Bot. Jahrb. 45: 12 (1910).—Type from Calderillo, southern Bolivia, *Fiebrig* 3184a.

BOLIVIA. La Paz: Charaña, 4050 m. alt., March 1, 1921, *Asplund* 2671 in pt., mixed with *A. pusilla* (Upsala). Potosi: Potosi, 4000 m. alt., March 1932, *Cardenas* 165, mixed with *A. pusilla* (G). Tarija: Calderillo, 3600 m. alt., March 1904, *Fiebrig* 3184a (BD, type; US, FM); southern Bolivia, 1903, *Fiebrig* 3576 (BD).

Very evidently related to *A. peruvianus*, and perhaps only a luxuriant form of that species. From its relative it differs in having, not 1 or 2, but 4-7 flowers clustered in an exceedingly abbreviated subumbellate axillary raceme. The flowers are intermixed with broadly lanceolate bracts. These bracts permit the plant to be distinguished from those forms of *A. peruvianus* which produce several flowers on a given branch of the caudex, for in the latter cases the flowers are separated, not by bracts, but by leaves and stipules. The leaves in *A. Urbanianus* are larger than in *A. peruvianus*, the lanceolate to oblong blade measuring 3-12 mm. and the leaf-rachis 1-5 cm. in length.

68. *Astragalus Dillinghami* Macbride, Pub. Field Mus. Bot. 8: 98 (1930), and l.c. 13 [Fl. Peru 3:]: 396 (1943).—Type from between Tarma and Morocochó, *Macbride & Featherstone 1052*.

PERU. Near Tarma, Junin, 4200 m. alt., June 1922, *Macbride & Featherstone 1052* (FM, type).

The type has no fruit. The flowers are in a much shortened raceme and form a cluster among the leaves. The leaves are abundantly villous with loosely appressed silky hairs about 2 mm. long. The plant is evidently related to *A. Urbanianus* but differs in the more abundant and longer hairs of its indument. It may not be specifically distinct.

69. *Astragalus peruvianus* Vogel, Verhandl. K. Leop.-Carol. Akad. Naturfors., 19: suppl. 18 (1843).—Type collected near Pisacoma in southern Peru, *Meyen*.

RANGE: High altitudes in southern Peru, Bolivia and northwestern Argentina.

PERU. Ayacucho?: Santa Inez silver mines (between Ayacucho and Pisco), May 1910, *Weberbauer 5450* (FM, BD). Moquegua: Carumas near Volcan Ticsani, 1925, *Weberbauer 7327* (FM, BD). Tacna: near Pisacoma, 4500 m. alt., 1831, *Meyen* (BD, type).

BOLIVIA. La Paz: La Cumbre, trail to the Yungas, ca. 4700 m. alt., March 28, 1921, *Asplund 6130* (US) and 3846 (Upsala); Chacaltaya, 4800 m. alt., 1908, *Buchtien 1813* (US, BD); near La Paz, 3000 m. alt., 1890, *Bang 660* (G, NY). Potosi: Cerro de Potosi, 4800 m. alt., Feb. 1933, *Cardenas 406* in pt. (US); Potosi, 4000 m. alt., 1936, *Cardenas 600* (G).

ARGENTINA. Tucuman: Cumbre de Calchaquies, 4200 m. alt., *Spegazzini 2104* (LP); El Pelado, 1912, *Rodriguez 442* (G).

Typical *A. peruvianus* usually has the coarse elongate branches of the caudex tightly ensheathed with glabrous tough commonly stramineous stipules. The leaves, with abundant appressed lustrous hairs, are usually small having leaflets mostly 1 mm. or rarely 2 (–2.5) mm. long on rachises 5–10 (–15) mm. long. The solitary (or rarely geminate) flowers are borne among the stipules of the functioning leaves. The species is closely related only to *A. Urbanianus* and *A. Dillinghami*, both of which have larger leaves and abbreviated racemes of flowers. Some forms of *A. peruvianus* suggest *A. deminutivus* in gross habit but these forms may be distinguished from that species by their very different fruit, lustrous more appressed indument, glabrous stipules, etc. Our present plant has been most frequently confused with *A. pusillus*, but that plant has non-lustrous indument, broader emarginate leaflets, much broader papery stipules, and clustered flowers.

Besides the specimens cited above I have in my notes thirteen other collections assigned to *A. peruvianus*. They represent collections identified before I had recognized *A. Urbanianus* as distinct from *A. peruvianus*, and some of them may possibly represent the former species. Those from Peru are, from near Arequipa, 2000–2500 m. alt., 1923, *Guenther & Buchtien 1077, 1353, 1354, and 1355* (Hamb); Saracocha near Lagunillas, 4400 m. alt., 1925, *Guenther & Buchtien 1164b* (Hamb), and those from Bolivia are, from Rinconada, Yungas Pass, northeast of La Paz, 4100 m. alt., 1928, *Troll 1891* (BD); Chuyuncayani, 1851, *Weddell* (Paris); Chacaltaya, northeast of La Paz, 1928, *Troll 1935* (BD); La Lancha near

La Paz, 5000 m. alt., *Mandon* 718 (K, Del); Huari pampa, between La Paz and Palca, 4200–4400 m. alt., 1910, *Pflanz* 483 in pt. (BD); Quemsachata near Tiahuanaco, 4300 m. alt. 1877, *Stübel* 64 (BD); Copacabana, 4050 m. alt. 1903, *Hill* 122 (K); and Quebrada Honda, Potosi, *d'Orbigny* 1310 (Paris).

70. *Astragalus Werdermanni*, sp. nov.

Planta dense caespitosa; ramulis caudicis congestis stricte ramosis, vetustioribus stipulis imbricatis membranaceis pallidis dense vestitis; foliis cinereis sparse breviterque strigosis, rhachi 13–18 mm. longa supra medium foliolata, foliolis 5–7-jugatis orbiculato-obcordatis evidenter plicatis 2–2.5 mm. longis 2–3 mm. latis paulo supra medium latioribus apice conspicue emarginatis basi rotundatis sparse strigosis pilis a costa oblique abeuntibus; stipulis 3–4 mm. longis strictis sparse strigosis; pedunculis 1–2-floris, fructiferis 3–7 mm. longis; pedicellis 0.5–1 mm. longis; calycibus sparse strigosis ca. 2.5 mm. longis, tubo membranaceo cupulato, lobis triangularibus ca. 0.5 mm. longis viridibus; corolla ignota; leguminibus subbilocularibus sparse strigosis 5–7 mm. longis 2–3 mm. crassis 3–4 mm. altis, margine superiori a latere viso recto, margine inferiore a latere viso valde convexo, sutura inferiore valde inflexa in loculo leguminis septum membranaceum 2–3 mm. altum gerente; seminibus pluribus.

CHILE: Chislluma, Cord. Volcan Tacora, Arica, depressed, a few plants between rocks, 4500 m. alt., April 1926, *Werdermann* 1439 (type, Berlin).

A well marked species probably most closely related to *A. casapaltensis* Ball, Jour. Linn. Soc. London 22: 36 (1885), a species known only from high altitudes in central Peru (cordilleras of Lima and Junin), which differs from our present plant in its fewer, more conspicuously emarginate leaflets that bear more persistent and more appressed shorter hairs. The proposed Chilean species is readily recognized by its very broadly obcordate, strongly folded leaflets which are strigose with numerous scattered closely appressed hairs oriented obliquely to the midrib. The fruit has a very well developed, almost complete, membranous false septum.

71. *Astragalus minutissimus* Weddell, Chlor. Andina 2: 257 (1861).—Type from "dept. Cuzco," *Gay* 629.

PERU. Cuzco: "dept. Cuzco," *Gay* 629 (Paris, type). Puno: Mullapata near Moho, 3125 m. alt., 1919, *Shepard* 110 (G, NY, US); between Huaicho and Moho, 1903, *Hill* 126 (K).

BOLIVIA: La Paz: Isla del Sol, Lake Titicaca, 3840 m. alt., March 1910, *Buchtien* (US). Cochabamba: Challa Pass, 4500 m. alt., March 17, 1892, *Kuntze* (NY).

This species is very closely related to *A. alpamarcae* Gray, U. S. Explor. Exped. 1: 417 (1854), which is known only from a few collections in the cordillera of central Peru (Cerro de Pasco, Junin, *Mathews* 924; Alpamarca, Lima, *U. S. Explor. Exped.*, type; and Casapalca, Lima, *Macbride & Featherstone* 837). The plants of the northern, older species have 7–9 pairs of leaflets. The leaves in our present southern form bear only 3–5 pairs of leaflets. Otherwise the plants seem very similar. The differences between *A. minutissimus* and *A. alpamarcae* are probably not of

specific value. Certainly the two are very much alike in general appearance. In gross aspect *A. minutissimus* is frequently very similar to *A. deminutivus*. The fruits of these species, however, are very different, and furthermore the leaflets of *A. minutissimus* show a very much stronger tendency towards glabrescence than do those of *A. deminutivus*.

72. *Astragalus minimus* Vogel, Verhandl. K. Leop.-Carol. Akad. Naturfors. 19: suppl. 18 (1843).—Type from Alto de Toledo, east of Arequipa, *Meyen*.

Astragalus colliculus Rusby, Mem. Torrey Bot. Club 3: 19 (1893).—Type from near La Paz, *Bang* 660.

PERU. Arequipa: Alto de Toledo, 4600 m. alt., *Meyen* (BD, type).

BOLIVIA. La Paz: near La Paz, 3000 m. alt., *Bang* 660 (NY, type of *A. colliculus*); Charaña, 4000 m. alt., March 1, 1921, *Asplund* 6145 (US) and 2672 (Upsala).

CHILE. Arica: Ancara, Cord. Volcan Tacora, 4300 m. alt., April 1926, *Werdermann* 1136 (G, BD).

ARGENTINA. Jujuy: Moreno, 3500 m. alt., Dec. 14, 1901, *Fries* 916 (Stock). Los Andes: San Antonio de los Cobres, Feb. 21, 1927, *Castellanos* 27/813 (G). Tucuman: between La Puerta and Los Cardones, Cumbre Calchaquies, 4400 m. alt., Jan. 30, 1933, *Burkart* 5386 (Burkart).

This species is closely related to *A. minutissimus* and *A. alpamarcae*, but has a more prostrate habit and an indument of shorter much more appressed hairs. In gross habit it much resembles *A. Bustillosii* which differs in its rhizomes, larger flowers, and much larger compressed fruit. As in *A. Bustillosii*, our present species frequently has the fruit elevated on a short but definite 1–2-flowered peduncle 2–6 mm. long.

The type specimen of *A. colliculus*, *Bang* 660 at New York, represents two forms of the present species. *Bang*'s collection was evidently a great mixture, for in addition to the two forms of *A. minimus* at New York, material of *A. peruvianus* and of a depauperate form of *A. arequipensis* has been distributed under his no. 660 to other herbaria. *Rusby*'s description of *A. colliculus* seems to include details derived from the material of all the species mentioned. To make matters worse, *Mandon* 712 at New York, which was cited by *Rusby*, is also a mixture consisting of plants of *A. pusillus* and *A. minutissimus*. If *Rusby*'s species is not to be discarded as a confused mixture, it must be taken as a synonym of *A. minimus* since the material of *Bang* 660 retained at New York by *Rusby* all belongs to that species.

73. *Astragalus pulviniformis* Johnston, Physis 9: 309 (1929).—Type collected at Vega Cadillo in northwestern San Juan, Argentina, *Johnston* 6128.

ARGENTINA. Vega Cadillo, Rio Tagua, San Juan, 3000 m. alt., 1926, *Johnston* 6128 (G, type; K, Paris, Stock).

A very well marked species which has its closest relations in *A. Reichei* and *A. deminutivus*. Its dense pulvinate habit, strongly marcescent dusky leaves, scattered hyaline stipules, slender elongating stems, and larger fruit readily distinguish it from the species mentioned.

74. *Astragalus Reichei* Spegazzini, Anal. Mus. Nac. Buenos Aires ser. 2, 4: 264 (1902).

Phaca compacta Phil. Cat. Pl. Itin. Tarapaca 14 (1891).—Type from Queb. Machuca, prov. Antofagasta, 3200 m. alt., *Philippi*.

Astragalus compactus (Phil.) Reiche, Anal. Univ. Chile 97: 539 (1897), and Fl. Chile 2: 82 (1898). — Not Lam. (1789).

BOLIVIA. Rosario, prov. Pacajes, dept. La Paz, 3750 m. alt., 1920, *Shepard* 227 (G); above Animas Mine, west of Chocaya, dept. Potosi, 4250 m. alt., *West* 6069 and 6070 (G).

CHILE. Peña Blanca, Cord. Arr. Coyacagra, prov. Tarapaca, 4000 m. alt., *Werdermann* 1117 (G, K, BD); Atacama Desert [Queb. Machuca, prov. Antofagasta, 3200 m. alt.], ex *Philippi* as *P. compacta* (K, BD).

This species has close relationship only with the more easterly and southerly ranging *A. flavocreatus*. The short simple or strictly branched stems are erect or ascending from the crown of the deep root. They are covered with the leaves of seasons past and crowded to form a dense mass commonly intermixed with some dirt. The stipules of *A. Reichei* are pale and are not so firm nor so closely appressed to the stem as are those of *A. flavocreatus*. The herbage of *A. Reichei* is slightly more grayish than in its relative.

75. *Astragalus flavocreatus*, sp. nov.

Planta perennis e radice profunda recta oriens; caudice saepe laxe ramoso plus minusve horizontali, ramulis funiculiformis gracilibus 1–1.5 mm. crassis stipulis stramineis strictis imbricatis vestitis vestigiis foliorum haud gerentibus; foliis apice ramulorum stipulosorum caudicis aggregatis pilis haud abundantibus (0.2–0.6 mm. longis rectis adpressis) vestitis vetuste deciduis; rhachi 5–15 mm. longa tertiam partem inferiorem efoliolata; foliolis 0.5–1.5 mm. longis obovatis vel ellipticis saepe subplicatis supra subglabris apice rotundis vel subemarginatis; stipulis stramineis ocreatis opacis internodiis ramuli subaequilongis vel longioribus persistentibus 2–4 mm. longis juventute laxe et vetuste stricte vaginatis dorse saepissime glaberrimis margine apicem versus ciliatis; pedunculis perinconspicuis inter stipulis occultis 1–2 mm. longis; floribus solitariis; calyce 2–3 mm. longo haud vel vix pedicellato imam ad basim per bracteam 1–2 mm. longam strictam suffulto, tubo cupulato pilis sparsis adpressis vestito, lobis angustis ca. 0.5 mm. longis breviter villosis; corolla violacea, vexillo 6–7 mm. longo, lamina suborbiculari ca. 5 mm. diametro apice emarginata; carina obtusa quam vexillo ca. 3 mm. brevior; alis 4–5 mm. longis supra medium ut videtur patentibus; leguminibus subglobosis ca. 2 mm. longis villosis unilocularibus biseminatis, sutura inferiore inflexa.

BOLIVIA. Cerro de Potosi, 4800 m. alt., 1933, *Cardenas* 406 (G) and 406 in pt. (US); Potosi, 4000 m. alt., 1932, *Cardenas* 166 (G).

ARGENTINA. Salta: Cerro de Cachi, 4000 m. alt., 1927, *Venturi* 6704 (US). Catamarca: Sierra Anconquija, 4200–4600 m. alt., *Venturi* 6626 and 6627 (US). Tucuman: Cumbre Calchaquies, dept. Tafi, between La Puerta and Los Cardones, 4400 m. alt., Jan. 30, 1933, *Burkart* 5385 (type, Gray Herb.); Est. Santa Rosa, dept. Chichigasta, 3600 m. alt., 1924, *Venturi* 6625 (US). La Rioja: Alto Blanco, Sierra Famatina, 1928, *Castillanos* 28/182 (G).

This plant is evidently related to *A. Reichei*, but its habit of growth, as well as various intangibles of pubescence, stipules, etc., permit it to be distinguished from that species. The caudex of *A. Reichii* is a compacted mass of strictly ascending stems and persistent old leaves. It is very different from the more spreading superficial caudex of leafless rope-like stems developed by *A. flavocreatus*. The tightly ensheathing straw-

colored stipules which clothe its more elongate and loosely branched stems, and the general lack of persistent old leaves, make *A. flavocreatus* a more neat and attractive plant and permit it to be quickly distinguished from other caespitose species. The flowers of *A. flavocreatus* have a bract tightly appressed about one side of the calyx. This is the bract borne at the apex of the reduced peduncle. From its axil the solitary flower is produced. The calyx is sessile. The apparent pedicel, accordingly, is really the reduced peduncle. This pedicel-like peduncle in *A. flavocreatus* is usually twice the length of that found in *A. Reichei*. It is usually well hidden in the stipular sheathes.

76. *Astragalus deminutivus*, sp. nov.

Planta multiceps cinerea dense caespitosa 2–15 cm. diametro; ramulis caudicis cum stipulis et reliquiis conspicuis congestis foliorum abundanter vestitis; foliis villosulis numerosis deminutivis, rhachi 1–2 cm. longa tertiam partem inferiorem efoliolata; foliolis 5–7-jugatis orbicularibus vel anguste ovatis saepe ca. 1 mm. longis margine laxe involutis apice rotundis; stipulis vaginatis amplis chartaceis albidis villosis-strigosis valde imbricatis saepe 4–5 mm. longis; floris axillaribus solitariis subsessilibus; calycibus 3–5 mm. longis villosis imam ad basim bracteam lanceolatam gerentibus, tubo chartaceo profundo, lobis linearibus herbaceis 1–1.5 mm. longis; vexillo corollae caeruleo 7–8 mm. longo quam carina 2–3 mm. longiori, lamina 3–4 mm. lata apice emarginata; alis caeruleis quam carina pallida obtusa 1–1.5 mm. longioribus supra medium ut videtur patentibus; ovario strigoso; leguminibus oblique subglobosis ca. 2 mm. longis et 1.5 mm. crassis subtus introflexis; seminibus 1–2 saepe 2 mm. diametro.

BOLIVIA. La Paz: General Campero, 3900–4200 m. alt., March 5, 1921, *Asplund* 6140 (US) and 2780 (Upsala). Potosi: Cerro de Potosi, 4800 m. alt., 1933, *Cardenas* 406 in pt. (US); Uyuni, 3700 m. alt., March 24, 1921, *Asplund* 6141 (US) and 3138 (Upsala); Rio Mulalo, prov. Porco, 1934, *Hammarlund* 464 (Stock). Tarija: Puna Patanca, 3700 m. alt., 1904, *Fiebrig* 2608 (type, Gray Herb; K, BD, Paris).

ARGENTINA. Los Andes: Susquis, March 7, 1927, *Castellanos* 27/818 (G). Jujuy: Laguna Tres Cruces, 1901, *Claren* 11657 (Stock).

The specimens I have cited above are certainly conspecific and merit description as a new species. They include the plant incorrectly called *A. Reichei* by Fries, *Nova Acta R. Soc. Sci. Upsala* ser. IV, 1¹: 134 (1905). Hosseus, *Bol. Acad. Nac. Cordoba* 26: 154, fig. 28 (1922), has given an illustration of *Claren* 11657, which is the basis of Fries' note, and properly expresses a doubt as to the correctness of Fries' identification.

Closely related to *A. deminutivus* and perhaps only a robust form of this species are two collections made in the dept. of Potosi by *Asplund*. These collections are, — Uyuni, 3700 m. alt., March 24, 1921, *Asplund* 6139 (US) and 3137 (Upsala), and Atocha, 3700 m. alt., March 20, 1921, *Asplund* 6138 (US) and 3025 (Upsala). They differ from typical *A. deminutivus* in having the pods more elongate and larger (oblong and 3–5 mm. long), the seeds smaller (1.3–1.5 mm. broad) and more numerous (3–6), the leaves larger (rhachis ca. 3 cm.), and the leaflets larger (1–2 mm.) and somewhat elongate. On Cerro de Chani, Jujuy, Argentina,

Venturi (no. 8527, US) has obtained still another form which is tentatively placed under *A. deminutivus*. This form has glabrous stipules.

77. *Astragalus Dielsii* Macbride, Field Mus. Pub. Bot. 11: 24 (1931), and l.c. 13 [Fl. Peru 3:]: 396 (1943).—Type from Yanashallos, west of Huallanca, dept. Ancash, *Macbride & Featherstone* 2479.

PERU. Yanashallas, Ancash, 4800 m. alt., Oct. 2, 1922, *Macbride & Featherstone* 2479 (FM, type; BD); mountains west of Oroya, 4300 m. alt., Nov. 23, 1902, *Weberbauer* 1704 (FM, BD).

This is an outlying northern relative of *A. deminutivus*. Its stipules are conspicuously and permanently strigose, and though white at first soon become very dusky in color.

UNPLACED SPECIES

Astragalus Cuatrecasii Macbride, *Candollea* 7: 221 (1937), and Pub. Field Mus. Bot. 13 [Fl. Peru 3:]: 394 (1943).—Peru, *Ruiz & Pavon*.

Based upon a flowering specimen at Madrid said to have been collected somewhere in Peru by Ruiz & Pavon. Among the notable features of the type are the numerous leaflets (9–12 pairs), the black appressed hairs on its calyx, and the rather elongate stems and accordingly laxly caespitose habit. It appears to be a relative of *A. minimus* Vogel and is, perhaps, even a form of that species. Lacking fruit, however, its identity remains uncertain.

Phaca diminutiva Philippi, Cat. Pl. Itin. Tarapaca 14 (1891).—"Inter Aguas calientes et Socaire. . . . lecta"; not *A. diminutiva* Johnston.

A very small caespitose plant with pallid appressed indument. The single specimen was collected with the type of *Phaca cryptantha* Phil. Reiche, Fl. Chile 2: 80 (1898), places both *P. cryptantha* and *P. diminutiva* as synonyms of *A. clandestinus* (Phil.) Hieron. which is called *A. cryptobotrys* in this paper. This is perhaps correct. In any case the name may be discarded since the trivial epithet is preoccupied under *Astragalus*. Prof. Espinosa could not locate the type in the Museum at Santiago.

Astragalus Gilliesii Philippi, Anal. Univ. Chile 31: 393 (1862), and *Linnaea* 33: 48 (1864).—"Portezuelo del Portillo, lado de Mendoza," 1860–61, *Diaz*.

This species was described without mature fruit. Judging from the description it might be a form of *A. Arnottianus* (Gillies) Reiche, or perhaps even a form of *A. carinatus* H. & A. I asked Prof. Espinosa for the privilege of examining a fragment of this type and was loaned material labeled "*Astragalus Gilliesii*, Portillo, lado de Mendoza, 1861–62, *W. Diaz*." This consisted of foliage and fruit of *A. Berteri* and flowers of *A. Cruckshanksii*. The material is not covered by the original description.

Astragalus gracilis Romero, Bol. Direc. Nac. Estad. y Estud. Geogr., La Paz, sec. Epoc. III, Nos. 31–33, pg. 45 (1920).—Not Nutt. (1817), nor Stev. (1842).

This species was described as follows in Romero's paper on the flora of the vicinity of La Paz, Bolivia: "*Astragalus gracilis*, sp. n. B. D. R.

Esta plantita erecta, delgada, con estipulas aladas, tiene foliolos lineares, semi-plegados, agudos y 8 yugados; sus espigas llevan pocas florecillas, la corola es blanca azuleda de 1 cm. de largo. Especie que la hemos recogido en los cerros de esta ciudad [La Paz].” This description, for the transcript of which I am indebted to Prof. Cardenas, is not detailed enough for the recognition of the species. The name is invalid in any case since it has two earlier homonyms.

Astragalus infirmus Steudel, Nomencl. ed. 2, 1: 161 (1840), nomen.

This name was applied to *Bertero* 820 from Chile. Among Steudel's specimens at Paris I could find no *Astragalus* bearing this number. The name, possibly, may refer to an *Adesmia*.

Astragalus lanuginosus Clos in Gay, Fl. Chile 2: 121 (1846); Reiche, Anal. Univ. Chile 97: 566 (1897), and Fl. Chile 2: 109 (1898). Not Kar. & Kir. (1841).

Tragacantha Gayana Kuntze, Rev. Gen. 2: 941 (1891).—Based upon *A. lanuginosus* Clos.

Astragalus hurtadensis Spegazzini, Anal. Mus. Nac. Buenos Aires ser. 4, 4: 265 (1902).—Based upon *A. lanuginosus* Clos.

This species was based upon specimens lacking both flowers and fruit. It is represented at Paris by two sheets, evidently parts of a single collection. The label written by Gay reads, “492 Pr. de Coquimbo, *Astragalus* ? *lanuginosus* Clos, Fl. Chil. Cl. Gay, nait sur les collines exposé et sablonneuses des basses cordilleres de hurtado—a la Coipa, haut 1639 m., passé fleur au janvier, tres rare.” If this plant is really a species of *Astragalus* it is one entirely unknown to me. However, I incline towards the opinion that it is an *Adesmia* or some other genus, rather than an *Astragalus*.

Astragalus Philippianus (Kuntze) Hauman, Anal. Soc. Cien. Argentina 86: 281 (1918).

Phaca ? *amoena* Philippi, Linnaea 28: 620 (1857).—In cordillera de la Campana, pro. Santiago, Nov. 1833, *Germain*.

Astragalus amoenus (Phil.) Reiche, Anal. Univ. Chile 97: 569 (1897), and Fl. Chile 2: 112 (1898).—Not Fenzl (1842).

Tragacantha Philippiana Kuntze, Rev. Gen. 2: 941 (1891).—Based upon *P. amoena* Phil.

Astragalus santiagensis Spegazzini, Anal. Mus. Nac. Buenos Aires ser. 2, 4: 265 (1902).—Based upon *P. amoena* Phil.

A spreading silky-strigose perennial with united stipules. The type has flowers but no fruit. Reiche, l.c., has suggested that it may be a form of *A. Germaini*. This may be correct though the description might also apply to a form of *A. Cruckshanksii*.

Astragalus pictus Steudel, Nomencl. ed. 2, 1: 163 (1840).—Based on *A. bicolor* Desf.

Astragalus bicolor Desfontaines, Cat. Hort. Paris, ed. 3, additamenta 473 (1832–33), nomen, from “Chili.”—Not Lam. (1783).

No description has ever been associated with the two names above cited. Desfontaines treats the species as follows, “*bicolor* H. P. Chili, Temp. 24” The name is a nomen nudum and its application wholly obscure.

Astragalus quindecimjugas (Phil.) Reiche, Anal. Univ. Chile 97: 540 (1897), and Fl. Chile 2: 83 (1898).

Phaca quindecimjuga Philippi, Anal. Univ. Chile 21: 443 (1862), and Linnaea 33: 41 (1864).—"Cord. de Doña Ana, prov. Coquimbo, ca. 4000 ft. alt. Volckmann."

Described as a plant with connate stipules, slender sparsely silky ascending stems, glabrescent leaves, oblong-linear 15-jugate (8 mm. long and 4 mm. wide) leaflets, and elongate peduncles. The corolla is said to have the wings very evidently shorter than the keel. Concerning the fruit Philippi says, "El unico fruto que tiene el ejemplar es todavia verde i casi globoso." Reiche describes the fruit as, "Legumbre (en estado maduro desconocida) casi globosa, pelada con varias semillas." Fragments of the type loaned me by Prof. Espinosa show the leaves to be folded, glabrous except for a few appressed hairs along the midrib and about the margin near the apex. The ovary is glabrous and the flower in all details similar to that of *A. palenae*. I believe that *A. quindecimjugus* is based upon a collection from southern Chile and falsely labeled as from the andes of Coquimbo. It probably represents *A. palenae* var. *grandiflorus* Speg.

Astragalus sphaerocarpus Desfontaines, Cat. Hort. Paris ed. 3, additamenta 473 (1832-33), nomen.

This is a garden name which has never been associated with a description. Desfontaines published merely the following concerning it: "*sphaerocarpus* H. P. Chili. Temp. 24."

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Johnston, I. M. 1947. "Astragalus in Argentina, Bolivia and Chile." *Journal of the Arnold Arboretum* 28(4), 375–409. <https://doi.org/10.5962/p.185581>.

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