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CONTRIBUTIONS TOWARD A FLORA OF NEVADA,

NO. 38 //

⁷⁶ X LEGUMINOSAE OF NEVADA,

PART I. - ASTRAGALUS AND OXYTROPIS *

by

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ASTRAGALUS PTEROCARPUS Wats., a rare species endemic to the middle Humboldt Valley. (Collected 10 mi. W of Battle Mountain, Ripley and Barneby 6169.) Drawn by R. C. Barneby.

LEGUMINOSAE OF NEVADA

PART I - ASTRAGALUS AND OXYTROPIS

By R. C. Barneby *

Contributions Toward a Flora of Nevada, No. 38

ASTRAGALUS (Tourn.) L. "Milkvetch; Rattleweed; Locoweed."

Ours annual or perennial, caulescent or acaulescent herbs, the stems arising from a taproot or oblique rhizome, often persisting at base as an aerial or sometimes subterranean caudex; pubescence simple and basifixed, or dolabriform, composed of hairs attached above the base, with an ascending and a shorter descending arm; stipules petiolar-cauline or connate opposite the petiole; leaves imparipinnate, rarely 1- or 3-foliolate, the lateral leaflets sometimes reduced or wanting; inflorescence axillary, racemose or spicate; calyx 5-toothed, naked or bracteolate; corolla papilionaceous, the keel muticous except in one annual; stamens diadelphous, 9 and 1; style glabrous; pod sessile, stipitate, or jointed to a stipe-like gynophore, highly variable in outline, texture and mode of compression, the valves often infolded dorsally to form a double-walled complete or partial septum.

A genus of nearly 2000 herbs and subshrubs, chiefly of Mediterranean and Continental climates in the Northern Hemisphere, at least 400 North American, 100 South American and 1 South African, but most abundant in Asia and the Levant. (Gr., astragalos: ankle-bone or (pl.) dice, early applied to some leguminous plant, and perhaps analogous to Rattleweed, from the rattling of the seeds in an inflated pod).

KEY TO SPECIES

1. Annuals of 3 or 4 months duration, fruiting early, small-flowered, the banner not over 7.5 mm. long (2)
2. Flowers subsessile in ovoid heads; pod very small, ovoid or sub-globose, transversely rugulose, sulcate dorsally, 2-seeded.

75. A. DIDYMOCARPUS

* Wappingers Falls, New York.

2. Flowers loosely but often shortly racemose; pod otherwise, several-seeded (3)
3. Keel and wings of nearly equal length; pod fleshy, becoming leathery, varying from oblong and straight to oblanceolate and strongly hamate-incurved, 2.5-8 mm. diam.; herbage densely white-strigulose. 68. A. MOHAVENSIS
3. Keel shorter than the wings; pod either linear-oblong and about 3 mm. diam., or more or less inflated, the valves in any case thin-textured, papery or membranous (4)
4. Pod linear-oblong, gently incurved, not over 4 mm. diam. (5)
 5. Leaflets of all or of all but the lowermost leaves elliptic and acute or obtusish, never retuse; pod firmly attached to the receptacle, dehiscent on the raceme. Racemes 1-4-flowered, not over 1 cm. long in fruit. 73. A. NUTTALLIANUS
 5. Leaflets of all leaves retuse; pod promptly deciduous when ripe, dehiscent on the ground (6)
 6. Pod resupinate on contorted pedicels; racemes loosely 3-6-flowered, the axis 1-4 cm. long in fruit; pod strigulose with appressed hairs; keel-petals acutely triangular or cuspidate at apex. . 72. A. ACUTIROSTRIS
 6. Pod declined or spreading on arched but not twisted pedicels, hirsutulous with spreading and incurved hairs; racemes 1-4-flowered, not over 1.5 cm. long in fruit; keel obtuse. 74. A. NYENSIS
 4. Pod obliquely ovoid or lunately ellipsoid, inflated or strongly turgid, 5-9 mm. diam. (7)
 7. Herbage and pod villous-hirsutulous. . . 17. A. SABULONUM
 7. Herbage and pod appressed-strigulose. . . 18. A. GEYERI
1. Perennials or, if winter-annual or flowering the first year, or very slender and appearing annual, then the flowers larger, the banner at least 9 mm. long (8)
 8. Leaflets 5-9, linear-elliptic, acute at both ends, all continuous with the rachis, mucronate or spinulose at apex; flowers few, commonly 2, very small and shortly-pedunculate, the banner less than 8 mm. long; prostrate and matted or more erect and bushy-branched, often rigid and spinescent plants. 1. A. KENTROPHYTA
 8. Leaflets either more numerous or jointed to the rachis or, if some leaflets confluent, then the flowers more numerous, longer and long-pedunculate (9)
 9. Material with ripe fruits. KEY (A), page 2.
 9. Material with flowers or immature fruits. . KEY (B), page 11.

KEY (A) BASED ON FRUITS

1. Pod laterally compressed, bicarinate by the sutures, 1-locular or nearly so, the septum, if present, less than 1 mm. wide (2)
2. Pod stipitate (3)

3. Pod erect or incurved-ascending. 25. A. PORRECTUS
3. Pod pendulous (4)
 4. Valves of pod fleshy, becoming leathery; persistent calyx-tube at least 7 mm. long (5)
 5. Pod turgid and laterally dilated, lunate or gently falcate, 5-8 mm. wide, villosulous. 26. A. GIBBSII
 5. Pod strongly flattened laterally, hamately incurved or coiled into a ring, 3-4 mm. wide, thinly strigulose
 27. A. CURVICARPUS
 4. Valves of pod much thinner, papery or papery-membranous; persistent calyx-tube 2-6 mm. long (6)
 6. Pod strictly 1-locular (7)
 7. Pod hamately incurved or coiled through 2 complete circles; stipules all free; W. Humboldt Co., rare.
 28. A. ALVORDENSIS
 7. Pod straight or nearly so; at least the lowest stipules connate opposite the petiole; relatively common from central Nevada northward (8)
 8. Body of pod oblong-elliptic, 6-10 mm. long, usually turning black on drying. 6. A. TENELLUS
 8. Body of pod linear-oblong, 1.7-3 cm. long, straw-colored on drying. 8. A. STENOPHYLLUS
 6. Pod obscurely 2-locular, the papery-membranous valves inflexed as a very narrow septum not over 0.5 mm. wide. High montane in the E. Humboldt Mts., Elko Co.
 63. A. ABORIGINUM
2. Pod sessile (9)
 9. Pod erect and leathery; coarse, large-flowered plants.
 5. A. TOANUS
 9. Pod spreading or pendulous and papery; slender, mostly low plants (10)
 10. Plants leafy at base, flowering stems often naked but sterile leafy shoots then present; upper leaves pinnate, the leaflets sometimes confluent but not reduced in size or number. 10. A. MISER
 10. Plants naked at base, stems all fertile; upper leaves mostly reduced to the naked rachis. . 11. A. CONVALLARIUS
1. Pod terete, dorsoventrally or triquetrously compressed, 1- or 2-locular, if laterally compressed carinate ventrally only and grooved dorsally or, if obscurely 2-carinate then fully 2-locular (11)
 11. Pod clearly and evidently stipitate, or elevated on a stipe-like gynophore and jointed to it, the stipe or gynophore in any case longer than the disc at base of the calyx, longer than wide, and over 1 mm. long, though often concealed by the persistent calyx (if stipe exactly 1 mm. long, the plants keyed under both alternatives (12)
 12. Body of the pod bladdery-inflated, 1-locular, 1-3 cm. diam., the valves papery or papery-membranous, either pendulous or borne on subradical peduncles shorter than the leaves (13)
 13. Pod continuous with stipe, the body balloon-shaped, broad-

- est just below the almost beakless apex. . 9. A. WHITNEYI
13. Pod jointed to stipelike gynophore, ellipsoid, broadest near the middle (14)
14. Plants subacaulescent, the subradical racemes 3-5-flowered, the strigulose pods clustered near the ground and surpassed by the tufted leaves. . . . 54. A. MEGACARPUS
14. Plants caulescent, the axillary racemes 4-10-flowered, the pods pendulous and glabrous. . . . 55. A. OOPHORUS
12. Body of the pod either not inflated or, if so, firm and hardly bladdery, or completely 2-locular (15)
15. Pod jointed to the stout gynophore. . . 56. A. BECKWITHII
15. Pod continuous with the stipe (16)
16. Pod erect and glabrous (17)
17. Pod 1-locular. 29. A. PREUSSII
17. Pod 2-locular or partially so, the septum sometimes narrow but always evident (18)
18. Pod obliquely ovoid or ovoid-acuminate (strongly incurved), inflated and grooved on both sutures; Mt. Rose, Washoe Co. 62. A. BOLANDERI
18. Pod not inflated, narrowly oblong and triquetrous, grooved only dorsally; distribution otherwise (19)
19. Stipe 3.5-7 mm. long, strictly erect in same plane as the body, both parallel and approximate to the raceme-axis; Charleston Mts., Clark Co. 60. A. REMOTUS
19. Stipe 7-15 mm. long, spreading and then incurved-ascending to the perpendicular, body erect but distant from raceme-axis; distribution otherwise. 61. A. EREMITICUS
16. Pod either pendulous or, if ascending (humistrate) or erect, then pubescent (20)
20. Body linear-oblong or -oblanceolate, 2.5-4 cm. long, 3.5-6 mm. diam., dorsoventrally compressed and 1-locular; upper leaves reduced to naked rachis. 14. A. LONCHOCARPUS
20. Body either much shorter, or broader, or 2-locular; leaves all pinnate (21)
21. Pod glabrous or strigulose (or if black-hirsutulous then pendulous) (22)
22. Pod ascending (humistrate), stiffly leathery, 7-10 mm. wide. 36. A. CIBARIUS
22. Pod pendulous, papery, not over 4.5 mm. wide (23)
23. Pod glabrous or strigulose with white hairs; plants of middle altitudes in pinyon-sagebrush zone (24)
24. Pod low-convex dorsally, depressed ventrally and longitudinally grooved on either side of ventral suture. 4. A. BISULCATUS
24. Pod grooved dorsally, acute or low-convex ventrally (25)
25. Pod strigulose; stipe up to 2 mm. long (26)
26. Pod triquetrous, slightly incurved, ven-

tral angle keeled by the suture, lateral faces shallowly concave near the suture; persistent calyx-tube 2.5 mm. long.

71. A. STRATURENSIS

26. Pod obcompressed-triangular, often slightly decurved, ventral and lateral faces low-convex; persistent calyx-tube 3-4.5 mm. long. 66. A. ATRATUS

25. Pod glabrous; stipe 3-4 mm. long.

70. A. TOQUIMANUS

23. Pod strigulose or hirsutulous with black or largely black hairs; plants of montane or sub-alpine elevations in E. Humboldt Mts., Elko Co. (27)

27. Pod flattened dorsally but not sulcate; stems 1.5-4 dm., fruiting racemes 6-17 cm. long.

64. A. OCCIDENTALIS

27. Pod openly grooved dorsally; stems (above ground) 1-15 cm., racemes 1.5-4 cm. long.

65. A. ALPINUS

21. Pod villosulous or hirsute (if at all black-hairy then erect) (28)

28. Pod erect on erect peduncles, subterete and nearly straight, not grooved dorsally.

35. A. MINTHORNIAE

28. Pod pendulous or ascending (in the latter case from weak humistrate peduncles) triquetrous, incurved, and grooved dorsally (29)

29. Racemes 3-9-flowered, fruiting axis 0.5-1.5 cm. long; E. Nevada. 37. A. CHAMAEMENISCUS

29. Racemes 10-35-flowered, axis 2-10 cm. long; W. Nevada. 38. A. MALACUS

11. Pod sessile or nearly so, if at all elevated on either stipe or gynophore this very short and obscure, either not longer than calycine disc, not longer than wide, or not over 1 mm. long (30)

30. Pod bladdery-inflated, broadly ovoid, half-ovoid, ellipsoid or globose, valves papery or papery-membranous (31)

31. Pod 2-locular (32)

32. Plants acaulescent or nearly so, dwarf; true septum produced across about half the pod-cavity to meet a wide flange from ventral suture. . . 20. A. PLATYTROPIS

32. Plants caulescent, septum produced across width of the cavity, ventral flange narrow or none (33)

33. Beak of pod linear-cylindric, resembling a persistent style; summit of Charleston Peak, Clark Co.

22. A. KERNENSIS

33. Beak of pod triangular, triangular-acuminate or ob-conic; range otherwise. 21. A. LENTIGINOSUS

31. Pod 1-locular (34)

34. Pod glabrous. 29. A. PREUSSII

34. Pod strigulose, villosulous or villous (35)
35. Plants acaulescent or nearly so, stems not over 2 cm. long. 16. A. JEJUNUS
35. Plants strongly caulescent (36)
36. Pod of rather firmly papery texture, ovoid or ellipsoid, even when somewhat oblique the sutures both convexly arched, valves strigulose or villosulous with short curly or incurved hairs; S. Nevada (37)
37. Pod villosulous, 1.3-2.5 cm. long; Lincoln Co. 7. A. SILERANUS
37. Pod strigulose, 2.5-4 cm. long; Charleston Mts., Clark Co. 13. A. AEQUALIS
36. Pod papery-membranous, very obliquely half-ovoid-ellipsoid, ventral suture nearly straight or concavely arched, valves villous or hirsute with straight hairs; NW Nevada (38)
38. Stems 1-2.5 cm. long; leaflets 7-13; racemes 3-13-flowered; sagebrush valleys. 15. A. PULSIFERAE
38. Stems 2.5-12 dm. long; leaflets 11-31; racemes densely 10-35-flowered; alkaline flats. 19. A. HORNII
30. Pod not bladdery-inflated, solid or, if somewhat tumid, the valves stiffly papery or leathery (39)
39. Pod sharply 4-angled, carinate by both sutures and also along middle of the valves, all 4 faces low-concave. 31. A. TETRAPTERUS
39. Pod terete or variously compressed, never 4-angled (40)
40. Pod glabrous (41)
41. Pod very strongly obcompressed (shieldlike) and sharply winged all around the middle of the transversely dilated valves, not more than 2 mm. thick although 2.5-4.5 cm. long and 1.3-1.7 cm. wide. 32. A. PTEROCARPUS
41. Pod terete or sulcate along sutures, not winged (42)
42. Leaflets all broad, obovate, oblong or suborbicular, glabrous above (43)
43. Pod 1-locular, no trace of septum. 29. A. PREUSSII
43. Pod 2-locular or partly so, septum, even when quite narrow, always present (44)
44. Septum broad, traversing at least half the cavity, usually more (if of S. Nevada and the septum incomplete, then pod 5-6 mm. diam.) 21. A. LENTIGINOSUS
44. Septum narrow, 1-2.5 mm. wide, traversing much less than half the cavity; pod 10-15 mm. diam., very thickly leathery or woody; S. Nevada. 30. A. PRAELONGUS
42. Leaflets linear or linear-lanceolate, silvery above, greenish below. 34. A. SERENOI
40. Pod pubescent, even if sparsely so (45)

45. Pod very small (6-7 mm. long), 2-locular, included in the calyx or nearly so; petals marcescent, banner and wings pubescent dorsally; densely matted or tufted dwarf plants of Mt. Rose, Washoe Co. . . 58. A. AUSTINAE
45. Pod variable in size but even when as small and bilocular, far exserted; petals (marcescent or not) glabrous (46)
46. Pod at the same time 1-locular and densely hirsute-tomentose or long-hirsute (hairs at least 2 mm. long), woolly, cottony or silky vesture usually concealing the surface, and often the shape, of the valves (47)
47. Vesture of herbage, petioles and peduncles composed of straight, strictly appressed hairs.
46. A. MARIANUS
47. Vesture various, but at least some loosely ascending hairs on petioles (48)
48. Pod 2.5-4 cm. long; rare species of S. Nevada with keel-petals (marcescent except in very mature plants) at least 2 cm. long (49)
49. Strictly acaulescent; keel 3.5-4 cm. long.
52. A. COCCINEUS
49. Shortly caulescent; keel 2.1-2.6 cm. long.
49. A. FUNEREUS
48. Pod 1.5-2.5 cm. long, if up to 3 cm. long then either not of S. Nevada or, if so, then keel not over 1.5 cm. long (50)
50. Herbage silky or silky-tomentose or stiffly hirsute-tomentose with at least some straight and ascending or merely incurved hairs (51)
51. Strictly acaulescent; surface of pod concealed by vesture of short curly mixed with longer spreading hairs. . . . 51. A. NEWBERRYI
51. Usually shortly caulescent; surface of pod not concealed, vesture of long spreading hairs only. 50. A. CALLITHRIX
50. Herbage softly cottony-tomentose or -pannose, exclusively with fine curly entangled hairs. (52)
52. Body of pod (stripped of the vesture) lance-ellipsoid or narrowly ovoid-ellipsoid, tapering into erect or scarcely incurved beak, the whole at least thrice longer than broad.
48. A. UTAHENSIS
52. Body of pod obliquely ovoid or ovoid-ellipsoid, proportionately wider, about twice longer than broad, abruptly contracted into a stiff, strongly incurved beak. 47. A. PURSHII
46. Pod variably pubescent but, if hirsute or tomentose, then either 2-locular or hairs much less than 2 mm. long (53)

53. Vesture of pod villous-hirsute, villosulous, hirsutulous or tomentulose (54)
54. Pod 1-locular (55)
55. 2-5.5 cm. long, 6-16 mm. diam., laterally compressed at both ends, dorsoventrally so at middle, valves leathery; tufted subcaulescent plants. 40. A. TIDESTROMII
55. 1.6-3 cm. long, 5-8 mm. diam., dorsoventrally and triquetrously compressed except in the laterally flattened beak, valves papery; strongly caulescent plants. 24. A. PSEUDIODANTHUS
54. Pod 2-locular (56)
56. Fruiting raceme dense and headlike; pods erect, contiguous and 1 cm. long or less.
76. A. AGRESTIS
56. Fruiting raceme, even though short, quite loose and not headlike; pods over 1 cm. long (57)
57. Pod obliquely ovoid, not more than thrice longer than wide, beak incurved, valves villous-tomentulose. 53. A. THOMPSONAE
57. Pod crescentic, hamate-incurved or straight and narrowly oblong, more than thrice longer than wide (58)
58. Pod straight and terete or nearly so, not grooved dorsally, densely villous or villous-tomentulose. 35. A. MINTHORNIAE
58. Pod gently to strongly incurved and grooved dorsally, rather thinly villous or hirsute (59)
59. Lower stipules conspicuously connate.
57. A. ANDERSONII
59. All stipules free (60)
60. Racemes 10-45-flowered, axis 3-20 cm. long in fruit (61)
61. Pod cuneate at base and long-acuminate distally, commonly arcuate-ascending. 39. A. LAYNEAE
61. Pod cuneately acute at both ends, declined or deflexed. 38. A. MALACUS
53. Vesture of pod strigulose, strictly appressed (62)
62. Dwarf, strictly acaulescent plants; pod laterally compressed-triquetrous, 2-locular; pubescence dolabriform. 67. A. CALYCOSUS
62. Taller and caulescent or, if stemless, the pod 1-locular (63)
63. Pod 4-7 mm. long, laterally compressed-triquetrous, 2-locular. 69. A. LEMMONI
63. Pod, if 2-locular, at least 1 cm. long (64)
64. Pod strictly erect (oblong or linear-oblong), straight, 2-locular (65)
65. Coarse plants, stems 1.5-5.5 dm. long;

stipules connate; vesture dolabriform.

77. A. CANADENSIS

65. Slender wiry plants, stems 5-15 cm. long;
stipules free; vesture basifixed.

59. A. OBSCURUS

64. Pod deflexed, spreading or, if ascending,
either incurved or 1-locular (66)

66. Pod laterally compressed at both ends,
dorsoventrally so at middle; S. Nevada
(67)

67. Leaves villous-tomentulose; hairs basi-
fixed. 40. A. TIDESTROMII

67. Leaves silvery-strigose, hairs dolabri-
form (68)

68. Pod either crescentic or incurved
through nearly a complete ring, most-
ly over 2 cm. long. 41. A. AMPHIOXYS

68. Pod nearly straight below, abruptly
hooked distally, 1.5-2 cm. long.

42. A. MUSIMONUM

66. Pod never laterally compressed at base (69)

69. Stipules connate; vesture of herbage
dolabriform (70)

70. Ventral suture of pod acute and pro-
minent, beak incurved; stems slender
decumbent, 1-4 dm. long, fruiting
peduncles humistrate.

2. A. HUMISTRATUS

70. Ventral suture of straight pod, acute
but depressed and lying in a double
groove; stems 1-20 cm. long, tufted;
peduncles (with us) erect.

3. A. FLAVUS

69. Stipules free (shortly connate in A.
occidentalis); vesture basifixed (71)

71. Pod 1-2.2 cm. long, 2.5-4.5 mm. diam.,
pendulous (72)

72. Leaflets broad, membranous, green
above, paler beneath; montane in E.
Humboldt Mts., Elko Co.

64. A. OCCIDENTALIS

72. Leaflets narrow, mostly linear,
cinereous, not bicolored; sagebrush
zone. 66. A. ATRATUS

71. Pod either at least 2.5 cm. long or
at least 5 mm. diam. (73)

73. Pod subterete and narrowly oblong-
ellipsoid or cylindroid, 1-locular.

12. A. PINONIS

73. Pod either dorsoventrally compressed,
subtriquetrous, or 2-locular (74)

- 74. 2-locular; leaflets densely silvery (75)
- 75. Leaflets 5-11.68. A. MOHAVENSIS
- 75. Leaflets 13-19; var. borreganus of: 21. A. LENTIGINOSUS
- 74. Either 1-locular or, if 2-locular, the leaves green (76)
- 76. Pod 1-locular, no trace of septum (77)
- 77. Strongly incurved or hooked near middle. 23. A. IODANTHUS
- 77. Straight or gently incurved below beak (78)
- 78. Leaflets narrowly oblong-elliptic or linear; stems 1.5-4 dm. long. 33. A. CASEI
- 78. Leaflets broader, or stems almost none (79)
- 79. Leaflets 3 or 5; acaulescent. . . 45. A. UNCIALIS
- 79. Leaflets more numerous (80)
- 80. Stems short, rarely over 1 dm. long and mostly less but, if more, the leaflets silvery-silky above (81)
- 81. Herbage densely silvery-silky.
 - 44. A. ARGOPHYLLUS
- 81. Herbage greenish, thinly strigose.
 - 43. A. TEPHRODES
- 80. Stems well developed, mostly 1-2 dm. long; leaflets glabrous above.
 - 36. A. CIBARIUS
- 76. Pod partly or wholly 2-locular, septum evident even though very narrow (82)
- 82. Septum narrow and incomplete (83)
- 83. Pod nearly straight above slightly incurved base.
 - 36. A. CIBARIUS
- 83. Pod sharply incurved or hooked near middle.
 - 23. A. IODANTHUS
- 82. Septum broad and complete.
 - 21. A. LENTIGINOSUS

KEY (B) BASED, SO FAR AS POSSIBLE, ON CHARACTERS
OF HERBAGE AND FLOWERS.

1. Stipules near base of stems, sometimes all, amplexicaul and connate, their contrapetiolar margins distinctly, even though shortly, united (2)
2. Pubescence of herbage dolabriform (3)
 3. Coarse erect plants, stems arising from horizontal cordlike rhizomes; calyx-tube gibbous behind insertion of pedicel, flowers nodding, disposed in dense oblong heads, banner at least 14 mm. long. 77. A. CANADENSIS
 3. Slender diffuse or tufted plants, stems arising from root-crown or shortly forking caudex; flowers ascending, loosely racemose, calyx subsymmetrical at base, banner not over 13 mm. long (4)
 4. Banner 7-9.5 mm. long; stems prostrate, radiating, forming loose mats; pinyon-juniper zone, 6000 ft. el. upward.
2. A. HUMISTRATUS
 4. Banner 11.5-13 mm. long; stems tufted, ascending, the peduncles erect; badlands, at about 2000 ft. in Nevada.
3. A. FLAVUS
2. Pubescence basifixed (5)
 5. Upper leaves, sometimes all, with lateral leaflets reduced or wanting, the uppermost commonly represented by a naked rachis, this sometimes distally dilated (6)
 6. Slender plants, small-flowered, the ochroleucous, broadly obovate, abruptly recurved banner not more than 11 mm. long. 11. A. CONVALLARIUS
 6. Stout plants, often coarse, larger-flowered, the bright pink-purple, rhombic-oblongate, gently recurved banner 15-20 mm. long. 5. A. TOANUS
 5. Leaves all regularly pinnate, leaflets mostly jointed to, rarely continuous with rachis (7)
 7. Banner and wings pubescent dorsally; dwarf, tufted or matted silvery plants of Mt. Rose, Washoe Co. 58. A. AUSTINAE
 7. Banner and wings glabrous (8)
 8. Flowers erect or nearly so, disposed in dense ovoid heads and subtended by oblong commonly obtuse, herbaceous bracts. 76. A. AGRESTIS
 8. Flowers spreading or nodding, loosely racemose, bracts commonly acute and membranous or membranous-margined (9)
 9. Plants low, often diminutive tufted, subcaulescent, stems of the year 0-2 cm. long, arising from root-crown or caudex at or above soil-level and concealed by imbricated stipules (if with subterranean caudex, as sometimes in A. platytropis on rock-slides above timberline, then herbage densely silky-strigulose) (10)
 10. Leaflets mostly oval or elliptic, obtuse, all jointed; petals of about equal length, 7-9.5 mm. long, the prominent keel appearing truncate.
20. A. PLATYTROPIS

10. Leaflets mostly linear and acute or acutish, the terminal one continuous with the rachis (11)
11. All leaflets confluent with rachis, remote from each other; keel 6-8.5 mm. long, gently incurved to narrowly triangular apex. . . . 10. A. MISER
11. Only terminal leaflet confluent, leaflets all very small and crowded; keel 3.5-4.5 mm. long, blades semicircular, very obtuse. 16. A. JEJUNUS
9. Plants usually taller, distinctly caulescent, with 1-several developed internodes (if apparently acaulescent, the stems partly subterranean and the herbage green) (12)
12. Calyx-tube gibbous dorsally at base, pedicel inserted laterally a trifle above lower end or at right angles to truncate base, flowers nodding (13)
13. Herbage and stems villosulous; flowers large, keel 12-15 mm. long, distinctly shorter than the sigmoidally arched banner. .26. A. GIBBSII
13. Herbage and stems strigulose; flowers much smaller, keel 8-10 mm. long, about equalling or a little longer than the abruptly refracted banner. 4. A. BISULCATUS
12. Calyx-tube not gibbous dorsally, pedicel inserted at base (but often obliquely so); flowers ascending or loosely declined (14)
14. Petals irregularly graduated, banner and prominent keel subequal, wings shorter and narrower than keel; stems slender, weak, arising from slender subterranean caudex-branches; montane in E. Humboldt Mts., Elko Co.
65. A. ALPINUS
14. Petals regularly graduated, wings shorter than banner, longer than keel (15)
15. Lowest stipules broadly ovate or obovate, broader than stem, several-nerved; montane and subalpine in E. Humboldt Mts. (16)
16. Herbage green, very sparsely strigulose, membranous leaflets mostly oval or ovate, obtuse or retuse, paler beneath.
64. A. OCCIDENTALIS
16. Herbage (with us) gray-villous, thicker-textured leaflets elliptic, acute or sub-obtuse, not bicolored. . 63. A. ABORIGINUM
15. Lowest stipules not as above, usually closely investing the stem; if of Elko Co., then of middle elevations (17)
17. Plants densely gray-villous throughout, stems white-tomentose toward base.
57. A. ANDERSONII
17. Plants strigulose or shortly villosulous

(long-villous in *A. pulsiferae*) but stems never tomentose (18)

18. Calyx relatively large, tube 4.5-6.5 mm., teeth 4.5-5.5 mm. long; Mt. Rose, Washoe Co. 62. *A. BOLANDERI*
18. Calyx smaller, tube 1.5-4.5 mm. long (in one rare instance up to 7.5 mm. long, but teeth then 2.5 mm. long or less and not of Mt. Rose) (19)
19. Leaflets broad, suborbicular-obcordate, glabrous or nearly so on both sides; low altitudes in Carson Sink region.
25. *A. PORRECTUS*
19. Leaflets narrower, linear or linear-oblong or, if broader, then villosulous on both sides (20)
20. Plants leafy at base, flowering stems sometimes naked below but short, sterile, leafy shoots present. . . . 10. *A. MISER*
20. Plants leafless at base, stems all fertile and mostly arising from buried root-crown or caudex; no sterile leafy shoots (21)
21. Peduncles disposed in unequal pairs or paired with a short leafy spur; stipules mostly turning black or drying. 6. *A. TENELLUS*
21. Peduncles solitary; stipules not blackening (22)
22. Herbage villous or villosulous; flowers small, banner 6-7.5 mm. long (23)
23. Calyx-tube 2.5-3 mm., teeth 1.5 mm. long; herbage villosulous with incurved hairs; leaflets 11-21; SE. Nevada. . . . 7. *A. SILERANUS*
23. Calyx-tube 1.5-2 mm., teeth 2-3 mm. long; herbage villous with sub-horizontal hairs; leaflets 7-13; NW. Nevada.
15. *A. PULSIFERAE*
22. Herbage mostly strigulose, if loosely so then flowers larger, banner over 13 mm. long (24)
24. Petals ochroleucous or whitish, immaculate; stems tall and erect, 2.5-5.5 dm. long or more; keel 7.5-10 mm. long; plants of middle altitudes, mostly with sagebrush; pod linear-oblong.
8. *A. STENOPHYLLUS*

24. Petals purple or lilac-tinged (but early fading when dried); stems shorter, up to 2.5 dm. long but mostly less; montane except for one var. in extreme N. Nevada but in that case the keel 12-13 mm. long; pod bladdery-inflated, balloon-shaped. . . 9. A. WHITNEYI
1. Stipules all free, lowest ones sometimes amplexicaul or even broader than stem but their contrapetiolar margins never united (25)
25. Pubescence dolabriiform (26)
26. Wing-petals deeply cleft at apex into 2 divaricate lobes; leaflets mostly 1-11, rarely 13. 67. A. CALYCOSUS
26. Wing-petals entire; leaflets mostly 11-19 (27)
27. Calyx-tube cylindric or deeply campanulate, 5-10 mm. long; banner 13-23 mm. long. 41. A. AMPHIOXYS
27. Calyx-tube campanulate, 3.5-4 mm. long; banner 10.5-13 mm. long. 42. A. MUSIMONUM
25. Pubescence basifixed (28)
28. Vesture of herbage and of stems when developed, hirsute, villous, villosulous or tomentose, hairs curly or incumbent or, when straight, spreading at a wide angle, or some of them so (29)
29. Flowers very small, keel less than 8 mm. long (30)
30. Leaves villous with long horizontally spreading hairs; flowers minute, banner less than 8 mm. long; W. Washoe Co. 15. A. PULSIFERAE
30. Leaves villosulous with short curly or incumbent hairs; flowers mostly a little larger but, if minute, then not of Washoe Co. (31)
31. Stems arising from buried root-crown, subterranean for a space of 3-10 cm., freely and divaricately branched above ground, forming fan-shaped sprays; flowers minute, banner 7-8.2 mm. long; rare in N. Humboldt Co. 28. A. ALVORDENSIS
31. Stems arising from root-crown at soil-level, simple or nearly so; flowers a little larger, banner 8-12 mm. long; vars. of: 21. A. LENTIGINOSUS
29. Flowers larger, keel over 8.5 mm., usually at least 10 mm. long (32)
32. Plants acaulescent or quite shortly caulescent tufted, stems, when at all developed, prostrate and shorter than longest raceme and peduncle together (33)
33. Petals scarlet, banner 3.5-4 cm. long. 52. A. COCCINEUS
33. Petals purple, white or yellowish, banner less than 3.5 cm. long (34)
34. Leaflets 19-31; vesture villous-tomentose, composed partly of long, spirally twisted villi up to 1-2 mm. long. 53. A. THOMPSONAE

- 34. Leaflets either not more than 21, or longest hairs much less than 1 mm. long (35)
- 35. Vesture composed of extremely fine curly, entangled hairs, softly cottony or pannose (36)
- 36. Petals of about equal length, keel as long as banner, wings a trifle shorter; Death Valley region. 49. A. FUNEREUS
- 36. Petals strongly graduated (37)
- 37. Plants of NE. to Centr. Nevada, calciphile; flowers bright purple; leaflets broadly obovate, obtuse. 48. A. UTAHENSIS
- 37. Plants widely dispersed over most of Nevada but if in range of A. utahensis, either flowers whitish, or leaflets elliptic and acute. 47. A. PURSHII
- 35. Vesture hirsute to villosulous, longest hairs either straight or simply incurved or, if curly, then quite coarse and not cottony (38)
- 38. Leaflets 3-13; racemes 3-8-flowered; strictly acaulescent plants. 51. A. NEWBERRYI
- 38. Leaflets 11-25, more than 13 in at least some leaves; either the flowers more numerous, or at least 1, even though short, internode developed (39)
- 39. Calyx (ebracteolate) white-hairy; petals bright pink-purple; NE. Nye and Lincoln Cos. (40)
- 40. Leaflets 6-19; immature pod hirsute; Nye Co. 50. A. CALLITHRIX
- 40. Leaflets 19-25; immature pod strigulose; Lincoln Co. 43. A. TEPHRODES
- 39. Calyx (conspicuously bracteolate) black-hairy; petals red-purple or tipped with dull purple; W. Nevada, Clark to Washoe Co. (41)
- 41. Stems arising from below ground, abruptly thickened and branched upon emergence. 39. A. LAYNEAE
- 41. Stems arising from root-crown at soil-level, simple or sometimes spurred (42)
- 42. Flowers at full anthesis declined; leaves coarsely spreading-hirsute; Mineral Co. northward. 38. A. MALACUS
- 42. Flowers at full anthesis ascending; leaves both hirsute and somewhat tomentose; Clark Co. 40. A. TIDESTROMII
- 32. Plants caulescent, stems longer than longest peduncle and raceme together or, if rarely shorter in some plants, erect (43)
- 43. Flowers small, banner 9-10 mm. long (44)
- 44. Petals purple, little graduated, the keel 8.5-9.5 mm. long and nearly as long as banner; flowers loosely racemose; dunes and sandy valleys, local

- in N. Nye Co. 24. A. PSEUDIODANTHUS
44. Petals whitish, strongly graduated, the keel about 7 mm. long; flowers approximate in capitate heads; alkaline flats, Washoe Co. 19. A. HORNII
43. Flowers larger, petals well graduated, banner 12-21 mm. long (45)
45. Calyx-tube gibbous dorsally at base, pedicel inserted laterally a trifle above lower end or at right angles to truncate base, flowers nodding (46)
46. Stems densely villosulous; local in Sierra foothills, W. Ormsby and adjacent Washoe Co.
26. A. GIBBSII
46. Stems loosely strigulose with subappressed or incurved hairs; widespread in N. Nevada.
27. A. CURVICARPUS
45. Calyx-tube not gibbous dorsally, pedicel inserted at base (but often obliquely so); flowers ascending or loosely declined (47)
47. Racemes 5-9-flowered; E.-Centr. Nevada (Lincoln, White Pine and NE. Nye Co.). 37. A. CHAMAEMENISCUS
47. Racemes (at least the most vigorous one on a given plant) 10-45-flowered; W. Nevada (Clark to Washoe Co. and not E. of NW. Nye Co.) (48)
48. Ovary glabrous; var. kennedyi of:
21. A. LENTIGINOSUS
48. Ovary pubescent (49)
49. Stems arising from below ground, abruptly thickened and branched on emergence.
39. A. LAYNEAE
49. Stems arising from root-crown at soil-level, simple or sometimes spurred (50)
50. Flowers ascending; calyx-tube 4.5-5 mm. long, deeply campanulate; Charleston Mts. and vicinity, Clark Co.; var. villosus of:
35. A. MINTHORNIAE
50. Flowers declined; calyx-tube 7-9 mm. long, cylindric; Mineral Co. northward.
38. A. MALACUS
28. Vesture of stems and herbage strigulose, hairs straight and appressed or nearly so, sometimes almost lacking (51)
51. Sparsely leafy, somewhat rushlike plants, upper leaves mostly reduced to naked petiole; extreme E. Nevada.
14. A. LONCHOCARPUS
51. Leaflets present in all leaves, even though sometimes few, or distant, or confluent with rachis (52)
52. Acaulescent or very shortly caulescent, tufted or matted plants, stems shorter than longest peduncle and raceme together, or shorter than the leaves; flowers large, calyx-tube 6-13 mm., banner 16.5-32 mm. long (53)
53. Herbage glabrous or nearly so, green.
54. A. MEGACARPUS

53. Herbage silvery-silky or cinereous, leaflets strigulose at least beneath (54)
54. Leaflets 3 or 5; banner 25-32 mm. long; NE. Nye Co.
45. A. UNCIALIS
54. Leaflets more numerous; banner 17-24 mm. long (55)
55. Racemes 10-25-flowered; herbage greenish-cinereous; S. Clark Co.; a form of: . 43. A. TEPHRODES
55. Racemes 1-9-flowered; herbage silvery; range otherwise (56)
56. Leaflets mostly rhombic-elliptic and acute or acutish, immature pod strigulose; plants of moist soil, mostly of N., rarely S. to Centr., Nevada. 44. A. ARGOPHULLUS
56. Leaflets mostly obovate obtuse or rarely broadly elliptic and acutish; immature pod long-hirsute; dry soil, Lincoln and White Pine Co.
46. A. MARIANUS
52. Caulescent or, if rarely subcaulescent, then flowers much smaller (57)
57. Flowers large, banner 12-26 mm., keel 10-20 mm. long (58)
58. Leaflets linear-elliptic or linear-lanceolate or exactly linear, often remote (59)
59. Calyx-tube campanulate 3.5-4.5 mm. long; banner broadly obovate, occasionally just over 12 mm. long (mostly less); Charleston Mts., Clark Co.
13. A. AEQUALIS
59. Calyx-tube deeply campanulate or cylindric 4.5-8.5 mm. long; banner oblanceolate or rhombic-elliptic, 13.5-26 mm. long; range otherwise (60)
60. Leaflets 3-9, all continuous with the rachis.
32. A. PTEROCARPUS
60. Leaflets either more than 9 or, if not more, then the lateral ones jointed to the rachis (61)
61. Plants of E. Nevada (Elko to Lincoln, rarely W. into N. Nye Co.); leaflets 9-21.
31. A. TETRAPTERUS
61. Plants of W. Nevada (Esmeralda to Washoe, E. to Nye Co., but the leaflets there only 5-11) (62)
62. Leaflets acute. 34. A. SERENOI
62. Leaflets obtuse. 33. A. CASEI
58. Leaflets of a broader type, mostly oblong, oval or suborbicular (63)
63. Calyx-tube gibbous dorsally at base, the pedicel inserted laterally a trifle above the lower end or at right angles to the truncate base, flowers nodding (64)
64. Calyx-tube 7.5-10 mm. long; leaflets pubescent, usually on both sides; N. and Centr. Nevada.
27. A. CURVICARPUS

64. Calyx-tube 4.5-6.5 mm. long; leaflets nearly glabrous; Lincoln (and perhaps Clark) Co. 30. A. PRAELONGUS
63. Calyx-tube not gibbous dorsally, pedicel inserted at base (but often obliquely so); flowers ascending or loosely declined (65)
65. Herbage densely silvery-silky; stems prostrate; calyx-tube at least 9.5 mm. long; caulescent states of: 44. A. ARGOPHYLLUS
65. Herbage green or thinly cinereous, if at all silvery the stems erect; calyx-tube shorter (66)
66. Calyx-tube glabrous (except for a few hairs in sinuses of the teeth) or, if sparsely strigulose then broadly campanulate, 4.5-6 mm. long, 3.5-5.5 mm. diam.; leaflets glabrous on both sides (67)
67. Pod bladdery-inflated, 1-locular, the valves papery. 55. A. OOPHORUS
67. Pod scarcely turgid, the fleshy at length leathery valves inflexed as a narrow partial septum. 56. A. BECKWITHII
66. Calyx-tube pubescent or, if nearly glabrous, much narrower (68)
68. Herbage or at least stems densely and canescently strigulose; low elevations in Clark Co.; var. stramineus and var. borreganus of: 21. A. LENTIGINOSUS
68. Herbage and stems green or thinly cinereous (69)
69. Plants of low altitudes in S. Clark Co. with nearly glabrous foliage and purple flowers (70)
70. Alkaline flats and badlands, not rare; pod oblong-ellipsoid, 1-locular. 29. A. PREUSSII
70. Calcareous hillsides, very rare in Nevada; pod cylindroid, valves inflexed; var. mokiensis of: 21. A. LENTIGINOSUS
69. Plants of Lincoln Co. northward; either flowers cream-colored, or leaflets pubescent on lower side, or of quite different range (71)
71. Stems and peduncles erect or strongly ascending (72)
72. Ovary glabrous; pod long-stipitate, glabrous. 61. A. EREMITICUS
72. Ovary pubescent; pod sessile, pilose. 35. A. MINTHORNIAE
71. Stems prostrate, decumbent or weakly ascending, peduncles incurved-ascending at anthesis, prostrate in fruit (73)

73. Lowest stipules large and broad, ovate or obovate and obtuse; pod oblong-ellipsoid, straight or gently incurved through one-third circle, 1-locular or nearly so. . . . 36. A. CIBARIUS
73. Lower stipules not as above; pod either inflated and completely 2-locular or, if 1-locular or nearly so, then abruptly incurved or hooked toward middle (74)
74. Pod not inflated, triquetrously or dorsoventrally compressed, septum none or very narrow and incomplete. 23. A. IODANTHUS
74. Pod strongly inflated, commonly bladdery, septum broad and complete. 21. A. LENTIGINOSUS
57. Flowers smaller, banner 12 mm. long or less, or, if up to 13.5 mm. long, the keel then less than 10 mm. long (75)
75. Racemes disposed in unequal pairs or paired with a short branchlet or spur in most axils; very slender prostrate plants of moist soil. . . . 69. A. LEMMONI
75. Racemes solitary in axils; plants of dry soil (76)
76. Herbage densely silvery-canescens; petals pink-purple (77)
77. Leaflets 5-11. 68. A. MOHAVENSIS
77. Leaflets 11-19; var. fremontii of: 21. A. LENTIGINOSUS
76. Herbage green or cinereous, if at all silky or silvery the petals ochroleucous (78)
78. Calyx-tube glabrous or nearly so; leaflets glabrous on both sides; Charleston Mts., Clark Co.; var. clokeyanus of: 55. A. OOPHORUS
78. Calyx-tube pubescent; if of Charleston Mts. the leaflets pubescent below (79)
79. Petals bright pink-purple, drying violet, the keel 5-6 mm. long; Lincoln Co. 71. A. STRATURENSIS
79. Petals whitish or ochroleucous sometimes lilac-tinged; keel at least 7 mm. long (80)
80. Leaflets or most of them very narrow, linear or linear-oblongate (81)
81. Wing-petals deeply cleft into 2 divaricate lobes or, if merely emarginate (in Elko Co.), then terminal leaflet of the upper leaves confluent with rachis. 66. A. ATRATUS
81. Wing-petals entire; terminal leaflet jointed (82)
82. Stems low, not more than 1.5 dm. long.

59. A. OBSCURUS
82. Stems taller, 2-6.5 dm. long (83)
83. Ovules 32-42; NE. Nye, Lincoln and White Pine Co. 12. A. PINONIS
83. Ovules 26-32; Charleston Mts., Clark Co. 13. A. AEQUALIS
80. Leaflets of a broader type, oblong-oblongate or broader (84)
84. Lowest stipules broad obtuse and several-nerved; inflorescence black-pilosulous.
35. A. MINTHORNIAE
84. Lowest stipules not as above; inflorescence not more loosely pubescent than the herbage (85)
85. Petals little graduated, keel and banner subequal, the latter 7-10 mm. long (86)
86. Racemes open, over 4 cm. long at full anthesis; ovary glabrous; N. Nye Co.
70. A. TOQUIMANUS
86. Racemes more compact, less than 4 cm. long; ovary strigulose; widespread in N. Nevada. 59. A. OBSCURUS
85. Petals evidently graduated, keel shorter than the banner (87)
87. Plants of Spring and Charleston Mts., Clark Co. (88)
88. Stems erect, 1.5-4 dm. long; racemes lax and open, axis over 3 cm. long at full anthesis; foothills below 6000 ft. 60. A. REMOTUS
88. Stems diffuse, less than 1.5 dm. long; racemes short and compact, axis not over 1.5 cm. long; summit of Charleston Peak, 10,000-10,500 ft. 22. A. KERNENSIS
87. Range otherwise; small-flowered forms of A. LENTIGINOSUS and A. IODANTHUS; cf. dichotomy 74/74.

1. A. KENTROPHYTA Gray, Proc. Philad. Acad. 1863: 60. 1863.

Prostrate and densely matted or more erect and bushy-branched perennials, strigulose with appressed or incurved hairs; stipules 2-7 mm. long, amplexicaul and connate into a subtruncate or bidentate sheath, the upper ones often with lanceolate spreading blades; leaves 2-20 mm. long, with (3-) 5-9 linear-elliptic crowded leaflets 1-15 mm. long, all confluent with the rachis, the strong midrib running out at apex as a mucro or spinule; peduncles 1-15 (-30) mm. long, nearly always shorter than the leaves, often shorter than

the stipules; racemes loosely about 2-flowered; calyx 2-4 mm. long, the subulate or aristiform teeth 0.5-2.5 mm. long; petals lilac or whitish, the strongly recurved banner 4-7.5 mm. long; pod spreading or declined, sessile, ellipsoid, oblong-ellipsoid or ovoid-acuminate, less than 1 cm. long, at first laterally compressed, becoming turgid in age, the papery valves strigulose, not inflexed.

A polymorphic species of the Rocky Mts., Great Basin and N. Great Plains, represented in Nevada by 3 var.:

1. Hairs of relatively flaccid herbage, basifixed, often loose; petals commonly purplish, banner broadly obovate, obcordate or suborbicular; pod subsymmetrically ellipsoid or oblong-ellipsoid, broadest near middle, beakless or nearly so, 4-8 mm. long; ovules (in Nevada) 5-8; prostrate matted, montane or subalpine plants.

1 a. var. IMPLEXUS

1. Hairs of stiffer, commonly spinescent herbage largely or wholly dolabriform, dense; petals whitish with faintly maculate keel, banner oblanceolate to narrowly obovate; pod ovoid- or lance-acuminate, broadest below middle, gently incurved into lanceolate beak; ovules 2-4; lowland plants (2)
2. Dwarf, prostrate densely matted or pulvinate plants; internodes rarely surpassing the stipules, commonly concealed by them. 1 b var. UNGULATUS
2. Taller, erect or diffuse plants with rigid herbaceous stems up to 2-4.5 dm. long, at least some internodes developed and 1-5 cm. long, often surpassing leaves. . . . 1 c var. ELATUS

1 a. var. IMPLEXUS (Canby) Barneby, Leaflet West. Bot. 6: 154. 1951. Dry rocky slopes and knolls above timberline, descending on rock-slides and in open places into the forest and rarely the sagebrush belt, in Nevada between 10,000 and 12,000 ft., Centr. Colorado to Montana, NE. Oregon and E. California, known with us from the Ruby and East Humboldt Mts., Elko Co.; Spruce Mt. and Snake Range, White Pine Co.; Toiyabe and Toiyabe Ranges, Nye Co.; to be expected in the White Mts., Esmeralda Co. (known from immediately adjacent Calif.). Including A. tegetarius Wats. (Bot. King 76. 1871), the type from the East Humboldt Mts. (Watson 286).

1 b. var. UNGULATUS Jones, Proc. Calif. Acad. Sci. II, 5: 650. 1895. Calcareous gravel or clay knolls, locally plentiful in scattered stations in the higher valleys of Centr. and NE. Nevada, 5800-7200 ft. (Elko, Eureka, Lander, White Pine and N. Nye Cos.), the type from Monitor Valley (Watson 290).

1 c. var. ELATUS Wats., Bot. King 77. 1871 (A. impensus (Sheld.) Woot. & St.) Clay knolls, gullied bluffs and talus-slopes, on sedimentary formations, especially sandstone, common in the Colorado Basin above Grand Canyon, 5000-8000 ft., NW. New Mexico and adjacent Colorado and Arizona and extending across Utah into extreme E. Nevada (Elko and Lincoln Cos.), the type (Watson 291) from

Holmes Creek Valley, Elko Co.

2. A. HUMISTRATUS Gray var. SONORAE (Gray) Jones, Contrib. West. Bot. 10: 58. 1902.

Slender, prostrate or decumbent, loosely matted perennial, densely strigose or appressed-pilose with dolabriform hairs, the herbage canescent or silvery-silky; stems 1-4 (-6) dm. long, branched below; stipules scarious connate into an amplexicaul sheath, the lowest short, the upper ones up to 8 mm. long, with lanceolate free blades; leaves 1-7 cm. long, with 11-17 oblong-elliptic or oblanceolate, mostly acute leaflets 5-17 mm. long; peduncles about equalling the leaves; racemes 7-17-flowered, the axis 1.5-9 cm. long in fruit; calyx-tube campanulate 3-3.5 mm., the teeth 2-3 (-4) mm. long; petals greenish-white or cream-colored, often veined or suffused with dull lilac, the banner 7-9.5 mm., the keel 6-8 mm. long; pod ascending sessile obliquely ovoid, obovoid or oblong-ellipsoid, 8-15 mm. long, 4-5 mm. diam., obcompressed in the lower half or third, either lunately incurved or only the laterally compressed deltoid to lance-acuminate beak incurved beyond the straight body, the ventral suture acute and prominent, the stiffly papery often purple-mottled valves strigulose, not inflexed.

Dry gravelly or sandy hillsides, with us confined to limestone areas in juniper-pinyon forests, 6200-7000 ft., widespread in Arizona and adjacent New Mexico and N. Sonora, extending more rarely through SW. Utah to Lincoln and White Pine Cos. and disjunctly to the Charleston Mts., Clark Co., Nevada.

3. A. FLAVUS Nutt. var. CANDIGANS Gray, Proc. Amer. Acad. 12: 54. 1876. (A. confertiflorus Gray).

Low malodorous (selenium-scented) perennial, caulescent but sometimes shortly so, densely strigulose with dolabriform hairs, the herbage cinereous or sometimes greenish, the leaflets often glabrous or glabrescent above; stems erect or ascending, loosely tufted, 1-20 cm. long; stipules scarious pallid 3-10 mm. long, amplexicaul and connate through half their length or more; leaves 3-13 cm. long, with 11-19 linear or linear-oblong obtuse leaflets 6-20 mm. long; peduncles erect 6-15 cm. long; racemes 10-30-flowered, rather dense at early anthesis, the flowers ascending, the axis elongating, 2-12 cm. long in fruit; calyx-tube campanulate 3-3.5 mm., the teeth about 2 mm. long; petals whitish, tinged with pale lavender, the banner 11.5-13 mm., the keel 6.5-8 mm. long; pod erect sessile, oblong- or ovoid-ellipsoid, 7-13 mm. long, 3.5-5 mm. diam., straight or nearly so, obtuse at base, cuspidate at apex, dorsoventrally compressed with flattened or shallowly grooved dorsal face, the thick ventral suture depressed and lying in a double groove, the somewhat fleshy valves becoming leathery, densely strigulose, not inflexed.

Barren clay flats and gullied bluffs or knolls, locally abundant in scattered stations in Centr. and SW. Utah, N. Arizona and entering Nevada in E. Clark Co. at about 2000 ft. The flowers in the Nevada station (near Crystal) agreeably fragrant.

4. *A. BISULCATUS* (Hook.) Gray var. *NEVADENSIS* (Jones) Barneby, Leaf1. West. Bot. 7: 195. 1954.

Diffuse or ascending malodorous (selenium-scented) caulescent perennial, more or less strigulose, the herbage green or cinereous, the leaflets glabrous above; stems numerous, 1.5-3 dm. long, stipules membranous, 1.5-6 mm. long, the lowest ones amplexicaul and connate into a sheath (sometimes ruptured in age by the expanding stem), the upper ones progressively less strongly connate, the uppermost often free; leaves 4-9 cm. long, with 11-19 mostly obovate-oblong or elliptic obtuse (or in some lower leaves emarginate) leaflets, 7-21 mm. long; peduncles ascending 3-7.5 cm. long; racemes (15-) 25-45-flowered, dense at early anthesis, becoming looser and narrowly cylindric in age, the flowers nodding, the axis 4-20 cm. long in fruit; calyx-tube campanulate about 3 mm., the teeth 1-1.5 mm. long; petals dull straw-colored, the banner 6.5-9 mm. long abruptly reflexed through about 130°, the wings and lilac-tipped keel slightly longer, the latter 8-10 mm. long; pod pendulous stipitate, the stipe 3-4 mm. long, the narrowly ellipsoid body 8-12 mm. long, 2.5-4 mm. diam., a little decurved, obcompressed, the dorsal face low-convex, the ventral one excavated on both sides of the prominent suture as two longitudinal grooves, the thinly leathery valves reticulate but hardly rugulose, not inflexed.

Alkaline sinks, barren knolls and gullied hillsides, in stiff red or white clays derived from limestone, with pinyon, juniper and sagebrush, 5000-7400 ft., locally plentiful in scattered stations in the higher valleys and foothills of E.-Centr. Nevada (White Pine, N. Eureka and NE. Nye Cos.) the type (of *A. haydenianus* var. *nevadensis* Jones, Zoe 2: 241. 1891), from Palisade, Eureka Co. (Jones in 1882). Including *A. jepsoni* Sheld. (Minn. Bot. Stud. 1: 22. 1894; *A. demissus* Greene, not Bss. & Heldr.), the type from the valley of the Humboldt River near Palisade (Greene in 1893).

5. *A. TOANUS* Jones, Zoe 3: 296. 1893.

Coarse malodorous (selenium-scented) sparsely leafy and junceous caulescent perennial, strigulose nearly throughout, the young growth canescent, the herbage becoming greenish or occasionally green and nearly glabrous; stems 2.5-5 dm. long, erect and ascending to form bushy clumps, simple or paniculately branched above the middle; stipules 1.5-6.5 mm. long, dimorphic, the lowest amplexicaul and connate into a papery truncate or bidentate sheath, the upper ones smaller, herbaceous, free; leaves 2.5-10 cm. long, the lower ones usually bearing 1-4 (-6) pairs of distant, linear-filiform or -oblong decurrent leaflets, 3-30 mm. long, the terminal one

represented by a linear production of the rachis, the upper leaves, sometimes all, reduced to a naked phyllode; peduncles stout, erect, 6-25 cm. long; racemes loosely 7-35-flowered, the flowers ascending, the axis 3-30 cm. long in fruit; calyx-tube campanulate or subcylindric 4-6 mm., the teeth 0.5-2 mm. long; petals pink-purple with white wing-tips, the gently recurved banner 15-20 mm., the keel 10.5-13.5 mm. long; pod erect or ascending, sessile, narrowly oblong or oblong-ellipsoid, 1.3-2.5 cm. long, 2.3-6 (-7) mm. diam., straight or a trifle incurved, obtuse at base, cuspidate at apex, somewhat laterally compressed and bicarinate by the prominent cord-like sutures, the lateral faces convex, the fleshy at length leathery or almost woody valves glabrous or rarely strigulose, not inflexed.

Barren calcareous clay banks, sandy clay or shale bluffs and knolls, sometimes on gumbo-flats with greasewood and shadscale, local but forming colonies. NE. and Centr. Nevada (Elko, White Pine, S. Eureka and NE. Nye Cos.) and very locally W. along the Humboldt River to the West Humboldt Mts. (Pershing Co.) and the lower Walker River (Lyon Co.); NE. Utah and SW. Idaho, the type from the Toano Range, Elko Co. (Jones in 1891). Including A. campylophyllus Greene (Pittonia 3: 195. 1897), the type from near Humboldt House, Pershing Co. (Greene).

6. A. TENELLUS Pursh, Fl. Amer. Sept. 2: 473. 1814.

Slender caulescent perennial, the stems arising from a partly buried caudex, sparsely strigulose with loosely appressed hairs, the herbage green, the leaflets glabrous above; stems erect or ascending, 2-3.5 dm. long, simple and naked below, branched upward, the branches again branched or spurred at most axils and the branchlets commonly paired with a peduncle, or the peduncles from the uppermost axils disposed in unequal pairs; stipules 2-6 mm. long, all amplexicaul and connate, the lower ones (becoming dark brown or black in age) into a bidentate sheath, the rest more shortly so, with triangular free blades; leaves 3-8 cm. long, the upper ones sessile, with 13-21 linear-oblongate or narrowly oblong-oval truncate to sharply acute leaflets, 4-22 mm. long; peduncles slender or subfiliform, 0.5-2.5 cm. long; racemes loosely, sometimes remotely, 3-15-flowered, the flowers ascending and then declined, the axis 1.5-11 cm. long in fruit; calyx-tube campanulate, 2-2.5 mm., the teeth 1-1.5 mm. long; petals whitish, the gently recurved banner 6-7.5 mm., the keel 4.5-5 mm. long; pod pendulous stipitate, the stipe 1-2.5 mm. long, the body oblong-elliptic in outline, 6-10 mm. long, 3.5-5 mm. wide, strongly flattened laterally, the papery reticulate, pale green valves becoming lustrous brown or black when ripe, strigulose or rarely glabrous, not inflexed.

A widely dispersed and variable species of middle altitudes in the Rocky Mts. and N. Great Plains, from N. New Mexico to Yukon, extending infrequently W. across the Great Basin to NE. and Centr.

Nevada (Elko, White Pine, Eureka, S. Lander and N. Nye Cos.) and SW. Idaho, 6300-10,500 ft. The Nevada plants, as described above, are uniformly small-flowered and the pod is commonly, though not invariably strigulose. The form or race with pubescent pod may be called *A. tenellus* fma. *strigulosus* (Rydb.) Macbr. (Contrib. Gray Herb. 65: 34. 1922), or *A. tenellus* var. *strigulosus* (Rydb.) F. J. Hermann (Jour. Wash. Acad. Sci. 38: 237. 1948), the type (of *Homolobus strigulosus* Rydb. Bull. Torr. Club 34: 420. 1907) from the East Humboldt Mts., Elko Co. (Watson 283), but its status is undetermined, and a strigulose pod, usually combined with slightly larger flowers, occurs sporadically in Colorado and elsewhere.

7. *A. SILERANUS* Jones, Zoe 2: 242. 1891.

Slender caulescent perennial, the stems 1.5-3.5 dm. long, arising from deeply buried root-crowns, subterranean and leafless for a space of 3-15 cm., diffusely branched above ground, the herbage cinereous with short incurved hairs, the leaflets bicolored, pubescent but brighter green above; stipules 2-4 mm. long, the lower ones amplexicaul and connate into a campanulate scarious sheath, the upper ones herbaceous, shortly or obscurely connate; leaves 2-7 cm. long, with 11-21 oblong or oblong-obovate retuse leaflets 3-14 mm. long; peduncles 2-7 cm. long; racemes at first rather densely 10-30-flowered, the flowers spreading or subhorizontal, the axis somewhat elongating, 1.5-7 cm. long in fruit; calyx-tube campanulate 2.5-3 mm., the teeth 1.5 mm. long; petals ochroleucous, tinged with dull lilac, the banner 6-7.5 mm., the keel about 5.5 mm. long; pod spreading or declined, sessile, broadly obovoid or obliquely ellipsoid, strongly inflated but rather firm, 1.3-2.5 cm. long, 7-12 mm. diam., obconic or obconic-attenuate at base into a short hollow stipelike neck, shallowly sulcate on both sutures, the papery opaque, finely villosulous, brightly mottled valves not inflexed.

Gullied knolls, in sandy soils, sometimes among sagebrush, locally plentiful at 5500 ft. in the valley of the upper Muddy River, Lincoln Co. Our plants, as described above, perhaps representing a distinct race or variety of the species, typically prostrate, slightly larger-flowered, and found in yellow pine-forests between 6000 and 9000 ft. on the plateaux of S. Utah and N. Arizona.

8. *A. STENOPHYLLUS* T. & G. Fl. N. Amer. 1: 329. 1838 (*A. filipes* of Nevada references).

Robust or quite slender, commonly tall and sparsely leafy caulescent perennial, variable in vesture, the herbage glabrous or cinereous-strigulose with short appressed hairs; stems usually numerous, erect or ascending in well-furnished clumps, 2.5-5.5 (-9) dm. long, simple or paniculately branched; stipules dimorphic, the lowest 2-5 mm. long, amplexicaul and connate into a bidentate sheath, the upper ones shorter, free or nearly so; leaves 2.5-10 cm. long,

with 9-19 mostly linear or linear-oblong obtuse or retuse leaflets 2-25 mm. long; peduncles erect, 6-22 cm. long; racemes projected well beyond the foliage, loosely 10-28-flowered, the flowers horizontal or declined, the axis 3-13 cm. long in fruit; calyx-tube campanulate, 3.5-5.5 mm., the teeth 0.5-1.5 mm. long; petals cream-colored, the rather abruptly recurved banner 11-14.5 mm., the keel 7.5-10 mm. long; pod pendulous stipitate, the filiform puberulent stipe 9-16 mm. long, the body linear-oblong or -elliptic in outline, 1.7-3 cm. long, 3.5-6.5 mm. diam., straight or a little arched downward, strongly compressed laterally and bicarinate by the filiform sutures, the faces flat or low-convex, the papery glabrous or exceptionally puberulent valves not inflexed.

Dry hillsides, plains and valley-floors, commonly on basalt but occasional on other substrate, nearly always among sagebrush, widespread, common and abundant locally over most of the northern half of Nevada (but extending little S. of the Humboldt River drainage), to NE. Calif., cismontane Oregon and Centr. Idaho; disjunctly in the Mts. of S. California and N. Baja California; a closely related var. in the Columbia Basin.

9. A. WHITNEYI Gray, Proc. Amer. Acad. 6: 526. 1864.

Caulescent perennials, variable in stature, nearly glabrous to densely strigulose or hirsutulous, the herbage green, cinereous or silky; stems erect or decumbent, arising from a usually buried caudex, 0.3-2.5 dm. long; stipules dimorphic, the lowest ones connate into a scarious truncate sheath 2-4 mm. long, the upper ones free or nearly so; leaves 3-8 cm. long, with 11-19 linear-elliptic to oblanceolate or oblong obtuse or acute leaflets 3-20 mm. long; peduncles 2-10 cm. long; racemes loosely 4-15-flowered, the flowers spreading or at length declined, the axis 1-4 cm. long in fruit; pod pendulous stipitate, the stipe 2-5 mm. long, the bladdery-inflated body balloon-shaped, broadest just below the obtuse apex, scarcely oblique, 1.5-6 cm. long, the papery-membranous, mottled valves not inflexed.

A widely dispersed species of the Sierra Nevada and North Coast Ranges in California, SW. Oregon and the N. Great Basin, represented in Nevada by 2 vars.:

1. Herbage more or less strigulose with appressed hairs; calyx-tube campanulate, 3.5-4.5 mm., the teeth 0.5-1.5 mm. long; banner 9.5-15 mm., keel 7.5-12 mm. long; body of the pod 1.5-3 cm. long, glabrous; montane and subalpine. 9 a. var. WHITNEYI
1. Herbage canescent with loosely incumbent hairs; calyx-tube more deeply campanulate or subcylindric, 5.5-7.5 mm., the teeth 1.5-2.5 mm. long; banner 14-16 mm., the keel 12-13 mm. long; body of the pod 2.5-6 cm. long, strigulose; foothills. 9 b. var. CONFUSUS

9 a. var. WHITNEYI

Dry gravelly crests and mountain slopes, 8000-11,400 ft. in Nevada, common and locally abundant in the Sierra Nevada, California, southward from Lake Tahoe, and extending in scattered stations into the Mts. of N. and W.-Centr. Nevada (White Mts., Mineral and probably Esmeralda Cos.; Wassuk Range, Mineral Co.; West Humboldt Mts., Pershing Co.; Santa Rosa Mts., Humboldt Co.). Including Phaca argentata Rydb. (N. Amer. Fl. 24: 340. 1929), the type from Star Peak, Pershing Co. (Heller 10633).

9 b. var. CONFUSUS Barneby, El Aliso 2: 206. 1950 (A. Hookerianus of Nevada references).

Dry hillsides, commonly among sagebrush, 4500-7000 ft., uncommon though locally plentiful in scattered areas, NE. California and adjacent Oregon to SW. Idaho and entering Nevada in N. Elko Co. (Burnt Timber Mts.); to be expected in N. Washoe and perhaps N. Humboldt Co.

10. A. MISER Dougl. ex Hook., Fl. Bor.-Amer. 1: 153. 1831.

Low slender tufted or diffuse perennials, sparsely to densely strigulose-pilosulous with mostly straight hairs, the herbage green, cinereous or silvery; stems 2-20 cm. long; stipules 1.5-9 mm. long, mostly papery-membranous, amplexicaul and connate into a bidentate sheath, the upper ones sometimes nearly free; leaves 4-20 cm. long, with 5-19 linear, linear-oblong or elliptic to broadly oblong or oval-elliptic, mostly acute leaflets 5-30 mm. long, either continuous with or jointed to the rachis; peduncles 2-13 cm. long, about equalling the leaves; racemes loosely 3-12 (-25) -flowered, the flowers ascending or declined, the axis 1.5-10 cm. long in fruit; petals whitish or suffused with lilac, the banner 6.5-9.5 mm., the keel 6-8.5 mm. long, the latter narrowly triangular or lance-acuminate and purple-maculate at apex; calyx-tube campanulate, 2-3 mm., the teeth 1-2.5 mm. long; pod linear or narrowly oblanceolate, straight or obscurely sigmoidally arched, laterally compressed and bicarinate by the sutures, the papery valves strigulose with white or some black hairs, not inflexed.

A polymorphic complex of Cordilleran and Great Basin races extending from Colorado to S. Dakota, British Columbia and interior Washington, represented in extreme E. Nevada by 2 vars., both with basifixed vestiture and pubescent pod:

1. Leaflets mostly elliptic, lanceolate or ovate, glabrous or nearly so above; pod oblanceolate, widest just below middle and gradually tapering downward into calyx; ovules 13-19.

10 a. var. OBLONGIFOLIUS

1. Leaflets narrowly linear, almost acerose, silvery on both faces; pod exactly linear; ovules 9-12 (-13). . . 10 b. var. TENUIFOLIUS

10 a. var. *OBLONGIFOLIUS* (Rydb.) Cronq., Leafl. West. Bot. 7: 18. 1953.

Dry hillsides among sagebrush, ascending into aspen-groves and open coniferous forest, 6000-10,300 ft. in Nevada, very common in Rocky Mts. of Colorado and S. Wyoming, extending in scattered stations across the Colorado Basin to the Schell Creek and Egan Ranges, White Pine Co., Nevada. Including *Homalobus hitchcockii* Rydb. (N. Amer. Fl. 24: 271. 1929), the type from Duck Creek, near Ely, White Pine Co. (*Hitchcock* 1344).

10 b. var. *TENUIFOLIUS* (Nutt.) Barneby, Leafl. West. Bot. 7: 195. 1954 (*A. decumbens* of Nevada references).

Dry hillsides among sagebrush, 6500-7800 ft. in Nevada, common on the Bear-Green River divide in SW. Wyoming and extending SW. in scattered stations through SE. Idaho and adjacent Utah into extreme E. Nevada (Goose Creek Mts., Elko Co.; Rocky Mt., N. White Pine Co.), apparently rare with us.

11. *A. CONVALLARIUS* Greene, *Erythraea* 1: 207. 1893 (*A. diversifolius* of Nevada references).

Slender, wiry, sparsely leafy or apparently almost leafless and rushlike caulescent perennials, densely to sparsely strigulose, the stems and herbage greenish-cinereous or canescent, the leaflets sometimes glabrous above; stems few, 2-5 dm. long, erect or ascending, naked and shortly subterranean at base, branched or spurred upward; stipules dimorphic, the lower ones 1-4 mm. long, connate into a low amplexicaul collarlike or campanulate sheath, the upper ones either free or shortly connate; leaves 2-11 cm. long, the leaflets of the upper leaves, sometimes of all, much reduced or wanting, when present 1-5 pairs, linear or linear-elliptic 2-25 mm. long, the terminal one represented by a filiform or slightly enlarged and hooked phyllodium; peduncles about equalling the leaves; racemes loosely 3-10-flowered, the flowers ascending and then declined, the axis 2-18 cm. long in fruit; calyx-tube campanulate, 3.5-5 mm., the teeth 0.5-1.5 mm. long; petals ochroleucous, often suffused or veined with dull lilac, all strongly incurved, the banner 8-11 mm., the keel 8-9.5 mm. long; pod pendulous or loosely spreading, sessile, linear, linear-oblong or -attenuate, or narrowly oblong, 1.3-5 cm. long, straight or nearly so, laterally compressed and bicarinate by the sutures, the papery valves strigulose, not inflexed.

A variable species, comprising several geographic races, most abundant in the Colorado Basin, represented in Nevada by 2 vars.:

1. Pod elongate, linear or linear-lanceolate, 2.5-5 cm. long and 2.5-3.3 mm. wide, 8-18 times longer than its greatest diameter; NE. Nevada. 11 a. var. *CONVALLARIUS*
1. Pod shorter, narrowly oblong, 1.3-2.4 cm. long, 3.5-4 mm. wide,

4-6 times as long as its diameter. . . . 11 b. var. FINITIMUS

11 a. var CONVALLARIUS (A. diversifolius of Nevada references).

Hillsides, bluffs and valley-floors, in dry sandy clay or loamy soils, commonly on sedimentary formations, 4150-7700 ft., widespread from Centr. Utah to W. Wyoming, the head of the Missouri in SW. Montana, W. into SE. Idaho and NE. Nevada (Elko and Eureka Cos.)

11 b. var. FINITIMUS Barneby, Leaf1. West. Bot. 7: 192. 1954.

Gravelly and sandy clay hillsides, with sagebrush, juniper and pinyon, 6100-6400 ft., locally plentiful in the foothills of the Highland Range, Lincoln Co., Nevada, and of the Pine Valley Mts., adjacent Utah.

Note. A. diversifolius Gray, often confused with the preceding but distinguished by its very slender prostrate stems, usually thin and dilated leaflets, and short pod, similar to that of var. finitimus above, has been collected in extreme E. Tooele Co., Utah, not far from the Nevada line, and is to be expected in low moist alkaline valleys or creek-banks in Elko and White Pine Cos.

12. A. PINONIS Jones, Contrib. West. Bot. 8: 14. 1898.

Slender, sparsely leafy perennial, strigulose nearly throughout, the herbage greenish or cinereous; stems few, naked below, simple or few-branched toward the middle, 2-4 dm. long; stipules somewhat dimorphic, the lowest ones ovate obtuse, purplish, decurrent-amplexicaul but not connate, 2.5-5 mm. long, the upper ones narrower or smaller, triangular; leaves 2-8 cm. long, with 9-15 (-19) linear or linear-oblong-ovate leaflets, 5-16 mm. long; peduncles incurved-ascending, 3-8 cm. long; racemes loosely 5-19-flowered, the axis 2-7 cm. long in fruit; calyx-tube campanulate 2.5-4 mm., the teeth 1-2 mm. long; petals greenish-white or cream-colored, tinged with dull purple, the abruptly recurved banner 8-10 mm., the keel 7.5-9 mm. long; narrowly triangular at apex; pod spreading or loosely pendulous, sessile or nearly so, narrowly oblong-ellipsoid, 2-3.5 cm. long, 5.5-8.5 mm. diam., straight or a trifle incurved, subterete but obtusely carinate by the thick sutures, the stiffly papery, densely strigulose valves not inflexed.

Hillsides, valleys and stony banks, nearly always sheltering under and scrambling up through sagebrush, occasionally in open ground among junipers and pinyons, mostly on limestone, 5200-7400 ft., scattered and rather rare, Egan, White Pine, Quinn Canyon, Highland and neighboring ranges in White Pine, Nye and Lincoln Cos., Nevada; somewhat isolated in E.-Centr. Utah and in NW. Arizona.

13. A. AEQUALIS Clokey, Madrono 6: 215. 1942.

Closely resembling and related to the last; calyx sometimes larger, the tube 3.5-4.5 mm., the teeth 2-2.5 mm. long; banner 11.5-12 mm., the keel 9-10.5 mm. long; pod spreading, obscurely stipitate, the stipe 0.7-1.5 mm. long, concealed by the calyx, the body broadly and subsymmetrically ellipsoid, ovoid or obovoid-ellipsoid, bladdery-inflated, 2.5-4 cm. long, 1.2-2 cm. diam., terete or a trifle dorsoventrally compressed and then shallowly sulcate ventrally, the stiffly papery valves strigulose, not inflexed.

Calcareous gravel flats and open ridges, often sheltering under low sagebrush, with pinyon and mountain-mahogany and ascending rarely into the lower edge of the yellow pine-forest, 6800-8200 ft., known only from the E. slope of Charleston Peak, Clark Co., the type from Harris Springs road (Clokey 7572).

14. A. LONCHOCARPUS Torr., Pac. R. R. Rep. 4: 80. 1857.

Tall, usually coarse, sparsely leafy perennial, the stems arising from a buried root-crown, finely strigulose, the herbage greenish or gray-silky; stems numerous, erect and ascending, 3.5-6 dm. long, forming low bushy or taller broomlike tufts, repeatedly branched or spurred nearly from the naked base; stipules 1.5-9 mm. long, the lowest largest obtuse, the upper ones narrower and acutish, all more or less decurrent but not connate; leaves 4-10 cm. long, the lower ones with 3-9 distant linear or linear-oblong leaflets, 2-25 mm. long, the terminal one continuous with the rachis and often elongate, the upper leaves commonly reduced to the naked rachis, terminating in a slightly dilated phyllodium; peduncles 9-22 cm. long; racemes loosely 15-35-flowered, the axis 5-20 cm. long in fruit; calyx-tube cylindric or deeply campanulate, 6-8 mm., the teeth 1-2 mm. long; petals cream-colored or whitish, the gently recurved banner 13.5-19.5 mm., the keel 10.5-14 mm. long; pod pendulous stipitate, the stipe 5-12 mm. long, the body linear-oblong-elliptic or -oblong in outline, 2.5-4.5 cm. long, 3.5-6 mm. diam., straight or a little decurved, strongly obcompressed, the stiffly papery glabrous or rarely puberulent valves not inflexed.

Gullied bluffs, clay knolls and open sandy or gravelly hillsides among pinyon and juniper, commonly on sandstone, 4900-7800 ft., widespread and locally plentiful in the Colorado Basin in S. Utah, adjacent Colorado, New Mexico and extreme N. Arizona, extending in scattered stations W. across the Sevier and Salt Lake deserts into extreme E. Elko and Lincoln Cos., Nevada; also E. to the upper Rio Grande and Arkansas rivers in New Mexico and S. Colorado.

15. A. PULSIFERAE Gray, Proc. Amer. Acad. 10: 69. 1874.

Delicate, diffuse or prostrate perennial, densely gray-villous with horizontal or widely ascending hairs; stems 1-2.5 dm. long,

arising from a buried root-crown, simple and subterranean for a space of 2-7 cm., divaricately branched upward, forming loose mats; stipules 1-4.5 mm. long, the lowest either free or connate into a cuplike sheath; leaves 1-4.5 cm. long, with 7-13 crowded, oblanceolate or obovate-cuneate obtuse or retuse leaflets 2-12 mm. long; peduncles very slender, 0.5-2.5 cm. long; racemes loosely but shortly 3-13-flowered, the flowers early declined, the axis 4-15 mm. long in fruit; calyx-tube shortly campanulate, 1.5-2 mm. long, the linear-lanceolate or setaceous teeth 2-3 mm. long; petals whitish veined and the keel tipped with lavender, drying yellowish, the abruptly recurved banner 6-7.5 mm., the keel 4-5.5 mm. long; pod spreading or declined, sessile bladdery-inflated, very obliquely half-ovoid, 1-2 cm. long, 6-10 mm. diam., broadly obconic to narrowly turbinate at base, tapering at apex into a laterally flattened, triangular beak, otherwise subterete but deeply grooved ventrally at the middle and dorsally toward the base, the ventral suture concavely and the dorsal one convexly arched, the papery, thinly villous valves not inflexed.

Gentle slopes and flats of sagebrush valleys, usually in sandy soil derived from basalt, 4650-5300 ft., not common, NE. California and adjacent Washoe Co., Nevada (Newcomb Lake; Red Rock); also at foot of Mt. Adams, S.-Centr. Washington.

16. A. JEJUNUS Wats., Bot. King 73. 1871.

Dwarf, tufted subacaulescent perennial, suffruticulose at base, strigulose with short appressed hairs, greenish or cinereous; stems 0-2 cm. long, clothed with imbricated amplexicaul and connate stipules, 1.5-2.5 mm. long; leaves 1-4 cm. long, with rigid, persistent petioles and 9-15 linear or narrowly elliptic, acute or obtuse leaflets, 1-5 mm. long, the terminal one continuous with the rachis; peduncles filiform, 1-3.5 cm. long, reclining in fruit; racemes shortly but loosely 3-7-flowered, the flowers spreading, the axis not more than 1 cm. long in fruit; calyx-tube campanulate, 1.5-2 mm., the teeth 0.5-1 mm. long; petals pink-purple, the wings white-tipped, the abruptly recurved banner 5-6.5 mm., the keel 3.5-4.5 mm. long; pod spreading, sessile, obliquely obovoid or subglobose, bladdery-inflated, 1-1.7 cm. long, 7-11 mm. diam., beakless or nearly so, the filiform sutures both convexly arched but the dorsal one more strongly so, the papery-membranous, brightly mottled valves, sparsely strigulose, not inflexed.

Arid, exposed summits of shale, sandstone or cobblestone bluffs and bare clay ridges on and near the Greenbear River divide in SW. Wyoming and adjacent Utah, N. of the Uinta Mts.; also disjunctly and apparently very rarely on calcareous clay knolls, about 6800 ft., associated with Lepidium nanum, in the White Pine Mts. (N. of Hamilton, Ripley & Barneby 9934), White Pine Co., Nevada.

17. *A. SABULONUM* Gray, Proc. Amer. Acad. 13: 368. 1878.

Rather coarse and diffuse or sometimes diminutive annual, the stems either branched at base and decumbent or solitary and erect, 1.5-26 cm. long, together with the herbage, villous or hirsutulous with spreading or curly and tangled hairs, silky, hoary or sometimes greenish throughout; stipules 1.5-4 mm. long, herbaceous, free; leaves 1.5-6.5 cm. long, with 9-15 oblanceolate oblong or obovate-cuneate retuse or obtuse leaflets, 4-13 mm. long; peduncles 1-3 cm. long; racemes loosely 2-5-flowered, the axis 3-25 mm. long in fruit; calyx-tube campanulate, 1.5-2.5 mm., the teeth 2-3.5 mm. long; petals purplish, the banner 5-7 mm., the keel 5.5-6.5 mm. long; pod spreading or declined, sessile, obliquely ovoid, oblong-ovoid or ovoid-ellipsoid, 9-15 mm. long, 5-7 mm. diam., turgid but scarcely bladdery, lunately arched or abruptly hooked toward the middle, rounded or shallowly open-sulcate dorsally, the stiffly papery, thinly to densely hirsutulous valves not inflexed.

Dunes, sandy flats, pockets in gullied clay hills, in Nevada commonly associated with *Larrea* between 1200-4500 ft., widespread and locally plentiful from the head of the Gulf of California to N. Arizona and NW. New Mexico, entering SW. Nevada in Mineral, Esmeralda, S. Nye and Clark Cos.; including *A. virgineus* Sheld. (Contrib. U. S. Nat. Herb. 4: 88. 1893), the type (Vernon Bailey, Death Valley Exped. 1910) from the valley of the Virgin River, "Lincoln" (actually below St. Thomas, Clark) Co., Nevada.

18. *A. GEYERI* Gray, Proc. Amer. Acad. 6: 214. 1864.

Slender annuals, more or less strigulose, the herbage greenish-cinereous, the leaflets commonly glabrous above; stems solitary and erect or branched from the base and ascending, 1-20 cm. long; stipules 1.5-4 mm. long, free, often greener than the adjacent stem; leaves 2-10 cm. long, with 3-13 leaflets, 3-17 mm. long; peduncles 0.5-2.5 cm. long, the first produced at the third or fourth node and often appearing subradical; racemes loosely 2-8-flowered, the flowers declined, the axis 3-15 mm. long in fruit; calyx-tube obconic-campanulate, 1.5-2.5 mm., the teeth 0.5-1.5 mm. long; petals whitish or less often reddish-lilac, drying violet, the gently recurved banner 5.5-7.5 mm., the keel 4-5 mm. long; pod spreading, sessile, very obliquely lunate-ovoid, bladdery-inflated, 1.5-2.5 cm. long, 6-9 mm. diam., cuneate at base, deltoid or triangular-acuminate at apex, the ventral suture straight or low-concave, the dorsal one strongly gibbous-convex, the papery valves strigulose. Two vars.:

1. Pod strictly 1-locular; leaflets or most of them linear-oblong or -oblanceolate; ovules 10-18; Esmeralda Co. northward.

18 a. var. *GEYERI*

1. Pod partially 2-locular, the valves inflexed as a narrow septum 1 mm. wide or less; leaflets broadly oblanceolate or elliptic;

ovules 7-9; Clark Co. 18 b. var. TRIQUETRUS

18 a. var. GEYERI

Sandy flats and depressions of mobile dunes, gullied bluffs and knolls, 2500-5500 ft. in Nevada, with *Larrea* (southward) or sagebrush, widespread and locally abundant from W.-Centr. Nevada and adjacent California to E.-Centr. Utah, SE. Oregon, SW. Montana and Centr. Wyoming; common in the middle and lower Humboldt Valley and S. to the latitude of Tonopah, but apparently absent from the calcareous E.-Centr. parts of the State.

18 b. var. TRIQUETRUS (Gray) Jones, Contrib. West. Bot. 8: 7. 1898.

Sandy flats and dunes, with *Larrea*, 1500-2000 ft., local and rather rare along the lower Muddy, Virgin and Colorado rivers, S. Clark Co., Nevada, and adjacent Arizona, the type (of *A. triquetrus* Gray, Proc. Amer. Acad. 13: 367. 1878) from the confluence of the Muddy and Virgin rivers.

19. *A. HORNII* Gray, Proc. Amer. Acad. 7: 398. 1868.

Annual (or perhaps biennial) but of long duration, flowering through the summer and the root becoming indurated late in the season; stems few or solitary, at first erect, becoming diffuse or procumbent, 2.5-12 dm. long, glabrous or nearly so; herbage (with us) thinly villosulous with spreading or loosely ascending hairs, the leaflets sparsely pubescent above; stipules 2.5-5.5 mm. long, semi-amplexicaul, free; leaves (1.5-) 2.5-12 cm. long, with 11-25 oblong-obovate obtuse or emarginate leaflets, 5-20 mm. long; peduncles 2-15 cm. long, longer or shorter than the leaf; racemes subcapitately or densely 10-35-flowered, the flowers spreading or ascending in globose or oblong heads, the axis not elongating, 0.5-7 cm. long in fruit; calyx villosulous, the campanulate tube 3-3.5 mm., the teeth 2-2.5 mm. long; petals whitish, sometimes tinged with pale lavender, the gently recurved banner 8.5-10 mm., the keel about 7 mm. long; pods crowded in globose or oblong heads, sessile, obliquely ovoid-acuminate, bladderly-inflated, 1.2-1.8 cm. long, 7-9 mm. diam., contracted into a triangular-acuminate, slightly incurved, laterally compressed beak, the ventral suture much less than the dorsal one, the papery-membranous valves hirsute with lustrous spreading hairs about 1 mm. long, not inflexed.

Alkaline clay flats, sometimes sheltering under or scrambling over low bushes, about 4000 ft., in Nevada, rare and local, known only from about Pyramid Lake, Washoe Co. ("the Willows", Kennedy 1971); also at lower elevations in the San Joaquin valley, California; N. Lower California; and reported from S. Utah.

20. A. PLATYTROPIS Gray, Proc. Amer. Acad. 6: 526. 1864.

Dwarf or diminutive, commonly tufted and subcaulescent perennial, the stems usually less than 2 cm. long (but more or less persistent below as caudex-branches and these sometimes, on shifting rock-slides, buried and elongating), the herbage gray- or silvery-strigulose; stipules 1.5-5.5 mm. long, mostly imbricated, the lowest amplexicaul-decurrent and shortly connate, the rest narrower and free; leaves 1.5-9 cm. long, with 7-15 elliptic or oval acute, obtuse or rarely retuse leaflets, 4-11 mm. long; peduncles subfiliform 1.5-6.5 cm. long, reclining in fruit; racemes subcapitately 4-9-flowered, the flowers ascending, the axis 2-6 mm. long in fruit; calyx-tube campanulate, 2-2.5 mm., the teeth 1-2 mm. long; petals whitish or sordid, the keel and often the wings and banner distally suffused with lilac or leaden purple, little graduated, the gently recurved banner about equalling or a little shorter than the wings and keel, 7-9.5 mm. long, the keel abruptly incurved through a right angle and appearing truncate; pod ascending (humistrate) sessile, broadly ovoid, ovoid-ellipsoid or subglobose, bladdery-inflated, 1.5-3.3 cm. long, 1-2 cm. diam., contracted at apex into a short conic-triangular, laterally compressed beak, otherwise a little obcompressed, shallowly sulcate along both sutures, the papery-mottled or speckled, strigulose valves inflexed as a septum, 2.5-3 mm. wide, produced across the cavity to meet a wide flange issuing from the seminiferous suture and thus completely 2-locular.

Rocky crests and ridges, descending from near timberline to openings in the forest belt, 8600-11,550 ft., commonly but not exclusively on limestone, rare and scattered on the higher peaks of Nevada: Charleston and Sheep Mts., Clark Co.; Toiyabe Mts. and Bunker Hill, Nye and Lander Cos.; Egan and Schell Creek ranges, White Pine Co.; Spruce Mt. and East Humboldt Mts., Elko Co.; W. just into California and, somewhat disjunctly and at lower elevations, in SW. Montana and Centr. Idaho.

21. A. LENTIGINOSUS Dougl. ex Hook., Fl. Bor.-Amer. 1: 151. 1831.

Caulescent perennials, sometimes short-lived, or winter annuals, diverse in stature, growth-habit, vesture and flower-size, nearly glabrous, strigulose, villosulous or densely silky-cinereous; stems prostrate, ascending or nearly erect, 0.5-7 dm. long; stipules more or less amplexicaul-decurrent but none connate; leaves (3-) 4-11 (-15) cm. long, with 13-21 (-27) oblong-obovate or sometimes oblanceolate or suborbicular obtuse or retuse leaflets, 4-20 mm. long; peduncles incurved-ascending or erect, shorter or longer than the leaf; racemes loosely but sometimes shortly, more rarely remotely 7-30 (-35) -flowered, the flowers spreading or ascending, the axis either not or much elongating, 1-12 (-25) cm. long in fruit; calyx-tube deeply campanulate or cylindric, 2.5-8 mm., teeth 0.5-4 mm. long; petals white (the keel then com-

monly pink- or purple-tipped), lavender-pink, or bright pink-purple, gently recurved banner 8-19 mm., keel 5.5-17 mm. long; pod spreading or ascending, sessile, mostly ovoid-acuminate and bladdery-inflated but sometimes cylindric or lance-ovoid and merely turgid, in the first case usually grooved on both sutures and abruptly passing upward into an incurved triangular or triangular-acuminate, laterally flattened beak, in the second case subterete or less strongly grooved and either lunately incurved or nearly straight, the glabrous, strigulose, villosulous or silky-pubescent valves either leathery, papery or membranous and diaphanous, mottled or not, inflexed as a nearly always complete septum.

A complex group of reticulately inter-related forms, chiefly of the Great Basin but extending into cismontane California, S. Montana, S. Wyoming, and S. through the deserts into northern Mexico, yielding reluctantly to classification by conventional methods. Very highly developed in Nevada, where one or more forms are adapted to each life-zone except the bleakest alpine summits. Of about 40 named vars., 16 occur in the State, most of them intergrading freely with sympatric or more commonly vicariant relatives:

KEY TO VARIETIES

1. Fruiting and flowering racemes short and relatively compact, the axis not over 4 cm. long (if longer, as in var. macrolobus of N. Nevada, then the flowers small and ochroleucous, the keel not over 8.5 mm. long) (2)
2. Flowers small, the keel 5.5-8.5 mm. long (3)
3. Stems 1.5-4 dm. long, the internodes well-developed; leaflets up to 21, usually flat and not remote; not of the White Mts. (4)
4. Pubescence of the herbage appressed, often sparse (5)
5. Fruiting racemes relatively loose; stems variable in length but nearly always simple; not of the Sierra foothills (6)
6. Pod stiffly leathery or woody, rigid and opaque; NW. Nevada. 21 a. var. CARINATUS
6. Pod papery, the valves readily flattened and usually subdiaphanous (7)
7. Plants of sagebrush plains and alkaline bottomlands, 4000-6000 ft.; pod rarely mottled; leaflets thick-textured. 21 b. var. SALINUS
7. Plants of the mountains of NE. Nevada, 7000-10,000 ft.; pod mottled; leaflets thin-textured, membranous. 21 c. var. TREMULETORUM
5. Fruiting racemes very dense, cylindric or subglobose; stems usually long (2.5-4 dm.) and branched; Sierra foothills in W.-Centr. Nevada. . . . 21 d. var. FLORIBUNDUS
4. Pubescence loose, spreading or curly, often copious; ra-

racemes commonly loose, 3-7 cm. long in fruit.

21 f. var. *MACROLOBUS*

3. Stems usually 1 dm. long or less, the internodes short (up to 12, rarely 30 mm. long, commonly less); leaflets up to 27, conduplicate, distant; White Mts., Esmeralda Co.

21 e. var. *SEMOTUS*

2. Flowers larger, the keel (9-) 9.5-13.5 mm. long (8)
8. Stems elongate, prostrate, 5-7 dm. long; leaves subsessile, shorter than the internodes; alkaline flats.

21 g. var. *SESQUIMETRALIS*

8. Stems 0.5-3.5 dm. long, ascending; leaves petioled, longer than the internodes; habitats various but not as above (9)
9. Flowers white; pod leathery, rigid; extreme N. Nevada.

21 h. var. *PLATYPHYLLIDIUS*

9. Flowers purple or, if whitish, the pod papery; S. of Humboldt River (10)
10. Pod broadly ovoid or subglobose, the septum produced nearly or quite into the apex of the shortly triangular beak, this 1/4 or less as long as the body; montane in White Pine Co. 21 i. var. *LATUS*
10. Pod narrowly to broadly ovoid-acuminate, the septum running out at base of the triangular-acuminate beak, about 1/3 as long as the body; if of White Pine Co. then down in the valleys and lower foothills (11)
11. Pod inflated but the valves somewhat fleshy, becoming leathery or stiffly papery; plants of the valleys and lower foothills, not above 7000 ft.

21 j. var. *ARANEOSUS*

11. Pod not at all fleshy, the valves papery or papery-membranous, mostly 1-2 cm. long; plants of 8000 ft. upward in the mts. of Centr. Nevada.

21 k. var. *TOYABENSIS*

1. Fruiting (and usually the flowering) racemes lax and open, the axis 4-12 (-26) cm. long in fruit; petals pale or bright purple and, if N. of Mineral Co., the flowers large, the keel 9.5-13.5 mm. long (12)
12. Flowers small, the keel 6.5-8.5 mm. long.

21 l. var. *FREMONTII*

12. Flowers larger, the keel 9-13.5 mm. long (13)
13. Pod bladdery-inflated, ovoid or ovoid-acuminate, 1 cm. or more diam. (14)
14. Leaves and stems villosulous, the hairs mostly curly or incumbent; banner 12.5-17 mm. long; pod nearly always glabrous; Esmeralda Co. northward. . 21 m. var. *KENNEDYI*
14. Leaves and stems trigulose, the hairs appressed; banner 11-12 mm. long; pod strigulose; Clark Co.

21 n. var. *STRAMINEUS*

13. Pod lance- or oblong-cylindric, little or not inflated, 4-6 mm. diam.; barely entering S. Clark Co. (15)
15. Herbage green, the leaflets glabrous above; pod leathery, glabrous or sparsely strigulose. . 21 o. var. *MOKIACENSIS*

15. Herbage and papery pod both silvery-silky.

21 p. var. BORREGANUS

21 a. var. CARINATUS Jones, Rev. Astrag. 125. 1923.

Sparsely strigulose, the leaflets glabrous or nearly so, pod falcately lance-ovoid, not strongly inflated, 11-17 mm. long, the valves leathery, usually mottled, strigulose.

Sagebrush plains and open pine-forest, 3000-4500 ft., commonly on basaltic formations, rather common and locally plentiful in E. Oregon and NE. California, entering Nevada in N. Washoe Co. Intergrades with var. 21 h.

21 b. var. SALINUS (Howell) Barneby, Leafl. West. Bot. 4: 86. 1945. (A. heliophilus (Rydb.) Tidestr.).

Similar to var. 21 a., but the pod 1.5-2.5 cm. long, strongly inflated, the valves papery glabrous.

Alkaline flats, sagebrush plains and foothills, 4000-6000 ft., not very common with us, known from Elko, Humboldt and (in slightly larger-flowered form) Lincoln Cos., (to be expected in N. Washoe Co.), to NE. California, E. Oregon, SW. Montana and SW. Utah. Intergrades with vars. (c, d, and f.)

21 c. var. TREMULETORUM Barneby, op. cit. 85. 1945.

Close to the preceding, but the pod commonly smaller (8-20 mm. long) and of slightly thicker texture; stems weaker, diffuse and very leafy.

Meadows and brushy slopes in the mountains, ascending to open crests near timberline where much reduced in stature, 7000-10,000 ft., locally plentiful in the Ruby, East Humboldt and White Pine Cos., the type from Lamoille Canyon, Elko Co. (Munz 16324).

21 d. var. FLORIBUNDUS Gray, Proc. Amer. Acad. 6: 524. 1865.

Like var. 21 b., but the stems more diffuse and the pods (papery, either glabrous or strigulose, 1-2 cm. long) densely congested.

Sandy soil of sagebrush valley, 4150-5200 ft., perhaps sometimes higher, locally abundant in the first foothills of the Sierra Nevada, Ormsby, Lyon and S. Washoe Cos., Nevada, N. through E. California into SE. Oregon; the type from Carson City, Ormsby Co. (Anderson in 1864); including Cystium ormsbyense Rydb. (N. Amer. Fl. 24: 412. 1929), the type from Eagle Valley, Ormsby Co. (Baker 1275). Passes SW. into var. ineptus (Gray) Jones, typically de-

veloped on the E. slope of the Sierra Nevada in California.

21 e. var. SEMOTUS Jeps., Fl. Calif. 2: 357. 1936

Usually low and loosely tufted, remarkable for its long and slender leaf-rachis and usually numerous remote and small leaflets; pod 1-2 cm. long, papery-membranous, the valves strigulose.

Sandy or gravelly flats and hillsides among sagebrush, 7000-11,000 ft., known only from the White and Inyo Mts., Esmeralda Co., Nevada, and adjacent California.

21 f. var. MACROLOBUS (Rydb.) Barneby, op. cit. 89. 1945.

Very close to var. 21 b., and distinguished by the loose vestiture, the often longer calyx-teeth, and looser raceme; pod quite similar, glabrous or strigulose.

Dunes, sandy valleys and river-banks, nearly always in sagebrush, 3800-5700 ft., locally abundant in the Humboldt River valley from Elko to Churchill Co. and ascending the Truckee W. as far as Reno; just into SE. Oregon; the type (of Cystium macrolobum Rydb., N. Amer. Fl. 23: 408. 1929) from the West Humboldt Mts. (Watson 254, in part). Including Cystium vulpinum Rydb. (op. cit. 409. 1929), the type from Grass Valley, Lander Co. (Watson 254, in part), the phase with pubescent pod. Intermediate between vars. 21 b. and 21 l. and intergrading with both.

21 g. var. SESQUIMETRALIS (Rydb.) Barneby, op. cit. 116. 1945.

Remarkable for the very long prostrate stems, short sessile leaves and long internodes; pod rather narrowly ovoid, 2-2.5 cm. long, the stiffly papery or almost leathery valves strigulose and mottled.

Moist alkaline flats or salt-grass meadows, about (?) 4500 ft., known only from "Soda Springs, Nevada" (Shockley 276), the type-collection of Cystium sesquimetrals Rydb. (N. Amer. Fl. 24: 414. 1929). The gazeteer published as No. 29 of these Contributions lists a Soda Spring in Esmeralda, Mineral and Nye Cos.

21 h. var. PLATYPHYLLIDIUS (Rydb.) Peck, Man. Pl. Ore. 449. 1940.

Resembling and having nearly the same distribution and habitat as vars. 21 a. and b., but distinguished from both by the much larger flower and often coarser growth; pod leathery, varying from globose to narrowly ovoid-acuminate, 1.5-3 (-4) cm. long.

Apparently not rare in Elko and N. Washoe Cos., Nevada; to NE. California, E. Oregon and SW. Wyoming.

21 i. var. LATUS (Jones) Jones, Rev. Astrag. 125. 1923.

Stems 5-10 cm. long; pod leathery glabrous, 1-2.5 cm. long, remarkable for its short 2-locular beak.

Open pine-forest, on limestone, above 8000 ft., known only from the Schell Creek and Egan Ranges, White Pine Co., Nevada, the type (of A. diphysus var. latus Jones, Zoe 3: 287. 1895) from Aurum (Jones in 1891).

21 j. var. ARANEOSUS (Sheld.) Barneby, op. cit. 112. 1945. (A. diphysus and A. lentiginosus var. palans of Nevada references).

Pod 2-3 (-4) cm. long, often much incurved, the leathery valves glabrous or rarely strigulose when young.

Sagebrush valleys and foothills, 4800-7000 ft., common and locally plentiful in the deserts of W. Utah, W. into Elko, S. Eureka and NE. Nye Cos., Nevada, apparently passing W. into the next.

21 k. var. TOYABENSIS Barneby, op. cit. 106. 1945.

Slender, the stems up to 30 cm. long, sometimes very short at great altitudes; pod 8-20 mm. long, the papery, mottled valves glabrous or exceptionally strigulose.

Dry hillsides among sagebrush, ascending through the forest-belt to open treeless crests near timber-line, 8000-11,300 ft., locally plentiful in the Wassuk, Toiyabe and Monitor ranges, N. Nye and W. Mineral Cos., Nevada, the type from the Toiyabe Mts. (Watson 253).

Including all but the type of var. scorpionis as interpreted by the writer (op. cit. 84) and the Nye Co. collection referred to var. tremuletorum (op. cit. 86). Plants from lower elevations much resembling var. 21 j, those from middle elevations var. 21.c. (but larger- and purple-flowered), those from the crests reduced in stature and the leaflets sometimes narrow and acute.

21 L. var. FREMONTII (Gray) Wats., Bot. King 66. 1871.

Often annual, or flowering the first year and short-lived perennial, sparsely strigulose to densely and sometimes loosely cinereous; pod 1.5-3.5 cm. long, the papery-membranous valves glabrous or sparsely strigulose.

Sandy flats, washes, desert playas, gravelly foothills and open valleys, with Larrea, Joshua-tree, greasewood, pinyon or sagebrush, with us not above 6500 ft., common and sometimes dominant over extensive sandy areas, nearly throughout the S. third of the

State (S. Mineral, Clark, S. Nye and Lincoln Cos.), W. to Owens Valley and E. Mohave Desert, California, the type (of A. fremontii Gray, in Torr., Pac. R.R. Rep. 4:80. 1857) from banks of the Rio Virgin, Clark Co. (Fremont in 1844). Including Cystium griseolum Rydb. (N. Amer. Fl. 24: 411. 1929), the type from Candelaria, Mineral Co. (Shockley 220); and also, in all probability, the type of A. lentiginosus var. scorpionis Jones (Rev. Astrag. 124. 1923), from Morey Peak, Nye Co. (Purpus 6365), a fragmentary specimen of questionable identity.

21 m. var. KENNEDYI (Rydb.) Barneby, op. cit. 121. 1925.

Resembling a coarse, ordinarily biennial or perennial, large-flowered form of the last; pod narrowly to plumply ovoid-acuminate, 2.5-3 cm. long, the papery-membranous valves glabrous or exceptionally puberulent.

Alkaline dunes, sandy valleys and dry stony knolls, 3700-5600 ft., locally common about the low arid basins of W.-Centr. Nevada, from Pyramid Lake and Carson Sink to Walker Lake and Columbus Salt Marsh (S. Washoe, W. Churchill, Ormsby, Mineral and NW. Nye Cos.), the type (of Cystium kennedyi Rydb., N. Amer. Fl. 24: 407. 1929) from Carson Sink region (Kennedy 1691). In N. Nye Co. intergrading with vars. 21 j. and 21 L.

21 n. var. STRAMINEUS (Rydb.) Barneby, op. cit. 122. 1945 (A. coulteri of Nevada references).

Much like var. 21 L., but the flowers larger; pod 1-2 cm. long, the papery valves strigulose.

Sandy valleys and dunes below 4000 ft., S. Utah, NW. Arizona, and entering Nevada along the Virgin River in E. Clark Co.

21 o. var. MOKIACENSIS (Gray) Jones, Rev. Astrag. 126. 1923.

Very different from our other varieties in the loose racemes of large purple flowers, the banner 14-18 mm. long, the green herbage, and the scarcely inflated cylindroid, stiffly leathery pod, 2-2.5 cm. long.

Dry hillsides, apparently calciphile, rare and seldom collected, along and near the Colorado River below Grand Canyon, NW. Arizona and E. Clark Co. (Mico Spring), Nevada.

21 p. var. BORREGANUS Jones, Contrib. West. Bot. 8: 3. 1898.

Annual or biennial, remarkable for its silky vesture and narrowly lance-ovoid, gently incurved, nearly terete pod, 1.5-2.5 cm. long, 4.5-6 mm. diam.

Sandy flats and dunes, with *Larrea*, below sea-level up to 2200, rarely 3000 ft., Colorado and E. Mohave Deserts, California, SW. Arizona and adjacent Mexico, not definitely known to occur in Nevada but locally abundant within a mile of the State line (about 11 mi. W. of Searchlight, Clark Co.) and therefore confidently to be expected within the State.

22. A. *KERNENSIS* Jeps., Man. Calif. 569. 1925.

Slender diffuse caulescent perennial, closely related to, and resembling, small-flowered forms of the last, strigulose with subappressed hairs, the herbage greenish or cinereous, the leaflets glabrous or nearly so above; stems 2.5-12 cm. long, forming loosely woven mats; stipules 1-3 mm. long, more or less amplexicaul but free; leaves 1-5 cm. long, with 11-19 elliptic-oblongate to obovate obtuse or emarginate leaflets, 1.5-7 mm. long; peduncles slender incurved-ascending, 6-25 mm. long; racemes loosely 3-9 flowered, the flowers ascending, the axis 3-15 mm. long in fruit; calyx-tube cylindric or deeply campanulate, 3.5-4.5 mm., the teeth 0.6-1.2 mm. long; petals whitish, the wings and keel tipped with lavender, the gently recurved banner 9.5-11.5 mm., the keel 7.5-8.5 mm. long; pod spreading, sessile, globose or plumply ovoid or obovoid, bladdery-inflated, 6-13 mm. long, 6-10 mm. diam., truncate or obscurely retuse-umbilicate at apex and tipped with an erect linear- or subulate-tubular cusplike beak, the papery, usually mottled strigulose valves inflexed as a complete septum.

Dry, gravelly or sandy slopes and flats, locally plentiful in two widely separated and narrowly restricted areas; with bristlecone pine on limestone, 10,000-10,500 ft., Charleston Peak, Clark Co., Nevada; and among sagebrush, 8000-8500 ft., along the upper Kern River in Tulare Co., California. The Nevada plants, separated as subsp. charlestonensis Clokey (Madrono 6: 218. 1942, type from Charleston Peak, Clokey & Bean 7573) differing very slightly from the Sierra populations in wider septum and larger seeds.

23. A. *IODANTHUS* Wats., Bot. King Expl. 70. 1871

Low diffuse caulescent perennial, sparsely strigulose, the stems nearly glabrous, the leaflets nearly always glabrous above but sometimes densely ciliate; stems prostrate or decumbent 5-35 cm. long; stipules 2-6 mm. long, more or less decurrent-amplexicaul but free; leaves 3-7 cm. long, with 11-21 obovate to oblong-oblongate rarely suborbicular retuse or obtuse leaflets, 5-15 cm. long; peduncles ascending, 2-4.5 cm. long, shorter than the leaves, decumbent in fruit; racemes loosely but shortly 7-17-flowered, the flowers ascending or spreading and declined in age, the axis 1-2 cm. long in fruit; calyx-tube campanulate or subcylindric, 3.5-5 mm., the teeth 1.5-3 mm. long; petals either bright wine-purple drying violet, pale lilac, or whitish with purple-tipped keel, exceptionally cream-colored throughout, the gently recurved

banner 12-15 mm., the keel (varying from 1 to 4.5 mm. shorter than the banner) 8-12 mm. long, sometimes very broad and prominent; pod naturally declined but often appearing horizontal or ascending from humistrate peduncles, sessile, very obliquely linear-oblongate, lanceolate or elliptic in outline, (2-) 2.5-4 cm. long, 5-8.5 mm. diam., straight or nearly so in the lower half or third and then abruptly incurved through at least 90° , often through 180° , or sometimes more evenly and yet further incurved so as to become annular or even coiled, acuminate distally into the laterally flattened cuspidate beak, elsewhere very variably compressed, the compression either: 1) strictly dorsoventral, with 2 nearly flat faces and narrow but obtuse lateral angles, or 2) triquetrous, the lateral faces then either flat or low-concave and the dorsal face openly sulcate, or 3) intermediate in some fashion between these states, the fleshy, commonly mottled, strigulose valves becoming leathery or stiffly papery, either not inflexed or more often inflexed as a narrow but sometimes nearly complete septum up to 1.5 mm. wide.

Dry hillsides and valley-floors, in sandy, loamy or gravelly-clay soils mostly of volcanic origin, common and locally plentiful between 5000-7800 ft., across the width of N. Nevada (Elko to Washoe and S. to N. Nye and Mineral Cos.), and descending about the Humboldt and Carson sinks to outwash fans and alkaline clay or sandy slopes and washes to 4000 ft., where associated with budsage and *Atriplex*: to NE. and E.-Centr. California and extreme SE. Oregon, the type from foothills of W. Nevada (Watson 269); another var. in SE. Oregon and SW. Idaho. Extremely variable, the type representing the relatively large- and purple-flowered form of the mountains and higher valleys. A small- and pale-flowered extreme, with less strongly graduated petals, the keel relatively long and conspicuous, has been described as var. *diaphanoides* Barneby (Leaf1. West. Bot. 3: 99. 1942), the type from between Reno and Dewey, Washoe Co. (Ripley & Barneby 5659); it is of frequent occurrence on the lower Carson, Truckee and Humboldt rivers, but passes insensibly into the typical form.

24. A. PSEUDIODANTHUS Barneby, Leaf1. West. Bot. 3: 99. 1942.

Diffuse caulescent perennial, similar to the last but canescently villous nearly throughout, with ascending or curly hairs, the stems arising from a shallowly buried root-crown; racemes 12-25-flowered, early elongating, the axis 2-5 (-8) cm. long in fruit; calyx-tube campanulate 3-4 mm., the teeth 1-1.5 mm. long; petals reddish-lilac, the banner 9-10 mm., the keel (about as long as the wings) 8.5-9.5 mm. long; pod deflexed sessile, very obliquely ellipsoid or lance-ellipsoid, 1.6-3 cm. long, 5-8 mm. diam., nearly straight in the lower third and then either abruptly hooked backward or more gently but yet further incurved into a nearly complete ring, acuminate distally into a laterally compressed, cuspidate beak, otherwise dorsoventrally compressed-triquetrous, the ventral suture commonly sulcate at base and prominent above, the dorsal

one widely and openly sulcate up to the base of the beak, the leathery, faintly mottled, villosulous valves inflexed either at base only, or through half their length, as a rudimentary but sometimes nearly complete septum about 0.5 mm. wide.

Dunes and sandy plains, with greasewood and Hilaria jamesii, about 5500 ft., rare and local, known only from W. and NW. Nye Co., Nevada, the type from 20 mi. SE. of Tonopah (Ripley & Barneby 3725).

25. A. PORRECTUS Wats., Bot. King Expl. 75. 1871.

Rather rigid caulescent perennial, thinly strigulose, the stems glabrous or nearly so below, the herbage green, the leaflets merely ciliate; stems erect and ascending, 2.5-4 cm. long, commonly branched, forming low bushy clumps; stipules scarious, 2-9 mm. long, the lowest ones of the main stems and of the more slender branches connate into an amplexicaul sheath, the upper ones deltoid, free; leaves 3.5-11 cm. long, with 9-13 distant, broadly obovate-cuneate or flabellate obtuse or retuse, thick-textured leaflets, 7-15 mm. long; peduncles stiffly erect, 3.5-15 cm. long; racemes loosely or remotely 12-33-flowered, the flowers ascending, the axis 4-20 (-28) cm. long in fruit; calyx-tube campanulate, 3-3.5 mm., the teeth 1.5-2 mm. long; petals white, drying ochroleucous, the abruptly recurved banner 8-11 mm., the keel 7-8 mm. long; pod strongly incurved-ascending stipitate, the straight or slightly incurved stipe 3-5 mm. long, spreading from the axis, the erect body lunately oblong-ellipsoid, incurved through about a third of a circle, abruptly cuspidate-beaked, 8-15 mm. long, 3-5 mm. diam., compressed but turgid, bicarinate by the riblike sutures, the glabrous, green or mottled, at length stiffly leathery valves not inflexed.

Hot gravelly washes and fans in the foothills of desert mountains, in volcanic sand or rock-debris, 4300-5000 ft., local and nowhere abundant, known only from the lower Humboldt and Truckee valleys in Churchill, Pershing and S. Washoe Cos., Nevada, the type from the Trinity Mts. (Watson 284).

26. A. GIBBSII Kell., Proc. Calif. Acad. Sci. 2: 161. 1862.

Robust, diffuse caulescent perennial, villosulous nearly throughout with spreading or loosely incumbent hairs, greenish or canescent; stems decumbent, from a shortly buried root-crown, 1.5-3.5 dm. long, simple or nearly so; stipules dimorphic, the lowest small, scarious, connate into a campanulate sheath, upper ones herbaceous, free; leaves 3-9.5 cm. long, 11-19 broadly or narrowly cuneate or narrowly cuneate or obovate retuse leaflets, 4-20 mm. long; peduncles stout 3-10 cm. long, reclining in fruit; racemes at first densely 10-30-flowered, the flowers nodding and retrorse-ly imbricated, becoming looser, the axis 2.5-10 cm. long in fruit; calyx-tube deeply campanulate or subcylindric, pallid and tumid, 7.5-10 mm. long, gibbous dorsally above the pedicel, the teeth 2.5-

3.5 mm. long; petals dull yellow, the sigmoidally arched banner 14-17 mm. long, its short broad blade abruptly recurved distally, the keel 12-15 mm. long; pod pendulous or (when humistrate) apparently ascending, stipitate, the stipe 1-2.2 cm. long, the body lunately or falcately oblong or narrowly oblong-elliptic in outline, 2.2-3 cm. long, 4.5-8 mm. diam., laterally compressed, bicarinate by the prominent sutures, the faces distended and convex at maturity, the fleshy, sometimes mottled, villosulous valves becoming stiffly leathery, not inflexed.

Sagebrush valleys and openings in yellow pine-forest, in sandy soils, 4200-6000 ft., locally plentiful in scattered stations along the E. base of the Sierra Nevada, from Lake Tahoe N. to Plumas and Lassen Cos., California, extending just into Nevada in Ormsby, adjacent Washoe (and probably Lyon) Cos.

27. *A. CURVICARPUS* (Heller) Macbr., Contrib. Gray Herb. n. ser. 65: 38. 1922. (*A. Whitedii* of Nevada references, not of Piper).

Closely resembling the preceding, but the stems commonly loosely strigulose with incumbent hairs, not villous; lower stipules embracing less than half the stem's circumference, free; peduncles sometimes longer, 4-15 cm. long; calyx-teeth mostly shorter, 0.5-2.5 mm. long; petals ochroleucous or lemon-yellow, the banner 16.5-21 mm. long, its blade less strongly recurved distally and longer relative to the keel, the latter 11.5-15 mm. long; stipe of the pod 1-2 cm. long, the body 2-3.5 cm. long, 3-4 mm. diam., hamately incurved or coiled into a ring, the lateral faces low-convex, the valves stiffly papery, villosulous or loosely strigulose, rarely glabrate.

Sagebrush plains and foothills, in loose sandy or gravelly soils derived from basalt or granite, 3100-6200 ft. or rarely a little higher, widespread and common across the width of N. Nevada within the Humboldt River drainage; to NE. California, SE. Oregon and SW. Idaho; related varieties in NE. Oregon.

Pod commonly incurved through about half a circle; a form with coiled pod, especially frequent in NE. Nevada and adjacent Oregon, has been described as *A. whitedii fma. speirocarpoides* Barneby (Proc. Calif. Acad. Sci. IV, 25: 148. 1949), the type from N. of Winnemucca, Humboldt Co. (*Ripley & Barneby 4552*), and has given rise to reports from the State of *A. speirocarpus* Gray, a distinct species endemic to the Columbia Basin.

28. *A. ALVORDENSIS* Jones, Contrib. West. Bot. 10: 67. 1902.

Slender perennial, villosulous with short twisted or incumbent hairs, the stems and herbage cinereous or the leaflets more thinly pubescent and greenish above; stems arising singly or few together from a buried root-crown, subterranean for a space of

3-10 cm., freely and divaricately branching on emergence and forming fan-shaped sprays, the whole 1.5-3 dm. long; stipules 0.5-2 mm. long, the lowest papery, amplexicaul around about $2/3$ the stem's circumference, the upper ones deltoid-ovate, herbaceous; leaves widely spreading or deflexed (1-) 1.5-5 cm. long, with 11-21 obovate and retuse or obcordate leaflets, 1-6 mm. long; peduncles divaricate, 1-3 cm. long; racemes loosely 5-14-flowered, the flowers early declined; calyx-tube campanulate, 2-2.5 mm. long, the triangular-deltoid teeth about 0.5 mm. long; petals pale lilac or yellowish veined with lilac, the abruptly recurved banner 7-8.2 mm., the keel 4.5-5.5 mm. long; pod pendulous stipitate, the stipe 2-9 mm. long, the body oblong, variable in length, 3-4 mm. broad, strongly and evenly falcate-incurved through at least $2/3$ of a circle or spirally coiled through 1-2 circles (the hook or ring so formed, 7-10 mm. diam.), the whole strongly compressed laterally, with prominent but filiform sutures, the papery valves loosely and thinly pubescent with incurved hairs, not inflexed.

Barren knolls, bluffs and desert hillsides, in loose sandy soils, 3500-4250 ft., rare and local on and near the Owyhee-Quinn River divide, SE. Oregon and extreme N. Humboldt Co., Nevada (S. of Denio, fide William H. Baker).

29. A. PREUSSII Gray, Proc. Amer. Acad. 6: 222. 1864.

Rather coarse malodorous (selenium-scented) perennials, nearly glabrous except for a few appressed hairs in the inflorescence and sometimes on the leaflet-margins and -midribs, the herbage green or glaucescent, leathery; stems erect or ascending, 1-3.5 dm. long, simple or nearly so; stipules 2-5 mm. long, the lowest ovate or broader than long obtuse, more or less decurrent but not connate; leaves 4.5-18 cm. long, ours with 11-15, mostly oblong-obovate retuse or truncate and mucronulate leaflets, 4-25 mm. long; peduncles stout, 3-15 cm. long; racemes 5-16 (-23)-flowered, the flowers ascending, the axis more or less elongating; calyx-tube cylindric or subcylindric, purplish and sparsely strigulose, 6-9.5 mm., the teeth 1.5-2.5 mm. long; petals pink-purple or whitish with purple tips, the gently recurved banner 16.5-23 mm., the keel 11.5-18 mm. long; pod erect or ascending, sessile or stipitate, the body narrowly to broadly oblong-ellipsoid, inflated but not bladdery, 1.5-2.7 cm. long, 7-13 mm. diam., abruptly contracted at apex into a rigid cuspidate beak, straight or nearly so, terete or a trifle compressed either way, the fleshy glabrous valves becoming leathery or stiffly papery, not inflexed.

A species of the Colorado Basin extending W. through S. Nevada into the Mohave Desert, SE. California, divisible into 3 or 4 geographic varieties, 2 of them in Nevada:

1. Pod stipitate, the stipe 3-5.5 mm. long; racemes short, the axis 1-7 cm. long in fruit; flowers large, calyx 9.5-11 mm.,

- keel 14.5-18 mm. long. 29 a. var. PREUSSII
1. Pod subsessile, the stipe reduced to a stout obconic neck hardly longer than wide; racemes looser, 4-23 cm. long in fruit; flowers a trifle smaller, calyx 8-9.5 mm., keel 11.5-13 mm. long. 29 b. var. LAXIFLORUS

29 a. var. PREUSSII

Dry alkaline flats in stiff adobe clay soils derived from limestone, 1700-3100 ft., abundant in a few localities in Clark Co. and adjacent California, the type from banks of the Rio Virgin in Nevada (Fremont); closely related, perhaps conspecific forms in N. Arizona.

29 b. var. LAXIFLORUS Gray, Proc. Amer. Acad. 13: 369. 1878.

Sandy or gravelly washes in gullied badlands, not or seldom on limestone, 1200-2000 ft., lower valleys of the Muddy and Virgin rivers, Clark Co., Nevada and immediately adjacent Utah and Arizona; also disjunctly on the W. Mohave Desert, California.

30. A. PRAELONGUS Sheld., Minn. Bot. Stud. 9: 23. 1894.

Stout malodorous (selenium-scented) perennial, nearly glabrous or sparsely strigulose, the herbage somewhat fleshy, green or glaucescent; stems several, erect or ascending, 2-6 dm. long, simple or nearly so; stipules 2.5-7 mm. long, the lowest often broader than long, more or less decurrent-amplexicaul but free; leaves 4-14 cm. long, with 11-27 obovate or oblanceolate obtuse or, in some upper leaves, elliptic acute leaflets, 8-30 mm. long; peduncles stout, 6-18 cm. long; racemes 10-25-flowered, the nodding flowers retrorsely imbricated at early anthesis, the axis elongating, 3.5-11 cm. long in fruit; calyx-tube pallid, broadly campanulate, gibbous dorsally, 4.5-6.5 mm. long, teeth deltoid to lance-subulate, 0.3-4.5 mm. long; petals ochroleucous, banner gently recurved, 15-23 mm., keel 11.5-17 mm. long; pod ascending or spreading, sessile or nearly so (sometimes cuneately contracted at base into a thick stipelike neck), broadly and plumply oblong, ovoid or obovoid, 2-3.5 cm. long, 1-1.5 cm. diam., straight or nearly so; cuspidate at apex, terete or a trifle dorsoventrally compressed, the smooth, thickly fleshy, glabrous or rarely puberulent valves becoming leathery or woody, inflexed as a narrow partial septum, 1-2.5 mm. wide.

Gullied bluffs, sandstone escarpments, clay knolls and sandy plains, usually in stiff alkaline soils, 2750-7100 (in Nevada not above 5000) ft., widespread and common in N. Arizona and NW. New Mexico and extending NW. through S. Utah to the upper Muddy River in E. Lincoln Co., Nevada; reported (on good authority) from the foothills of the Charleston Mts., Clark Co., but no specimens known to Clokey or to the writer; related forms in S. Utah, New

Mexico and NW. Texas.

31. A. TETRAPTERUS Gray, Proc. Amer. Acad. 13: 369. 1878.

Rather robust but sometimes low caulescent perennial, more or less strigulose, the stems and herbage varying from silvery or cinereous to pallid- or dark-green, the leaflets commonly more densely pubescent above than below, occasionally glabrous; stems several, simple, naked and shortly subterranean at base, branched or spurred upward, 1-3.5 dm. long, at first ascending but weighed down by the heavy fruits; stipules 2-5.5 mm. long, the lowest scarious, more or less amplexicaul but free, the upper ones narrower, herbaceous reflexed; leaves 2.5-8 cm. long, with 9-21 linear to narrowly elliptic or some ovate, obtuse to sharply acute leaflets, 1-20 mm. long, these similar throughout the plant or those of the lower leaves broader, the terminal leaflets (and sometimes all, at least of some upper leaves) continuous with the rachis; peduncles 1-5 cm. long, shorter than the leaf; racemes at first rather densely 6-15-flowered, the flowers ascending, the axis 1-4 cm. long in fruit; calyx-tube cylindric or deeply campanulate 4.5-7 mm., the teeth 1-2.5 mm. long; petals whitish tinged with lilac, yellowish tinged with pink, or bright pink-purple, the gently recurved banner 15-19 mm., the keel 10.5-13 mm. long; pod pendulous, sessile, obliquely oblong or broadly clavate-oblongate in outline, falcately incurved through 1/3 circle or coiled into a ring, 2-4 cm. long, 6-10 mm. diam., broadest above the middle and tapering toward the cuneate base, shortly deltoid-beaked, fleshy and a trifle obcompressed when first formed but becoming, by collapse of the pulpy walls, sharply tetragonal when ripe, the sutures then both prominent and acute and the middle of the valves longitudinally winged, the valves glabrous or puberulent, smooth and lustrous, not inflexed.

Gullied bluffs, barren knolls and open valleys, in dry exposed places but sometimes sheltering under sagebrush, 2500-6500 ft., locally plentiful in scattered stations through nearly the length of E. Nevada (S. Lincoln to N. Elko Co.) and, somewhat isolated, on the upper Reese River in NW. Nye Co; to SE. Oregon, W. Utah and extreme NW. Arizona. Extremely variable in pubescence, flower-color, and development of leaflets, each population having something of a distinctive aspect, here interpreted as individual variations; including therefore A. tetrapteris var. capricornus Jones (Rev. Astrag. 149. 1923), the type from Cobre, Elko Co. (Jones), and var. cinerascens (Rydb.) Barneby, the state with glabrous pod.

32. A. PTEROCARPUS Wats., Bot. King Expl. 71. 1871. (frontispiece).

Sparsely leafy, somewhat juncaceous, caulescent perennial, strigulose nearly throughout, the leaflets densely silvery above, greenish below, the inflorescence black-pilosulous; stems numerous, de-

cumbent, ascending and erect, naked and simple below, branched upward, 1.5-4 dm. long, the branches interlacing to form low bushy tufts; stipules 2.5-7 mm. long, the lowest papery, obtuse amplexicaul around $\frac{3}{4}$ or more of the stem's circumference but free, the upper ones narrower herbaceous; leaves 5-10 cm. long, with 1-4 distant pairs of linear or linear-acuminate acute, dorsally keeled leaflets 1-5 cm. long, all continuous with the rachis, the terminal one usually much surpassing the contiguous pair; peduncles ascending or at length weighed down by the heavy fruits, 5-15 cm. long; racemes loosely but shortly 6-15-flowered, the flowers ascending, becoming horizontal, the axis 2-8 cm. long in fruit; calyx-tube cylindric, about 7.5 mm., the teeth 2-4 mm. long; petals purple, the gently recurved banner about 16.5 mm., the keel 13 mm. long; pod pendulous, sessile, ovate or broadly oblanceolate in dorso-ventral view, 2.5-4.5 cm. long, 1.3-1.7 cm. wide, rounded or cuneate at base, contracted at apex into an incurved, laterally compressed triangular beak, otherwise very strongly obcompressed and not more than 3 mm. thick, the lateral angles margined all around (when ripe) with a thin rigid wing 2-3 mm. wide, the pale green, fleshy, glabrous valves becoming leathery, straw-colored lustrous, transversely rugulose-reticulate, not inflexed.

Sandy gullies and alluvial salt-grass meadows, about 4500 ft., rare and local although plentiful in the few known stations, middle Humboldt River valley, S.-Centr. Humboldt and N. Lander Cos., Nevada, the type from the junction of Reese River with the Humboldt (i.e., Battle Mountain), Lander Co. (Watson 272).

33. A. CASEI Gray, Bot. Calif. 1: 154. 1876.

Usually slender but wiry caulescent perennial, strigulose throughout, the herbage greenish-cinereous, the leaflets equally pubescent on both faces or more densely so above; stems naked at base, arising from a subterranean rootcrown, divaricately branched upward, erect or ascending, 1.5-4 dm. long, rigid and zigzag above; stipules 2-5 mm. long, the lowest ovate, more or less strongly amplexicaul but free, the upper ones narrower deflexed; leaves 3-10 cm. long, with 9-15 rather distant, elliptic-oblong to linear obtuse retuse or rarely acutish leaflets, 5-25 mm. long; peduncles 3-9 cm. long; racemes loosely 8-20-flowered, the flowers ascending and then declined, the axis 3-12 cm. long in fruit; calyx-tube cylindric, commonly tapering downward, 5.5-7.5 mm., the teeth 1-2 mm. long; petals pink-purple with white wing-tips (exceptionally all white), the gently recurved banner 13.5-18 mm., the keel 11-13.5 mm. long; pod deflexed, sessile, lance-ellipsoid or oblong-ellipsoid, 2-5.5 cm. long, 6-10 mm. diam., a trifle sigmoidally arched or rarely straight or gently incurved throughout, rounded or cuneate at base, contracted upward into a long-acuminate or triangular laterally compressed beak, otherwise obcompressed, the fleshy, strigulose, mottled valves becoming leathery, not inflexed.

Dry hillsides, valley floors, occasionally on dunes, usually in alkaline gravelly soils derived from granite or basalt, 4000-8000 ft., locally plentiful and rather frequent in W. Nevada from the lower Humboldt River and Pyramid Lake (Pershing to Washoe Co.) to Lida (Esmeralda Co.), and SW. to Owens Valley and Death Valley, California, the type from a high plateau near Pyramid Lake (Lemmon & Case).

34. A. SERENOI (O. Kze.) Sheld., Minn. Bot. Stud. 1: 130. 1894.

Rather tall, stiff, sparsely leafy and somewhat junceous perennials, finely strigulose, the herbage greenish or cinereous, the leaflets more densely pubescent above than below; stems usually numerous, erect and ascending to form bushy clumps, 1.5-4.5 dm. long, usually branched; stipules 1.5-5 mm. long, the lower ones decurrent around half to nearly the whole stem's circumference but free, the upper ones smaller, deflexed; leaves 2-15 cm. long, with 5-11 distant, linear, linear-oblongate or narrowly lanceolate, acute leaflets, 5-40 mm. long, those of the upper leaves often reduced in size or number, the terminal one sometimes obscurely jointed; peduncles stout, 3-25 cm. long; racemes loosely or remotely 5-25-flowered, the flowers ascending, the axis 2-20 cm. long in fruit; calyx-tube cylindric or cylindro-campanulate, often tapering downward, 6.5-9.5 mm., the teeth 1.5-4.5 mm. long; banner gently recurved, oblongate, 14.5-26 mm., the keel 13-18.5 mm. long; pod erect, sessile, obliquely ovoid or plumply oblong, 1.5-3 cm. long, 6-10.5 mm. diam., straight or a trifle incurved, fleshy and subterete when formed but becoming a little compressed either way, the valves shrinking to expose the prominent thick cordlike sutures, becoming stramineous, woody, transversely and longitudinally rugulose, glabrous, partially but sometimes obscurely 2-locular. Two vars.:

1. Peduncles and axis of the raceme together 1.5-4 dm. long, the pods and usually the flowers far exserted from the leaves; calyx-tube 3-4 mm. diam.; petals lilac or purple with white wing-tips, strongly graduated, the banner 4.5-8.5 mm. longer than the keel; pod oblong, broadest at the middle, semibilocular, the septum about 2-3 mm. wide. 34 a. var. SERENOI
1. Peduncles and axis 6-15 cm. long, the flowers and pods exserted just beyond the leaves; calyx-tube narrowly cylindric, about 2.5 mm. diam.; petals sordid straw-color, the wings and keel tipped with dull purple, the banner only 1.5-2.5 mm. longer than the keel; septum subobsolete, 0.5 mm. wide or less.

34 b. var. SORDESCENS

34 a. var. SERENOI

Open places on dry hillsides and canyon-slopes in the juniper-sagebrush zone, commonly in alkaline, gravelly clay soils, apparently calcifuge, 5000-7400 ft., locally plentiful and rather common

in the mountains of W.-Centr. Nevada, from S. Esmeralda to SW. Lander and N. Mineral Co.; also in the West Humboldt Mts., Pershing Co., whence the type (of A. nudus Wats., Bot. King 74. 1971, not of Clos, basonym of Tragacantha serenoii O. Kze., 1891, of A. oblatum Sheld., 1894, and of A. watsonianus Spegazz., 1902), including A. shockleyi Jones (Proc. Calif. Acad. Sci. II, 5: 659. 1895), the type from Fish Lake Valley, probably Esmeralda Co. (Shockley in 1886), and A. canonis Jones (Contrib. West. Bot. 8: 15. 1898), the type from Big Indian Canyon near Hawthorne, Mineral Co. (Jones).

34 b. var. SORDESCENS Barneby, Leaflet. West. Bot. 7: 195. 1954.

Gentle slopes and flats, among and sheltering under or scrambling up through sagebrush, about 6800 ft., known only from the E. slope of the Toiyabe Range, Nye Co., Nevada, the type and cotype from 7 miles S. of Belmont (Ripley & Barneby 3673, 4000).

35. A. MINTHORNIAE (Rydb.) Jeps., Fl. Calif. 2: 374. 1936.

Caulescent perennials, erect or nearly so, the stems and herbage variously pubescent, the inflorescence black-pilous; stems 1.5-3 dm. long, with several short basal internodes and 3-5 developed ones mostly 3-7 cm. long; stipules 4-15 mm. long, the lowest ovate, papery, several-nerved amplexicaul and often broader than the stem but free, the upper ones narrower; leaves 6-17 cm. long, with 9-17 obovate, ovate or suborbicular, obtuse leaflets, 8-20 mm. long; peduncles erect, 6-16 cm. long; racemes loosely 7-30-flowered, the flowers ascending, the axis 2.5-11 cm. long in fruit; calyx-tube deeply campanulate to cylindric, 4.5-5 mm., the teeth 1.5-2.5 mm. long; petals ochroleucous, tinged with dull purple or pink-purple with white wing-tips, the gently recurved banner 12-17 mm., the keel 9.5-13 mm. long; pod erect or strongly ascending, sessile or obscurely stipitate, the stout stipe 0.5-1.5 mm. long, the body oblong-ellipsoid or linear-oblong, straight or nearly so, 1.5-3 cm. long, 4-5.5 mm. diam., abruptly acute and cuspidate at apex, at first terete, becoming a little laterally compressed with convex sides and prominent cord-like ventral suture, the stiffly papery valves variously pubescent, inflexed as a complete septum. Two vars.:

1. Stems and herbage strigulose, the hairs strictly appressed, not over 0.7 mm. long; base of stem and lower stipules sparingly pubescent, not conspicuously more so than the rest of the stem; pod shortly silky-pilose with white hairs; ovules 22-24.

35 a. var. MINTHORNIAE

1. Stems and herbage villous with spreading, sometimes curly hairs up to 0.8-1.5 mm. long; base of the stem and lower stipules densely villous-pilose and canescent, generally more densely so than the rest; pod more densely shaggy-villous with black or white hairs 0.6-1.3 mm. long; ovules 26-32. 35 b. var. VILLOSUS

35 a. var. MINTHORNIAE

Dry calcareous, stony hillsides, in open places among sagebrush and in pinyon-juniper forest, 6000-6600 ft., not common but locally plentiful, known only from Centr. Lincoln and S. White Pine Cos., Nevada, the type from Pioche (Minthorn 77).

35 b. var. VILLOSUS Barneby, El Aliso 2: 208. 1950.

Similar habitats, 4400-7200 ft., calcareous mountains of E. (and locally W.) Mohave Desert, California, and common in the foothills of Spring and Charleston Mts., Clark Co., Nevada.

36. A. CIBARIUS Sheld., Minn. Bot. Stud. 1: 150. 1894.

Diffuse caulescent perennial, thinly strigulose, the herbage green or cinereous in youth, the leaflets glabrous above; stems prostrate or decumbent, 6-25 cm. long, simple; stipules 3-7 mm. long, the lowest large ovate, amplexicaul but not connate, the upper ones narrower; leaves 3.5-10 cm. long, with 13-19 obovate, oblong-obovate or broadly oblanceolate, mostly obtuse leaflets, 4-15 mm. long; peduncles 3-8 cm. long, reclining in fruit; racemes shortly 4-14-flowered, the flowers spreading-ascending, the axis 0.5-1.5 cm. long in fruit; calyx-tube black-strigulose, deeply campanulate or subcylindric, 5-6.5 mm., the teeth 1.5-2.5 mm. long; petals ochroleucous, tinged with dull lavender, pale bluish-white, or pale purple with white wing-tips, banner gently recurved, 15-19 mm., keel 10-12.5 mm. long; pod ascending (humistrate), subsessile or cuneately tapering at base into a thick stipelike neck up to 2 mm. long, the oblong-ellipsoid or ellipsoid body 1.5-3.2 cm. long, 7-10 mm. diam., nearly straight to incurved through 1/3-circle, contracted above into a short, laterally compressed beak, otherwise obcompressed, openly sulcate (when long) both ventrally and dorsally or (when short) ventrally only, the sutures both thick and prominent, the stiff-leathery valves minutely strigulose, either not inflexed or inflexed as a vestigial septum less than 1 mm. wide.

Grassy hillsides, sagebrush flats and canyons, in clay or gravel of various origins, (3300 northward) 4800-8000 ft., common and locally abundant in the mountains of Centr. Utah, extending more rarely to S. and W. Wyoming, SW. Montana, S.-Centr. Idaho and NE. Nevada (Elko, White Pine and Eureka Cos.).

37. A. CHAMAEMENISCUS Barneby, Leaflet. West. Bot. 3: 105. 1942.

Low caulescent perennial, villous-hirsutulous with fine spreading and incumbent hairs, the herbage greenish or canescent, the leaflets glabrous above; stems decumbent, 3-13 cm. long, arising from a shallowly buried root-crown; stipules 3-7 mm. long, the lowest ovate obtuse, semiamplexicaul, free, the upper ones narrower;

leaves 2-8 cm. long, with 15-21 obovate to oblanceolate obtuse or emarginate leaflets, 3-11 mm. long; peduncles 1.5-5 cm. long, reclining in fruit; racemes shortly but loosely 5-9-flowered, the flowers ascending, the axis 0.5-1.5 cm. long in fruit; calyx-tube deeply campanulate, 5-7 mm., the teeth 1-3 mm. long; petals reddish-violet or clear pink, banner gently recurved, 13.5-19 mm., keel 10.5-15 mm. long; pod ascending or loosely pendulous (humi-strate), narrowed at base into a stout necklike stipe 1-2.5 mm. long, the body crescentic, 2.5-4.5 cm. long, 5-8 mm. diam., arched through $1/6$ - $1/3$ circle, triquetrously compressed with acute ventral and obtuse lateral angles, openly sulcate dorsally, the thin-leathery, villosulous valves inflexed as a complete septum.

Sandy flats, knolls and gentle hillsides, commonly sheltering under sagebrush, 4900-6100 ft., local but forming colonies, known only from N. Lincoln, NE. Nye and Centr. White Pine Cos., Nevada, the type from near Sunnyside, Nye Co. (Ripley & Barneby 3514).

38. A. MALACUS Gray, Proc. Amer. Acad. 7: 336. 1867.

Low but rather stout, tufted caulescent perennial, thinly to densely hirsute with horizontal and ascending hairs up to 1.5-2 mm. long, green or somewhat canescent, the leaflets pubescent or sometimes glabrescent above; stems erect and ascending, 2.5-20 cm. long, with 1-6 developed internodes, the lowest ones inhibited and concealed by imbricated stipules; stipules 7-17 mm. long, the lowest ovate or ovate-acuminate, amplexicaul but free, the upper ones narrower, often caudate-acuminate; leaves 4-15 cm. long, with 11-19 oblong-obovate, obtuse or retuse leaflets 5-15 mm. long; peduncles usually stout, erect or ascending, 4-11 cm. long; racemes 9-35-flowered, the flowers early declined, the axis 2-10 cm. long in fruit; calyx-tube usually black-hirsute, cylindric, 7-9 mm., the teeth 1.5-5 mm. long; petals reddish-violet, banner gently recurved, 15-18 mm., keel 12.5-16 mm. long; pod reflexed, shortly stipitate, stipe stout, 1-3 mm. long, the body narrowly oblong in outline, lunate or arched through nearly half a circle, 1.8-3.8 cm. long, 4.5-6 mm. diam., cuneate at both ends or acuminate distally, triquetrously compressed with acute ventral and obtuse lateral angles, the shallowly sulcate, dorsal face narrower than the nearly flat, lateral ones, the stiff-papery, sometimes mottled, long-hirsute valves inflexed as a complete septum.

Dry rocky slopes, bluffs and benches, in sand or clay derived from basalt, with sagebrush or pinyon, 4000-7500 ft., Owens Valley, California, N. along the foothills of the Sierra Nevada and adjacent mountains of W. Nevada (Mineral to Pershing and N. Washoe Cos.) to NE. California, SE. Oregon and SW. Idaho, the type from near Carson City, Ormsby Co., Nevada (Anderson).

39. A. LAYNEAE Greene, Bull. Calif. Acad. Sci. 1: 156. 1885.

Low, rather coarse caulescent perennial, gray-hirsute with ascending and spreading hairs, greenish or canescent; stems arising nearly always from a buried root-crown, slender below ground and becoming abruptly stouter and branched on emergence, 2.5-16 cm. long, shorter than the sometimes subscapose peduncles and racemes; stipules membranous, 3-10 mm. long, decurrent around nearly the whole stem's circumference but free; leaves 6-16 cm. long, with 13-21 ovate or obovate-cuneate, obtuse or notched leaflets, 5-18 mm. long; peduncles stout, erect but decumbent in age, 4.5-10 cm. long; racemes loosely 15-45-flowered, the flowers ascending or somewhat declined, the axis 3-20 cm. long in fruit; calyx-tube black-hirsute or -hirsutulous, deeply campanulate, 5-7 mm., the teeth 1-2 mm. long; petals whitish with keel- and wing-tips and often the banner also purplish, banner gently recurved, 12.5-18 mm., keel 10.5-16.5 mm. long; pod ascending or somewhat declined, linear-ellipsoid (2-) 3-6 cm. long, 2.5-8 mm. diam., acuminate tapering at both ends or cuneate at base, uniformly crescentic or abruptly hamate-incurved through nearly a complete arc, triquetrously compressed with acute ventral and obtuse lateral angles, sulcate dorsally, the leathery, thinly hirsute, often mottled valves inflexed as a nearly complete septum.

Sandy flats and gentle slopes in the foothills of desert mountains, commonly with *Larrea*, 1500-5000 ft., widely distributed over the Mohave Desert, California and extending in scattered stations E. into S. Esmeralda, S. Nye and W. Clark Cos., Nevada and extreme NW. Arizona.

40. A. TIDESTROMII (Rydb.) Clokey, Madrono 6: 214. 1942.

Low tufted perennial, acaulescent or nearly so, the stems rarely up to 4 cm. long, the herbage densely villous-hirsute and subtomentose with spreading incumbent and curly hairs, the inflorescent black-hairy; stipules mostly imbricated, 3-8 mm. long, free; leaves 4-15 cm. long, with 11-19 broadly obovate or suborbicular, mostly obtuse, thick-textured leaflets, 4-14 mm. long; peduncles 5-13 cm. long, recurved or prostrate in fruit; racemes loosely 5-16-flowered, the flowers ascending, the axis 2-7 cm. long in fruit; calyx-tube deeply campanulate 5-7.5 mm., the teeth 1-2.5 mm. long; petals whitish, tinged with sordid lavender, the keel and wings purple-tipped, the gently recurved banner 12-17.5 mm., the keel 10-14 mm. long; pod ascending (humistrate), sessile, obliquely lance-acuminate in outline, 2-5.5 cm. long, 6-16 mm. diam., laterally compressed at both ends, obcompressed toward the middle, hooked or incurved through $1/4$ - $3/4$ circle into the triangular-acuminate beak, bicarinate by the sutures but the ventral one depressed and lying in an open groove, the fleshy strigulose-villosulous valves becoming stiffly leathery and rugulose, not inflexed.

Open gravelly hillsides, outwash fans and sandy playas in the foothills of calcareous desert mountains, commonly with *Larrea*, sometimes with juniper, 2400-5000 ft., frequent and locally plentiful about the Spring, Charleston and Desert ranges, Clark Co., Nevada and W. into the Mohave Desert of adjacent California, the type from the Charleston Mts. (Tidestrom 9661).

41. A. AMPHIOXYS Gray, Proc. Amer. Acad. 13: 366. 1878.

Low tufted subcaulescent or shortly caulescent winter-annual or perennial, silvery-canescens throughout with appressed dolabri-form hairs; stems almost none to 5 (exceptionally 15) cm. long, prostrate when developed; stipules triangular or acuminate, 3-8 mm. long, more or less amplexicaul but free; leaves 3-10 cm. long, with 11-19 (in some early leaves 3-7) elliptic oblanceolate or obovate acute or obtuse leaflets, 4-12 mm. long; peduncles 4-12 cm. long, shorter or longer than the leaves, reclining in fruit; racemes shortly but loosely 4-12-flowered, the flowers ascending, the axis 0.5-4 cm. long in fruit; calyx-tube cylindric or deeply campanulate, (4-) 5-10 mm., the teeth 1.5-3.5 mm. long; petals bright pink-purple, banner gently recurved, 13-23 mm., keel over 10 mm. long; pod ascending (humistrate), sessile, with us crescentic or sometimes coiled into a nearly complete ring, (1.5-) 2-4 (-5) cm. long, 5-10 mm. diam., laterally compressed and acute or long-acuminate at both ends, obcompressed toward the middle, the sutures there prominent but often depressed and lying in an open groove, the stiffly leathery, strigulose valves becoming rugulose on the transversely dilated angles, not or only vestigially inflexed.

Sandy valleys, plains and hillsides, sometimes on dunes or gumbo-clay flats, 1600-5000 ft. in Nevada, rather common and locally abundant in Clark and S. Lincoln Cos., to N. Arizona, S. Utah and SE. through the Rio Grande valley to extreme W. Texas; a variety in the Colorado Basin.

42. A. MUSIMONUM Barneby, Proc. Calif. Acad. Sci. IV, 25: 150. 1944.

Closely resembling slender forms of the preceding; calyx-tube campanulate 3.5-4 mm., the teeth 1.5-2.5 mm. long; banner 10.5-13 mm., keel (about equalling the wings) 10-11.5 mm. long; pod 1.5-2 cm. long, 4-6 mm. diam., gently incurved in the lower three fourths and then abruptly hooked backward, more thinly leathery, not rugulose on the angles.

Open hillsides in calcareous gravel, 5300-5700 ft., rare and local, foothills of the Sheep Range, Desert Game Refuge, Clark Co., Nevada, the type from the mouth of Deadman Canyon (Ripley & Barneby 3332); also (?) extreme NW. Arizona. Poorly known, and perhaps no more than a form or variety of the last.

43. *A. TEPHRODES* Gray var. *BRACHYLOBUS* (Gray) Barneby, Amer. Midl. Nat. 37: 466. 1947.

Loosely tufted, subacaulescent or shortly caulescent perennial, strigulose with appressed or ascending straight or incurved hairs, silky-canescenscent or greenish; stems 1-10 cm. long, the internodes short and congested; stipules deltoid or lanceolate, 3-9.5 mm. long, semiamplexicaul, free; leaves 7-22 cm. long, with 19-25 broadly rhombic-elliptic and acute to ovate-oblong and obtuse leaflets, 6-25 mm. long; peduncles stout, 8-28 cm. long, the flowers ascending, the axis 4-15 cm. long in fruit; calyx loosely strigulose with black or white hairs, the deeply campanulate or cylindric tube 8.5-10 mm., the teeth 2-3.5 mm. long; petals pink-purple, banner gently recurved, 18-22 mm., keel 15.5-19 mm. long; pod loosely ascending (usually humistrate), sessile, obliquely ovate-, oblong- or lance-acuminate in outline, 2-3 cm. long, 6.5-16 mm. diam., strongly obcompressed in the lower half or three fourths, tapering or contracted into a strongly incurved, laterally flattened deltoid or lance-triangular cuspidate beak, the sutures both prominent and cordlike, the fleshy strigulose valves becoming woody and rugulose on the angles, not inflexed.

A common and variable species of Centr. and N. Arizona, extending feebly into SE. New Mexico, SE. California and S. Nevada (Needle Mts., Lincoln Co.; Newberry Mts., Clark Co.), occurring with us on sandy or gravelly washes and desert hillsides or gullied clay badlands, 3000-4700 ft.

As defined by the writer (loc. cit.) var. brachylobus is a polymorphic series of intergrading populations, differing greatly in stature and in density, quality and orientation of the pubescence. The Nevada races (as described above) are both robust, hairy throughout but dissimilar in type of vesture. The plants from Clark Co. have rhombic acute leaflets, strigulose with straight hairs, black-hairy calyx with teeth about 3.5 mm. long, and closely resemble A. chloridae Jones, a segregate described from the Cerbat Mts. across the Colorado River in adjacent Arizona. Here the pod (not yet seen from Nevada) varies from 6-12 mm. in diameter. The plants from the Needle Mts. are more loosely and densely silky with incurved or sinuous hairs, the leaflets are mostly oblong-ovate and obtuse, the calyx is white-hairy, and the pod is extraordinarily large for the species as a whole, 10-16 mm. diam. Each may perhaps rank as a distinct variety.

44. *A. ARGOPHYLLUS* Nutt. ex T. & G., Fl. N. Amer. 1: 331. 1838. (A. uintens Jones).

Low tufted, acaulescent or shortly caulescent perennial, the stems when developed up to 1 (-1.5) dm. long and prostrate, densely silky-pilose with appressed-ascending hairs, the herbage silvery; stipules 2-8 mm. long, mostly imbricated, more or less amp-

lexicaul but free; leaves 1.5-12 cm. long, with 9-21 rhombic-elliptic or -ovate, mostly acute leaflets, 4-15 mm. long; peduncles 2-9 cm. long, shorter than the leaves, prostrate in fruit; racemes shortly but loosely 2-9-flowered, the flowers ascending, the axis 3-25 mm. long in fruit; calyx-tube cylindric, 9.5-12 mm., the teeth 2.5-5 mm. long; petals bright purple or purple-margined, drying bluish, the gently recurved banner 18-24 mm., the keel 16-20 mm. long; pod ascending (humistrate), sessile, plumply ovoid-acuminate to lance-ellipsoid, 1.5-2.5 cm. long, 7-12 mm. diam., either straight below and incurved into a triangular, laterally flattened beak or lunately arched its whole length, obcompressed and shallowly sulcate or flattened dorsally, the ventral suture thick and prominent but sometimes depressed and lying in a groove, the fleshy, loosely strigulose valves becoming stiff-leathery or woody, not inflexed.

Alkaline or saline meadows moist in spring, stream-banks and lake-shores, in stiff alluvial clay or loam, 4500-7650 ft., scattered but locally abundant, Centr. and N. Nevada (Elko, Eureka, Humboldt, Lander, Nye Washoe and White Pine Cos.) to E.- Centr. Idaho, SW. Montana, W. Wyoming and Centr. Utah; related varieties further east.

45. A. UNICIALIS Barneby, Leaflet. West. Bot. 3: 101. 1942.

Dwarf tufted, acaulescent perennial, densely silvery-strigose with straight, lustrous, appressed hairs; stipules 3-6.5 mm. long, closely imbricated, strongly amplexicaul but free; leaves 1.5-7.5 cm. long, with 3-5 oblanceolate or narrowly obovate, mostly acute leaflets, 5-17 mm. long, the upper 3 subpalmate, the lower pair, when present, remote; peduncles scapose, 0.5-3.5 cm. long, reclining in fruit; racemes 1-3-flowered, the flowers nearly erect, the axis not over 3 mm. long; calyx-tube cylindric, 10-13 mm., the teeth 2-3.5 mm. long; petals bright pink-purple, banner gently recurved, 25-32., keel 21.5-24.5 mm. long; pod ascending (humistrate), sessile, obliquely oblong- or lance-ovoid, 2.5-3 cm. long, 8.5-12 mm. diam., obcompressed and nearly straight in the lower two thirds, then abruptly incurved into a deltoid-acuminate, laterally flattened beak, the fleshy, densely strigulose valves becoming leathery, not inflexed.

Dry knolls and gullies, in sandy or gravelly, alkaline clay soils derived from limestone, 5300-6050 ft., rare and local, known only from the foothills of the White Pine and Pancake ranges, NE. Nye Co., Nevada, the type from Currant (Ripley & Barneby 3563).

46. A. MARIANUS (Rydb.) Barneby, Proc. Calif. Acad. Sci. IV, 25; 150. 1944.

Loosely tufted, subacaulescent perennial, densely silky-strigose with straight appressed hairs, the herbage silvery or green-

ish-silvery; stems, at least in mature plants, arising from slender divisions of a caudex up to 3 cm. long; stipules ovate-acuminate or triangular, 3-7 mm. long, more or less amplexicaul but free, loosely imbricated or shortly discrete; leaves 3-8 cm. long, with 11-17 obovate to broadly oblanceolate, obtuse or acute leaflets, 3-11 mm. long; peduncles 1-5 cm. long, recurved in fruit; racemes shortly 3-8-flowered, the flowers ascending, the axis 1-1.5 cm. long in fruit; calyx-tube cylindric, 8-11 mm., the teeth 2-3.5 mm. long; petals pale purple or whitish, tipped with purple, banner gently recurved, 17-24 mm., keel 15.5-20 mm. long; pod 1-2.3 cm. long, closely resembling that of A. Purshii and A. newberryi, the shaggy-villous vestiture up to 1-3.5 mm. long.

Dry gravelly hillsides and benches among junipers or sagebrush and open pinewoods, 4500-10,000 ft., rather frequent in Lincoln and S. White Pine Cos., Nevada, W. to the Sevier River in central and SW. Utah.

47. A. PURSHII Dougl. ex Hook., Fl. Bor.-Amer. 1: 152. 1834.

Acaulescent and densely tufted or shortly caulescent and closely or loosely matted perennials, densely villous, villous-tomentose or pannose with extremely fine sinuous, spreading hairs, the herbage silky or in age cottony, gray to silvery-white; stems 0.1 dm. (in Nevada rarely over 5 cm.) long, prostrate when developed, the internodes usually shorter than the stipules; stipules 3-15 mm. long, ovate to lance-caudate, semiamplexicaul but free; leaves 1-12 cm. long, with 5-17 leaflets varying from suborbicular or broadly obovate-cuneate and obtuse to narrowly elliptic and acute, 2-14 mm. long; peduncles about equalling the leaves or shorter, prostrate in fruit; racemes loosely but shortly 2-10-flowered, the flowers ascending, the axis up to 2 cm. long in fruit, usually less; calyx-tube cylindric or deeply campanulate; banner oblanceolate, gently recurved; pod ascending (humistrate), sessile, obliquely ovoid to lance-ellipsoid, 0.8-2.7 cm. long, 3.5-11 mm. diam., straight or nearly so and more or less strongly obcompressed in the lower half or two thirds, passing upward into the slightly to strongly incurved or backwardly hooked deltoid to lance-triangular, laterally compressed beak, scarcely to deeply sulcate along one, either or both sutures, the fleshy valves becoming rigidly leathery, nearly always concealed by the dense shaggy vestiture of sinuous or straightish, white or cream-colored hairs up to 1.5-5 mm. long, not inflexed, the whole pod often resembling a floccule of cotton. A complex species of wide distribution, most highly diversified in the Great Basin, represented in Nevada by 4 vars.:

1. Petals, except for the purplish-tipped keel, whitish or cream-colored; pod not or but obscurely sulcate ventrally; widespread.

47 a. var. PURSHII

1. Petals bright pink-purple or deep purple (2)
2. Flowers consistently large, the keel over 15 mm. long (3)

3. Pod not or very narrowly sulcate ventrally; leaflets (mostly 7-13) often obtuse but, if acute, the flowers commonly more numerous than in the next, or smaller, or both; W. Nevada. 47 b. var. TINCTUS
3. Pod deeply sulcate ventrally below the middle; leaflets (mostly 9-17), uniformly elliptic and acute; racemes 2-5 (-7)-flowered, the flowers consistently large, the banner 19-25 mm. long; NE. Nevada. 47 c. var. GLAREOSUS
2. Flowers smaller, the keel 11.5-15 (-15.5) mm. long; pod (8-15 mm. long) deeply sulcate ventrally in the lower half; Centr. Nevada. 47 d. var. PUMILIO

47 a. var. PURSHII

Plains, dry hillsides, characteristic of the sagebrush deserts of the N. and W. Great Basin, but almost as common on bare gravelly slopes in juniper-pinyon forest, or sandy flats and banks in yellow pine-forest, with us mostly between 4000 and 7000 ft., widespread and locally abundant over N. and Centr. Nevada and passing westward insensibly into var. 47 b ; to British Columbia, Alberta, N. Colorado and N. Utah.

Commonly acaulescent with us, but becoming shortly caulescent in favorable sites, the condensed extreme (A. purshii var. interior Jones, Rev. Astrag. 222. 1923, the type from Aurum, White Pine Co.) correlated with habitat. Including a lax form with long calyx-teeth (Xylophacos incurvus Rydb.) of yellow pine-forest on the E. slope of the Sierra Nevada just entering Nevada in W. Ormsby Co.

47 b. var. TINCTUS Jones, Zoe 4: 269. 1863.

Habitats of var. 47 a but of more restricted range, common along the foothills of the Sierra Nevada and adjacent ranges, 3750-9500 ft., from Esmeralda and NW. Nye to Washoe Co., Nevada, NE. California and E. Oregon. Including A. candelarius Sheld. (Minn. Bot. Stud. 1: 142. 1894) and A. candelarius var. exiguus Sheld. (op. cit. 143), the types of both from Candelaria, Mineral Co. (Shockley in 1888; No. 33, in part).

Variable in flower-size, the banner 15.5-25 mm. long, the small extreme passing into the yet smaller-flowered var. lectulus (Wats.) Jones (with banner 10-15 mm. long), to be expected along the California border in Esmeralda or S. Lyon Co. Densely pannose-tomentose plants with short, triangular calyx-teeth from S. Washoe Co. simulate A. utahensis but have the characteristic pod of A. purshii.

47 c. var. GLAREOSUS (Dougl.) Barneby, Amer. Midl. Nat. 37. 503. 1947. (A. glareosus Dougl.).

Sagebrush plains and scablands, bluffs and canyon-banks, some-

times in pine-forest, widespread and common in the Columbia Basin, E. Washington and NE. Oregon, extending SE. to S. Idaho, NW. Utah and Elko Co., Nevada, apparently rare with us.

47 d. var. *PUMILIO* Barneby, op. cit. 506. 1947.

Dry flats and hillsides, with sagebrush and pinyon, 5500-6800 ft., locally frequent in the foothills and on the lower slopes of the Desatoya, Shoshone, Toiyabe and West Humboldt Mts., Nye, W. Churchill, S. Lander and Pershing Cos., Nevada, the type from Grass Valley (Ripley & Barneby 5908).

Differs consistently from vars. 47 a and 47 b of the region by its smaller flowers and deeply sulcate, ventral face of the pod.

48. A. *UTAHENSIS* (Torr.) T. & G., Pac. R.R. Rep. 2: 120. 1855.

Low tufted, subcaulescent or diffusely caulescent and matted perennial, densely pannose-tomentose with extremely fine entangled, cottony hairs, the herbage white; stems almost none, up to 1.5 dm. long, when developed prostrate, the internodes much shorter than the leaves; stipules ovate-triangular or -caudate, 3-10 mm. long, more or less amplexicaul, free; leaves 3-12 cm. long, with 9-19 broadly obovate to suborbicular, nearly always obtuse leaflets, 4-15 mm. long; peduncles 3-10 cm. long, prostrate in fruit; racemes shortly but loosely 3-8-flowered, the flowers ascending, the axis 0.5-2.5 cm. long in fruit; calyx-tube broadly cylindric, often tumid, 9.5-13 mm., the teeth 2.5-4 mm. long; petals bright pink-purple, banner gently recurved, 24-29 mm., keel 17-22 mm. long; pod ascending (humistrate), sessile (but elevated on a gynophore 1.5-2.5 mm. long), the body, excluding the vesture, lance-ellipsoid or narrowly ovoid-acuminate, 1.7-3 cm. long, 5.5-7.5 mm. diam., tapering into an erect or gently incurved, laterally compressed beak, otherwise obcompressed, the slightly fleshy valves becoming papery or thinly leathery, their shape and surface concealed by a dense shaggy-villous coat of lustrous, silky, cream-colored or pale yellow hairs, 4-8 mm. long, not inflexed.

Dry stony hillsides, open gravelly banks and river-terraces, in Nevada with sagebrush or juniper and mostly on limestone, between 4100 and 7000 ft., very common in Centr. and NW. Utah and extending less abundantly into SW. Wyoming, SE. Idaho, and into N. Lincoln, White Pine, NE. Nye and S. Eureka Cos., Nevada.

49. A. *FUNEREUS* Jones, Contrib. West. Bot. 12: 11. 1908.

Shortly caulescent, loosely matted perennial, densely cottony-tomentose with entangled hairs, resembling the last; stems 3-6 cm. long, prostrate; leaves 2-5 cm. long, with 11-15 crowded, broadly obovate-cuneate leaflets, 4-11 mm. long; calyx-tube (black-hairy) cylindric, 8-9 mm., the teeth 2.5-4 mm. long; petals purple-tipped,

little graduated, the gently recurved banner and keel subequal, 21-26 mm. long, the wings a trifle shorter; pod obliquely oblong- or ovoid-acuminate, 2.5-4 cm. long, 1-1.5 cm. diam., closely resembling that of A. coccineus in shape and vesture.

Clay ridges and canyon-walls, about 4500 ft., rare and local, Grapevine Mts., Death Valley, S. Nye Co., Nevada and adjacent California, the type from near Rhyolite (Jones in 1907); reports from Tonopah (probably) and the Charleston Mts. (certainly) based on forms of the strictly acaulescent A. Newberryi, superficially similar in the black-hairy calyx.

50. A. CALLITHRIX Barneby, Leaf1. West. Bot. 3: 103. 1942.

Low, loosely tufted, shortly caulescent perennial of short duration, densely white-pilose throughout with straight, ascending and some curly subappressed hairs; stems few or solitary, prostrate or ascending, 1-6 (-15) cm. long; stipules ovate or acuminate, 2-5 cm. long, more or less amplexicaul but free; leaves 2-8 cm. long, with 9-19 obovate suborbicular or rarely oblanceolate obtuse to truncate-retuse leaflets, 2-13 mm. long; peduncles 2-5 (-13) cm. long, nearly always shorter than the leaf, spreading or decumbent in fruit; racemes loosely but shortly 5-15-flowered, the flowers ascending, the axis 0.5-4 (-8) cm. long in fruit; calyx-tube cylindric, 5.5-11 mm., the teeth 1-3 mm. long; petals bright pink-purple, banner gently recurved, 16-26 mm., keel 13-21 mm. long; pod ascending or spreading, sessile, very obliquely oblong-ovoid, 1-1.6 (-2) cm. long, 5-7.5 mm. diam., nearly straight and strongly obcompressed in the lower third, passing upward and incurved through 90-100° into the triangular-acuminate cuspidate beak, the fleshy valves becoming stiffly papery or thin-leathery, hirsute with lustrous spreading hairs, up to 2-2.5 mm. long (but these concealing neither the shape nor surface of the valves), not inflexed.

Bare open places on semistabilized dunes and in deep sand of sagebrush valley-floors, 5100-5200 ft., locally plentiful but known from only two restricted areas between the Quinn Canyon and Hot Creek ranges in NE. Nye Co., Nevada, the type from S. of Callaway (Ripley & Barneby 3631). Plants from the type-station much smaller-flowered than those from Warm Springs valley (the calyx about 7 mm. as opposed to 10-13 mm., the banner about 17 mm. as opposed to 22.5-26 mm. long), but further collections needed to establish the constancy and significance of the differences.

51. A. NEWBERRYI Gray, Proc. Amer. Acad. 12: 55. 1876.

Low or dwarf, acaulescent perennial, the stems reduced to thick crowns beset with a thatch of stipules and stout recurving petioles, densely silky-pilose and also commonly tomentulose with long straight and shorter curly hairs, the petioles, peduncles and

inflorescence loosely ascending-pilose; stipules ovate or lance-acuminate, 5-11 mm. long, somewhat amplexicaul but free; leaves 3-13 cm. long, with 3-13 obovate oblanceolate or suborbicular acute or obtuse leaflets, 5-15 mm. long; peduncles stout, 1-10 cm. long, usually shorter than the leaves, recurved in fruit; racemes loosely but shortly 3-8-flowered, the flowers ascending, the axis 3-20 mm. long in fruit; calyx-tube cylindric, 10.5-13.5 mm., the teeth 2.5-6.5 mm. long; petals pale or bright pink-purple, banner gently recurved, 22-32 mm., keel 17-25 mm. long; pod ascending or spreading (humistrate), sessile, obliquely ovoid-acuminate, 1.5-2.8 cm. long, 7-13 mm. diam., obcompressed below and there openly sulcate ventrally, contracted upward into a triangular or acuminate incurved or backwardly hooked, laterally compressed beak, the fleshy valves becoming stiffly leathery, concealed by the dense vesture of short curly and longer lustrous, straight or spirally twisted, spreading hairs up to 2.5-4.5 mm. long, not inflexed.

Plains, foothills, canyons, gullied knolls and badlands, in dry gravelly or sandy clay soils of various composition, 4400-7800 ft., with sagebrush, juniper or pinyon, common and locally plentiful nearly throughout Nevada (all counties except Lyon, Douglas, Storey and Washoe; in Clark Co. only about the Charleston and Sheep ranges), feebly N. to E. Oregon and S. Idaho, W. to the E. Mohave Desert, California, and, becoming less frequent, S. and E. Utah and N. Arizona to the upper Rio Grande valley in N. New Mexico.

Variable in stature, the large extreme with strongly hooked pod (A. watsonianus (O. Kze.) Sheld., Minn. Bot. Stud. 1: 144. 1894, based on A. eriocarpus Wats., not DC., the type from the Coyote Mts., Pershing Co., Watson 273) freely intergrading and practically inseparable from the dwarfer, typical form with less strongly incurved pod.

52. A. COCCINEUS Brandg., Zoe 2: 1891.

Closely resembling A. newberryi in habit and vesture; calyx-tube 13.5-16 mm., the teeth 3.5-8 mm. long; petals scarlet (drying crimson), the nearly erect banner and subsymmetrically, acute keel of equal length, 3.5-4 cm. long; pod ascending (humistrate), sessile, obliquely lance-ovoid or lunately ellipsoid, 2.5-4 cm. long, 9-12 mm. diam., obcompressed in the lower half, passing upward into an acuminate incurved, laterally compressed beak, the fleshy valves becoming leathery, concealed by a dense coat of shorter curly and longer straightish, spreading lustrous hairs up to 2-3 mm. long, not inflexed.

Open gravelly ridges and canyon-banks of mountains enclosing and within the deserts of SE. California, with pinyon, juniper and sagebrush, on decomposed granites, 2100-7000 ft., from extreme N. Baja California to Owens Valley, Death Valley, and reported on

good authority from the Charleston Mts., Clark Co., Nevada; somewhat isolated on the Kofa Mts., SW. Arizona.

53. *A. THOMPSONAE* Wats., Proc. Amer. Acad. 10: 344. 1875.

Low but rather coarse, tufted perennial, acaulescent or nearly so, the stems not over 3 cm. long, mostly concealed by imbricated stipules, densely villous-tomentose throughout with shorter curly and longer spreading, often spirally twisted hairs up to 1-2 mm. long; stipules 3-15 mm. long, lanceolate or ovate-acuminate, more or less amplexicaul but free; leaves 5-12 cm. long, with 19-31 obovate to suborbicular obtuse or retuse, upwardly diminishing leaflets, 3-12 mm. long; peduncles 4-15 cm. long, recurved or prostrate in fruit; racemes rather densely 12-25-flowered, the flowers ascending, the axis 2-12 cm. long in fruit; calyx-tube deeply campanulate or cylindric, 8-11 mm., the teeth 2-3.5 mm. long; petals pink-purple, banner gently recurved, 18-22 mm., keel 15-18.5 mm. long; pod spreading or ascending (commonly humistrate), sessile, obliquely ovoid, 11-23 mm. long, 6-11 mm. diam., tumid below, abruptly incurved near the middle through about a right angle into a deltoid-acuminate, laterally compressed beak, a trifle obcompressed below and shallowly sulcate on both sutures, the stiffly leathery valves densely villous-tomentose, inflexed (below the beak) as a complete septum.

Dry hillsides, mesas, canyon-benches and gullied slopes at the foot of cliffs and buttes, in sandy soils mostly derived from shale and sandstone, often among junipers, 4650-6000 ft., widespread and locally common in the Colorado Basin above Grand Canyon, NW. New Mexico, SW. Colorado, N. Arizona, and extending across S. Utah to the upper Muddy River in Lincoln Co., Nevada.

54. *A. MEGACARPUS* (Nutt.) Gray, Proc. Amer. Acad. 6: 215. 1864.

Low but robust, tufted subacaulescent perennial, appearing nearly glabrous but the leaflets sparsely ciliate and strigulose on the lower or both faces, the herbage leathery and green; stems 1-5 cm. long, forming dense leafy tufts, 1-4 dm. diam., the short internodes mostly concealed by the ovate amplexicaul, but free stipules; leaves 5-17 cm. long, with stiff petioles and 9-15 broadly obovate suborbicular or oblong-elliptic obtuse or emarginate leaflets, 5-14 mm. long; peduncles 0.5-2.5 cm. long, much shorter than the leaves; racemes loosely 3-5-flowered, the flowers nearly erect, the axis less than 1 cm. long; petals pink-purple or whitish and pink-veined, banner gently recurved, 16-5-22 mm., keel 11.5-17.5 mm. long; pods gathered in dense clusters at the base of the plant, sessile but elevated on and jointed to a stipelike gynophore, 2-4 mm. long, the body subsymmetrically ellipsoid or ovoid-ellipsoid, bladdery-inflated, 4-6 cm. long, 1.5-2 cm. diam., the papery, often mottled, thinly strigulose valves not inflexed.

Gullied hillsides, knolls or canyon-benches, in stiff usually alkaline clay or gravel derived from limestone, shale or red sandstone, 5500-7600 ft., fairly frequent on the plateaux of Centr. and SW. Utah, extending in scattered stations around the edge of the Colorado Basin to NW. Colorado and SW. Wyoming and, somewhat isolated, on barren bluffs and knolls in SW. Elko and adjacent Eureka Cos., Nevada.

55. A. OOPHORUS Wats., Bot. King Expl. 73: 1871.

Low, usually robust perennials, appearing glabrous but bearing a few appressed hairs on the leaf-rachis, leaflet-margins and in the sinuses of the calyx-teeth, the herbage green or glaucescent leathery; stems decumbent and ascending, 0.5-2 cm. long, forming low clumps; stipules 2.5-7 mm. long, more or less amplexicaul-decurrent but not (or the lowest very obscurely) connate; leaves 5-13 cm. long, with 9-21 oval, obovate or suborbicular obtuse or retuse or (in some leaves) elliptic and acute leaflets, 5-20 mm. long; peduncles ascending, 4-10 cm. long; racemes loosely 4-10-flowered, the flowers widely spreading, the axis 1-5 cm. long in fruit; calyx 6-12 mm. long; petals purple with white wing-tips or ochroleucous, banner 11-23 mm. long; pod loosely pendulous (sometimes humistrate and apparently ascending), sessile, but elevated on and jointed to a slender stipelike gynophore, 3.5-12 mm. long, the body ellipsoid or half-ellipsoid, bladdery-inflated, 2-2.5 cm. long, 1-2 cm. diam., the papery, glabrous valves often mottled, not inflexed. Four vars.:

1. Calyx-tube broadly campanulate, 4-6.5 mm. long, 2.5-5 mm. diam., half as wide as long; blades of the keel half-obovate or -orbicular, abruptly incurved through 90-100° to the obtusely deltoid apex; gynophore 3.5-8 (-10) mm. long (2)
2. Petals bicolored, the banner and keel purple, the wing-tips white; pod subsymmetrically ellipsoid, both sutures about equally convex; Centr. and S. Nevada (3)
3. Flowers large, the calyx 7-12 mm., the banner 16-23 mm., the keel 11.5-16 mm. long; ovules 41-53; W. and Centr. Nevada. 53 a. var. OOPHORUS
3. Flowers small, the calyx 6 mm., the banner 11 mm., the keel about 9.5 mm. long; ovules about 28; Charleston Mts., Clark Co. 53 b. var. CLOKEYANUS
2. Petals ochroleucous, concolorous; pod strongly asymmetric, half-ovoid or -ellipsoid, the ventral suture straight or concave, the dorsal very strongly convex; E.-Centr. Nevada. 53 d. var. CAULESCENS
1. Calyx-tube cylindric, 8-8.5 mm. long and 3.5-4.4 mm. diam., about twice longer than wide; blades of the keel lunately half-elliptic, gently incurved through about 45° to the triangular apex; gynophore 10-11 mm. long; SE. Nevada. 53 c. var. LONCHOCALYX

55 a. var. OOPHORUS

Open hillsides and gullied banks, in dry gravelly or sandy soils of sedimentary or eruptive origin, commonly with sagebrush, 5500-10,000 ft., frequent and locally plentiful in the mountains of W.-Centr. Nevada (Churchill, Esmeralda, Lander, Mineral and Nye Cos.), W. to Death Valley and Owens Valley, California; SE. Oregon; the type from Reese River Pass of the Shoshone Mts., Lander Co. (Watson 278).

55 b. var. CLOKEYANUS Barneby, Leaflet West. Bot. 7: 194. 1954.

Slopes and benches in open yellow pine-forest, in gravelly soil derived from limestone, 8100-9100 ft., known only from the E. slope of Charleston Peak, Clark Co., Nevada, the type from Lee Canyon (Train 2141).

55.c. var. LONCHOCALYX Barneby, op. cit. 194. 1954.

Dry gravelly hillsides and stony flats, in calcareous soils, sometimes sheltering under sagebrush, 6000-6600 ft., local and apparently not common, known only from the mountains about the head of the Muddy River, Lincoln Co., Nevada, the type from E. of Deer Lodge (Train 2630).

55.d. var. CAULESCENS (Jones) Jones, Rev. Astrag. 121. 1923. (A. artipes Gray).

Dry hillsides, mostly in sagebrush, 5000-8000 ft., widespread around the Colorado Basin from W. Colorado to N. Arizona and Centr. Utah, rarely W. into N. White Pine Co. (Becky Mt., at 7600 ft.), Nevada.

56. A. BECKWITHII T. & G., Pac. R.R. Rep. 2: 120. 1855.

Diffuse or ascending caulescent perennials, glabrous or nearly so, the leaflets sometimes ciliate and the inflorescence and inner face and tips of the calyx-teeth sparsely black-strigulose, the herbage leathery; stems (0.2-) 0.5-3 dm. long, simple or nearly so; stipules 1.5-10 mm. long, more or less amplexicaul-decurrent but free; leaves 4-15 cm. long, with 11-27 suborbicular obovate or rhombic-elliptic obtuse or retuse leaflets, 3-25 mm. long; peduncles erect, 3-14 cm. long; racemes loosely but shortly 7-16-flowered, the flowers ascending at a wide angle, the axis 1-7 cm. long in fruit; calyx-tube campanulate, 3.5-5.5 mm., the teeth 2-4.5 mm. long; petals variously colored, the abruptly recurved banner 16.5-21 mm., the keel 11.5-15.5 mm. long; pod ascending, horizontal or somewhat declined, sessile but raised on and jointed to a stout stipelike gynophore, the body obliquely ellipsoid, oblong- or ovoid-ellipsoid, (1.5-) 2-3 cm. long, 7-12 mm. diam., narrowed from a point 1.5-5 mm. above the base into a clavate or narrowly

obconic, sterile neck and contracted distally into a triangular-acuminate, laterally compressed, cuspidate beak, otherwise obcompressed, sharply incurved or bent, mostly at or below the middle, through $45-135^{\circ}$, flattened or shallowly sulcate dorsally, the ventral face usually depressed and excavated on both sides of the prominent wing-margined suture, the fleshy, mottled, glabrous valves becoming stiffly leathery, inflexed as a narrow but sometimes nearly obsolete septum up to 1.5 mm. wide.

A variable species, comprising 3 or 4 varieties of the N. Great Basin, 2 of them in Nevada:

1. Petals ochroleucous, concolorous; NE. Nevada.

56 a. var. BECKWITHII

1. Petals purple or bicolored, the wings then with pale or white tips, exceptionally (in Esmeralda Co.) white-tinged with lavender at the base. 56 b. var. PURPURPEUS

56 a. var. BECKWITHII

Hillsides and canyon-banks, in alkaline gravelly soils, preferring limestone, either with sagebrush or budsage, 4200-6450 ft., common and locally abundant in and around the basin of Great Salt Lake, the Sevier Basin and Escalante Desert of W. Utah, extending feebly into E. Elko Co. Nevada.

56 b. var. PURPURPEUS Jones, Zoe 3: 288. 1893 (A. artemisiarum Jones).

Gravelly flats, hillsides and gullied knolls, with pinyon and low sagebrush, strongly calciphile, 5900-6500 ft., locally abundant in the valleys and foothills of E.-Centr. and S. Nevada (Lincoln to extreme S. Elko, N. Nye and Esmeralda Cos.: Charleston Mts., Clark Co.), the type from Nevada, the locality not precisely stated (Jones).

57. A. ANDERSONII Gray, Proc. Amer. Acad. 6: 524. 1864.

Loosely tufted, caulescent perennial, densely gray-villous throughout with fine spreading hairs, the base of the stems more shortly white-tomentose; stems decumbent and ascending, 1-2 dm. long, simple or nearly so; stipules 2-7 mm. long, the lowest, scarious connate through nearly half their length into a sheath, the upper ones amplexicaul but nearly free; leaves 3-10 cm. long, with 13-21 mostly elliptic-oblongate acute leaflets, 3-10 mm. long, keeled dorsally by the midvein; peduncles ascending, 3-7 cm. long, the flowers ascending and then declined, the axis elongating, 2.5-8 cm. long in fruit; calyx-tube campanulate, 3.5-4.5 mm., the subulate-setaceous teeth 2.5-4.5 mm. long; petals whitish or cream-colored, often tinged with lavender, banner gently recurved, 9.5-14.5 mm., keel 6.5-9 mm. long; pod declined, sessile, narrowly

oblong or lanceolate in outline, 12-18 mm. long, 3-4.5 mm. diam., lunately or falcately incurved, triquetrously compressed with low-convex, lateral and narrower, shallowly sulcate, dorsal faces, the papery villous or villous-tomentulose valves inflexed as a complete septum.

Sandy flats, hillsides and valley-floors, on granite or basalt, usually among sagebrush, 4300-7200 ft., locally plentiful in a narrow strip along the E. slope and foothills of the Sierra Nevada from Mono Lake, California, through the lower Carson and Truckee valleys (Ormsby and S. Washoe Cos.) and re-entering California in Lassen Co., the type from Carson City (Anderson in 1863).

58. A. AUSTINAE Gray, Bot. Calif. 1: 156. 1876.

Dwarf, densely tufted, matted or subpulvinate perennial, silvery-villous and often somewhat tomentulose with lustrous, ascending hairs; stems 0-6 cm. long, the internodes mostly concealed by the scarious amplexicaul-sheathing, connate stipules; leaves 1-3 cm. long, with 7-13 (-17), crowded elliptic-oblongate, sessile leaflets, 1.5-8 mm. long; peduncles 1-4 cm. long; racemes subcapitately 4-15-flowered, the flowers gathered into dense ovoid or subglobose heads, the axis scarcely elongating, not over 1.5 cm. long in fruit; calyx-tube campanulate (or becoming tumid and then ovoid-campanulate), 3.5-5.5 mm., the teeth 3-4.5 mm. long; petals whitish tinged or veined with lilac, all silvery-villosulous dorsally and marcescent, banner gently recurved, 8.5-10.5 mm., keel 6.5-8 mm. long; pod subsessile and included in the calyx or nearly so, subsymmetrically oblong-ovoid, 6-7 mm. long, 3-3.5 mm. diam., compressed-triquetrous with low-convex, lateral and narrower, sulcate dorsal faces, the papery, densely tomentulose valves inflexed as a complete septum.

Dry, exposed crests and ridges, 8000-11,000 ft., peaks of the N. Sierra Nevada in Placer and Nevada Cos., California, and Mt. Rose, Washoe Co., Nevada.

59. A. OBSCURUS Wats., Bot. King Expl. 69. 1871.

Low slender, wiry caulescent or subacaulescent perennial, more or less strigulose, the stems greenish or cinereous; stems 0.5-15 cm. long, when short the leaves and peduncles appearing subradical, but usually with 1-5 developed internodes and then prostrate or ascending; stipules 2-5 mm. long, the lowest ovate, loosely imbricated, rather strongly decurrent but free, the upper ones narrower; leaves 4-10 cm. long, with 7-13 usually distant leaflets, 2-10 (-15) mm. long, varying from broadly oblong-elliptic to linear-elliptic and retuse to acutish, those of the lower leaves usually broadest; peduncles stiff but slender, 3-15 cm. long; racemes 6-14-flowered, the flowers ascending, the axis 2-8 cm. long in fruit; calyx-tube campanulate, 2.5-4 mm., the teeth 0.5-1.5 mm.

long; petals ochroleucous, often suffused with dull lilac, little graduated, the banner 7-10.5 mm., keel 7-10 mm. long, narrowly triangular at apex; pod strictly erect, sessile, linear-oblong in outline, straight, 1.3-2.5 cm. long, 2.5-3.5 mm. diam., cuneate at both ends, obtusely triquetrous with convex, lateral and openly sulcate, dorsal faces, the leathery strigulose valves inflexed as a nearly complete septum.

Stony flats, hillsides and barren ridges, in sand or clay derived from basalt, 3500-6500 (-8000) ft., nearly always among sagebrush, widely dispersed and locally common throughout the drainage of the Humboldt, lower Carson and lower Truckee rivers, Nevada, to NE. California, SE. Oregon and SW. Idaho, the type from foothills near Truckee Pass (Watson 266).

60. *A. REMOTUS* (Jones) Barneby, Leaflet. West. Bot. 4: 59. 1944.

Slender, sparsely leafy perennial, thinly strigulose, the herbage greenish, the leaflets glabrous above; stems erect and ascending, 1.5-4 dm. long, simple or nearly so; stipules 2-4 mm. long, more or less amplexicaul-decurrent, free; leaves 4-15 cm. long, with 11-19 oblong or narrowly obovate obtuse or shallowly retuse leaflets, 2-13 mm. long; peduncles stiffly erect, 6-17 cm. long; racemes loosely and often remotely 8-15-flowered, the flowers ascending, the axis 5-15 cm. long in fruit; calyx-tube campanulate, 3-4 mm., the teeth 1-2 mm. long; petals ochroleucous, banner gently recurved, 10.5-13.5 mm., keel faintly lilac-tipped, 8.5-9.5 mm. long; pod stiffly erect, stipitate, the slender, straight stipe 3.5-7 mm. long, the body linear-oblong in outline, 1.5-3 cm. long, 2.5-4 mm. diam., straight or nearly so, cuneate at both ends, compressed-triquetrous with nearly flat, lateral and narrow, shallowly sulcate, dorsal faces, the papery, glabrous valves inflexed as a nearly complete septum.

Rocky hillsides and canyons, in dry gravelly soil on sandstone and limestone, 3600-5500 ft., locally abundant but known only from a few stations in the E. and SE. foothills of the Spring and Charleston Mts., Clark Co., Nevada, the type (of *A. arrectus* var. remotus Jones, Rev. Astrag. 162. 1923) from Good Springs (Jones).

61. *A. EREMITICUS* Sheld., Minn. Bot. Stud. 1: 161. 1894.

Caulescent perennials, sparsely strigulose, herbage green, leaflets glabrous above; stems several, erect or ascending, 1-5 dm. long, simple or nearly so; stipules 3-11 mm. long, the lowest mostly ovate, often imbricated, the upper narrower, more or less amplexicaul-decurrent but free; leaves 4.5-18 cm. long, with 11-23 ovate, broadly oblong or elliptic obtuse or retuse leaflets, 5-25 mm. long; peduncles erect, 2.5-17 cm. long; racemes 10-26-flowered; calyx-tube deeply campanulate or subcylindric, 4.5-7.5 mm., the

teeth 1-2.5 mm. long; banner gently recurved, 14.5-20 mm., keel 10.5-14 mm. long; pod erect stipitate, the stiff stipe 7-15 mm. long, spreading from the axis of the raceme but incurved to perpendicular, the body narrowly oblong or oblong-ellipsoid, 1.5-2.7 cm. long, 3.5-7.5 mm. diam., straight or nearly so, cuneately contracted at base into the stipe and at apex into a short triangular, porrectly cuspidate beak, bluntly triquetrous and a trifle obcompressed with low-convex, lateral and openly sulcate, dorsal faces, the stiffly papery or leathery, glabrous valves inflexed as a nearly complete septum. Two vars.:

1. Racemes lax and distantly flowered, well-exserted, the calyx subsymmetrical at base and the flowers ascending at anthesis, the axis 5-17 cm. long in fruit; petals purple with white wing-tips; S. Nevada. 61 a. var. EREMITICUS
1. Racemes more compact, exserted just beyond the leaves; calyx distended dorsally at base and oblique, flowers horizontal or declined at anthesis, axis 2.5-10 cm. long; petals uniformly ochroleucous. 61 b. var. SPENCIANUS

61 a. var. EREMITICUS

Open slopes among pinyons and junipers, sometimes in sparse sagebrush, in gravelly clay soils mostly of calcareous origin, 3000-5500 ft., uncommon, NW. Arizona, SW. Utah, and entering Nevada in E. Clark and Lincoln Cos.

61 b. var. SPENCIANUS Jones, Contrib. West. Bot. 10: 60. 1902.

Open valleys, foothills and rolling plains, in stiff clay or sandy alluvial soils nearly always derived from basalt, commonly in sagebrush, widespread and locally abundant in the valley of the Humboldt River in Humboldt, N. Lander, Eureka, Elko and White Pine Cos., Nevada, to SE. Oregon and SW. Idaho, the type from E. Nevada (Jones).

62. A. BOLANDERI Gray, Proc. Amer. Acad. 7: 337. 1868.

Rather robust, sparsely leafy perennial, loosely strigulose or villosulous but the stems glabrous toward the leafless base, the herbage greenish-canescens; stems erect or decumbent, 1.5-4 dm. long; stipules scarious pallid, 2-6 mm. long, the lowest united opposite the petiole into a rather loose (fragile and sometimes ruptured) sheath, the upper ones free or nearly so; leaves 4-12 cm. long, with 17-25 narrowly oblong-elliptic or oblanceolate, usually acute leaflets, 5-20 mm. long; peduncles erect, shorter than the leaf, 3-8 cm. long; racemes shortly 8-18-flowered, the axis little elongating, 1-3 (-5) cm. long in fruit; calyx-tube campanulate, 4.5-6.5 mm., the teeth 2.5-5.5 mm. long; petals whitish, banner gently recurved, 13-17.5 mm., keel 10-12.5 mm. long; pod stipitate, the slender, straight or incurved stipe nearly hori-

zontal, 5-12 mm. long, the very obliquely ovoid or ovoid-acuminate body set at an angle to the stipe and so strongly incurved as to bring the beak either vertical or directed inward toward the raceme-axis, inflated but scarcely bladdery, 1.5-2.5 cm. long, 6-12 mm. diam., subtruncate at base, a little dorsoventrally compressed and sulcate on both sutures, the stiffly papery, glabrous valves inflexed (below the 1-locular, laterally flattened deltoid beak) as a complete septum.

Dry stony meadows and openings in coniferous forest, mostly above 6500, rarely up to 10,000 ft., common on the W. slope of the Sierra Nevada, California, and extending E. of the crest around Lake Tahoe to the higher slopes of Mt. Rose, Washoe Co., Nevada.

63. *A. ABORIGINUM* Richards., Frankl. Journ. 756. 1823.

Caulescent perennial, very variable in stature and pubescence, the ascending or nearly prostrate stems 2-26 cm. long, the herbage sparsely to densely strigulose with appressed or villous-tomentose, spreading or curly and entangled hairs, sometimes nearly glabrous, the leaflets either pubescent or glabrous above; stipules 2-7 mm. long, the lowest ones approximate or imbricated, broadly ovate and commonly broader than the stems, amplexicaul and shortly connate, the upper ones narrower; leaves 1-7 cm. long, with 7-15 broadly to narrowly elliptic acute or obtusish leaflets, 3-27 mm. long, peduncles 2-8 cm. long; racemes 5-30-flowered, the flowers spreading and then declined, the axis elongating, 1-20 cm. long in fruit; calyx-tube campanulate 3-6 mm., the teeth 1.5-3 mm. long; petals white or cream-colored sometimes tinged with lilac, banner gently recurved, 7.5-11 mm., keel prominently maculate, 6.5-9 mm. long, slightly shorter than the bidentate wings; pod pendulous stipitate, the stipe 2.5-8 mm. long, the narrowly ellipsoid, slightly decurved body, 1-2.5 cm. long, 2-5.5 mm. wide, laterally compressed but turgid in age, bicarinate by the convexly arched, ventral and straight or slightly concave, dorsal sutures, the papery-membranous valves glabrous or strigulose, inflexed as an obscure septum 0.5 mm. wide or less.

A polymorphic species of extensive range in the Rocky Mts. from Colorado to Alaska, E. interruptedly to Hudson Bay and Quebec, and W. into the mountains of the Great Basin, entering Nevada in the Ruby Mts., Elko Co., there occurring rarely on stony meadows and turfey banks about 11,000 ft.

The description above includes most of the variations (and several named segregates) found in the species as it occurs in the western U. S. The Nevada plants are villous, with relatively broad leaflets and glabrous pods, thus agreeing fairly well with *A. aboriginum* in the narrowest sense.

64. *A. OCCIDENTALIS* (Wats.) Jones, Contrib. West. Bot. 10: 17. 1898
(*A. macounii* Rydb.).

Slender, caulescent perennial, green and appearing glabrous but the stems and lower leaf-surface sparsely strigulose, the leaflets bicolored, pale or glaucous below; stems 1.5-4 dm. long, weakly ascending, simple; stipules dimorphic, the lowest ovate obtuse, several-nerved, amplexicaul and broader than the stem, nearly always shortly connate, the upper ones progressively narrower, free; leaves 4-12 cm. long, with 9-13 oval or oblong-ob lanceolate obtuse, pinnately nerved, thin-textured leaflets, 0.5-3 cm. long; peduncles ascending, 4.5-19 cm. long; racemes loosely 10-25-flowered, the flowers early declined and secund, the axis much elongating, 6-17 cm. long in fruit; calyx-tube black-hirsutulous, campanulate, 3-4 mm., the teeth 0.5-2 mm. long; petals purplish, drying bluish, banner gently recurved, 8-11 mm., keel 6-7.5 mm. long; pod pendulous stipitate, the stipe up to 3 mm. (in ours mostly 0.7-1 mm.) long, the ellipsoid body acute or cuneately contracted at both ends, 1-1.5 cm. long, 3.5-4.5 mm. diam., straight or a trifle arched downward, obtusely compressed-triquetrous with acute ventral and obtuse lateral angles, flattened but not sulcate dorsally, the papery-membranous valves loosely strigulose with black hairs, inflexed as an obscure septum about 0.5 mm. wide.

Stream-banks, mountain meadows, damp thickets and glacial moraines, often with willows and shrubby cinquefoil, in lowland northward but ascending to 10,550 ft. near its southern limit, widespread and locally common, Alaska to Great Bear Lake, S. in the Rocky Mts. to NE. Washington, Centr. Idaho, NE. Nevada and Colorado, known with us only from moderate and high elevations (6050 ft. upward), in the Ruby and East Humboldt Mts., Elko Co.

The type of *A. robbinsii* var. *occidentalis* Wats. (Bot. King Expl. 70. 1871) from the East Humboldt Mts. (Watson 268) represents a minor local variation of the common Cordilleran species often passing as *A. macounii* Rydb., distinguished solely by the relatively short, short-stipitate pod.

65. *A. ALPINUS* L., Sp. Pl. 760. 1753.

Low weak, usually shortly caulescent perennial, more or less strigulose or villosulous, the herbage usually green; stems arising from slender, widely creeping, subterranean caudex-branches (seldom collected), 1-15 cm. long above ground; stipules herbaceous, ovate or broadly lanceolate, 1.5-8 mm. long, mostly broader than the stem, connate at least at base and the lowest often through half their length; leaves 3-11 cm. long, with 15-25 mostly oval-ovate obtuse or retuse (rarely narrower) and acutish, thin-textured leaflets, 2-20 mm. long; peduncles 3-13 cm. long; racemes compactly 7-17-flowered, the flowers nodding, the axis somewhat elongating, 0.5-4 cm. long in fruit; calyx-tube campanulate, black-hairy, 2-3.5 mm., the teeth 1-3 mm. long; petals bicolored, whit-

ish below, the banner margined and veined and the broad blunt keel tipped with bluish lavender, irregularly graduated, the banner and keel subequal, 7.5-13 mm. long, the narrow wings 0-1.5 mm. shorter; pod pendulous, stipitate, the stipe 1.5-3 mm. long, the half-ellipsoid body 7-14 mm. long, 2.5-4 mm. diam., straight or gently incurved, triquetrously compressed, carinate by the ventral suture, the dorsal face widely sulcate, the papery-membranous valves densely hirsutulous with black fuscous and often some white hairs, inflexed as a narrow and incomplete hyaline septum less than 1 mm. wide.

The most widely dispersed *Astragalus*, consisting of several races, common in high latitudes around the N. Hemisphere, descending S. in the mountains of Europe and Asia and in the Rocky Mts. to New Mexico, South Dakota, E. Washington and entering Nevada in the Ruby and East Humboldt Mts., where rather frequent on creek-banks, in aspen-groves, and in cool moist meadows or turfy banks from 6050 ft. up to timberline.

66. A. ATRATUS Wats., Bot. King Expl. 69. 1871.

Low wiry, sparsely leafy, caulescent perennials, strigulose nearly throughout, the herbage cinereous or canescent, the leaflets often glabrous above; stems weakly ascending, 3-30 cm. long, forming loosely tufted mats; stipules 1.5-4 mm. long, the lowest mostly imbricated, ovate obtuse, strongly amplexicaul but not connate, the upper ones narrower; leaves 3-15 cm. long, with 9-13 distant linear, linear-setaceous or, in some lower leaves, oval-oblong obtuse or acutish leaflets, 5-16 mm. long; peduncles incurved-ascending, 5-15 cm. long; racemes loosely, sometimes remotely 6-30-flowered, the flowers nodding on slender, often filiform pedicels, the axis 3-30 cm. long in fruit; calyx-tube campanulate, 3-4.5 mm., the teeth 1-2.5 mm. long; petals whitish veined or suffused with dull lavender, banner strongly recurved, 8-12 mm. long; pod pendulous, stipitate, the stipe 0.5-2 mm. long, the body narrowly oblong-oblongeolate in outline, a trifle decurved, 1-2.2 cm. long, 2.5-4 mm. diam., a little obcompressed with convex ventral and lateral faces and deeply sulcate, dorsal face, the valves usually mottled, strigulose. Two vars.:

1. Wing-petals deeply cleft at apex into two divaricate lobes, 1-2.5 mm. long; pod nearly 2-locular, the stiffly papery valves inflexed as a septum about 1 mm. wide; leaflets variable in shape but the terminal one always jointed to rachis.

66 a. var. ATRATUS

1. Wing-petals rounded or shallowly notched at apex; pod almost 1-locular, the thinly papery valves not or only vestigially inflexed; leaflets linear, those of the upper leaves, sometimes of all, much reduced, the terminal one confluent with rachis.

66 b. var. OWYHEENSIS

66 a. var. ATRATUS

Gravelly ridges and hillsides, mostly on eruptive rocks, commonly scattered among and sheltering under sagebrush, 4900-8100 ft., widespread and rather frequent on the higher plains and foothills of N. Nevada (Elko, Eureka, Humboldt, Lander, N. Nye and White Pine Cos.), the type from the Pah-Ute Mts., Pershing Co. (Watson 265). Including A. atratus var. stenophyllus Jones (Zoe 3: 297. 1893), the type from Palisade, Eureka Co. (Jones 3840), and var. phyllophorus Jones (Contrib. West. Bot. 10: 62. 1902), the type from "Nevada" (Jones). In Elko Co. intergrading with the next.

66 b. var. OWYHEENSIS (Nels. & Macbr.) Jones, Rev. Astrag. 182. 1923.

Similar habitats, N. Elko Co., Nevada, N. through SW. Idaho to the Blue Mts., E. Oregon.

67. A. CALYCOSUS Torr. ex Wats., Bot. King Expl. 66. 1871.

Dwarf, tufted or sometimes mounded, acaulescent perennials, densely gray- or silvery-strigose with straight dolabriform hairs; stipules 1.5-6 mm. long, ovate or triangular imbricated, free; leaves 1-12 cm. long, with slender petioles and 1-13 obovate-cuneate to oblanceolate acute or obtuse leaflets, 2-19 mm. long; peduncles 1-7 cm. long and weakly ascending or, in one var. up to 18 cm. long and erect; racemes loosely but usually very shortly 1-8 (exceptionally -17) -flowered, the axis 1-30 (-70) mm. long in fruit; calyx-tube campanulate, 3.5-6.5 mm., teeth 0.5-4 mm. long; petals whitish, flesh-colored, milky-blue or bright purple, the apically dilated and deeply bidentate wing-tips uniformly white, banner gently recurved, 9.5-16.5 mm., keel 7.5-11.5 mm. long; pod ascending, sessile, oblong-elliptic, linear-oblong or lance-acuminate in outline, 1-2 cm. long, 3-4.5 mm. diam., straight or gently lunate-incurved, compressed-triquetrous with nearly flat, lateral and narrower sulcate, dorsal faces, the papery, cinereous-strigulose valves inflexed as a complete septum.

A widespread species of the Great Basin, most abundant and variable in Nevada, where represented by 4 poorly differentiated and intergradient vars.:

1. Leaves 1-6 cm. long, with 1-7 (in var. mancus up to 13 but then very small and crowded) leaflets disposed on a rachis 0-1 cm. long; racemes 1-6 (-8)-flowered, the axis 2-20 (-30) mm. long in fruit; calyx variable, mostly northern (2)
2. Leaves, except a few primary ones, 3-several-foliolate (3)
3. Leaflets 3-7, (3-) 5-19 mm. long; widespread, mostly at middle altitudes. 67 a. var. CALYCOSUS
3. Leaflets 7-13, mostly 2-6 mm. long; high-montane.

67 c. var. MANCUS

2. Leaves all, or nearly all, reduced to a single terminal leaflet; local in Centr. Nevada. . . . 67 b. var. *MONOPHYLLIDIUS*
1. Leaves 2.5-12 cm. long, with (5-) 7-13 leaflets disposed on a rachis 0.5-4 cm. long; racemes 4-17-flowered, the axis 1-7 cm. long in fruit; calyx 4.7-6.6 mm. long, the teeth 0.5-2 mm. long; SE. Nevada. 67 d. var. *SCAPOSUS*

67 a. var. *CALYCOSUS*

Dry open hillsides, knolls and ridges, in gravelly clay or sandy soils, commonly on limestone, with sagebrush, pinyon and juniper, 4200-7400 ft. (but up to 11,300 ft. in the Wassuk and 10,500 ft. in the Toiyabe Range), widespread and common nearly throughout Nevada (excepting the Larrea deserts to the S. and the NE. corner of the State), the type from western Nevada (Torrey).

67 b. var. *MONOPHYLLIDIUS* (Rydb.) Barneby, Leaflet. West. Bot. 3: 107. 1942.

Open gravelly hillsides, on limestone, in juniper-pinyon forest, 5600-6300 ft., locally common but known only from a small area in NE. Nye and Eureka Cos., Nevada, the type (of *Hamosa monophyllidia* Rydb., N. Amer. Fl. 24: 421. 1929) from Currant (Georgia H. Bentley in 1916).

67 c. var. *MANCUS* (Rydb.) Barneby, Leaflet. West. Bot. 7: 195. 1954.

Bare rocky ridges at or near timberline, descending into openings of yellow pine-forest, commonly but not exclusively on limestone, (8400-) 9000-13,000 ft., scattered in the higher mountains of Nevada: Charleston Peak, Clark Co.; Toiyabe and probably Toiyabe ranges (where passing into var. 67 a.), Nye Co.; Ruby and East Humboldt Mts., Elko Co.; Snake Range, White Pine Co.; also in the Deep Creek Mts., W. Utah; the type (of *Hamosa manca* Rydb., Bull. Torr. Club 54: 17. 1927) from the Clover Mts. near Deeth, Elko Co. (Heller 9163).

67 d. var. *SCAPOSUS* (Gray) Jones, Zoe 4: 26. 1893. (A. scaposus Gray).

Sandy or gravelly hillsides, plains and mesas, on sedimentary formations, in Nevada between 4500-5000 (southward up to 6000) ft., widespread and rather common across N. Arizona to extreme NW. New Mexico and SW. Colorado, entering Nevada in SE. Lincoln Co. The Nevada material not wholly typical of the robust Arizona forms and intergradient to var. 67 a.

68. *A. MOHAVENSIS* Wats., Proc. Amer. Acad. 20: 361. 1885.

Low caulescent, winter-annuals or short-lived perennials, densely silvery- or white-strigulose throughout; stems slender,

decumbent or ascending, (1-) 3-35 cm. long; stipules small deltoid, free; leaves 2-10 cm. long, with 5-11 obovate or elliptic obtuse or acutish leaflets, 5-18 mm. long; peduncles equalling or a little shorter than the leaf, ascending but at length weighed down by the pods; racemes loosely 3-12-flowered, the flowers ascending or at length declined; the axis 1-7 cm. long in fruit; calyx-tube campanulate, 2.5-4.5 mm., the teeth 2-3 mm. long; petals pink-purple; banner gently recurved, 7-12.5 mm., keel broad obtuse, 6-9.5 mm. long, about equalling the narrower wings; pod declined or humistrate and apparently spreading sessile, variable in outline and curvature, 1.5-3 cm. long, subterete when first formed, laterally compressed or obtusely triquetrous when ripe, the fleshy valves becoming leathery, strigulose or minutely hirsutulous, inflexed as a nearly complete septum. Two vars.:

1. Pod plumply oblong or oblong-obovoid, straight or but little incurved, 1.5-3 cm. long, 5.5-8.5 mm. diam., the valves shrinking in age and leaving both sutures prominent (but when arched the dorsal suture depressed); banner 9-12.5 mm., keel 7.5-9.5 mm. long. 68 a. var. MOHAVENSIS
1. Pod oblanceolate, definitely and with us strongly incurved through about half a circle, 2.5-3 cm. long, 2.5-5.5 mm. diam., the dorsal suture deeply sulcate at maturity; banner 7-9 mm., keel 6-7.5 mm. long. 68 b. var. HEMIGYRUS

68 a. var. MOHAVENSIS

Rocky slopes in canyons or on cliff-ledges, commonly on limestone, 2500-5200 (-7400) ft., widespread and locally plentiful over the Mohave Desert to Death Valley, California, and entering Nevada in W. Clark and S. Nye Cos.

68 b. var. HEMIGYRUS (Clokey) Barneby, *El Aliso* 2: 207. 1950. (A. albens of Nevada references).

Limestone rock ledges and gravelly hillsides, about 4100 ft., rare and local, the typical form known only from Indian Springs, Clark Co. (whence the type of A. hemigyris Clokey, *Madrone* 6: 220. 1942, Clokey 8409), but forms transitional to var. 68 a occur in Death Valley region, California.

69. A. LEMMONI Gray, *Proc. Amer. Acad.* 8: 627. 1873.

Very slender, prostrate perennial, green but sparsely strigulose, the leaflets glabrous above; stems 1-3 dm. long, floriferous from well below the middle, the lower nodes bearing a peduncle or a peduncle and a spur together, the spurs reduced upward to a single depauperate, sessile raceme and the peduncles then disposed in unequal axillary pairs; stipules 2-4 mm. long, decurrent around half or more of the stems's circumference, free; leaves 1-4 cm. long, with 9-13, narrowly elliptic or oblanceolate, mostly acute

leaflets, 2-10 mm. long; peduncles subfiliform, 0.5-1.5 cm. long; racemes loosely but shortly 5-9-flowered, the flowers ascending, the axis 2-10 mm. long in fruit; calyx-tube campanulate, about 2 mm., the teeth 1-1.5 mm. long; petals whitish veined or tinged with lilac, banner abruptly recurved, 5-6 mm., keel 3.5-4 mm. long; pod spreading or declined, sessile, oblong-ellipsoid, 4-7 mm. long, 1.5-2 mm. diam., compressed-triangular with flat, lateral and narrower grooved, dorsal faces, the papery, strigulose valves inflexed as a complete or nearly complete septum.

Moist but often summer-dry meadows and alkaline, rushy flats among streams and lake-shores, mostly between 4200-5300 ft. (higher southward), locally plentiful in scattered stations along the E. foothills of the Cascades and Sierra Nevada and on the plains adjacent, from Centr. Oregon to Sierra Co., California and NW. Nevada ("Great Desert", presumably Washoe Co., Lemmon in 1875); also in Mono Co., California, and to be sought on the upper Walker River in S. Lyon and W. Mineral Cos., Nevada.

70. A. TOQUIMANUS Barneby, Leaflet. West. Bot. 3: 111. 1942.

Slender wiry, caulescent perennial, the herbage strigulose, greenish or cinereous; stems ascending, simple, 7-30 cm. long; stipules 1.5-3 mm. long, more or less decurrent, free; leaves 4-11 cm. long, with 9-17 oblong-oblongeolate or linear-oblong, obtuse or retuse leaflets, 3-15 mm. long; peduncles 2.5-6 cm. long; racemes loosely 9-30-flowered, the flowers ultimately declined, the axis 4.5-13 cm. long in fruit; calyx-tube campanulate 2.5-3 mm., the teeth 1-1.5 mm. long; petals ochroleucous, veined with dull lilac, subequal, banner abruptly recurved, 7-7.5 mm. long, keel narrowly triangular at apex; pod pendulous stipitate, the stipe 3-4 mm. long, the body narrowly oblongeolate or oblong in outline, gently lunate-incurved, 1.8-2.5 cm. long, 3.5-4.5 mm. diam., sharply triangular with flat lateral, and depressed, openly sulcate dorsal faces, the papery, glabrous, mottled valves inflexed as a complete septum.

Gravelly hillsides and canyon-benches among pinyon and juniper, often sheltering under and entangled in sagebrush, rare but locally plentiful at about 7000 ft. on the E. slope of the Toquima Range, Nye Co., Nevada, the type from between Belmont and Manhattan (Ripley & Barneby 3692, 3996).

71. A. STRATURENSIS Jones, Contrib. West. Bot. 8: 19. 1898.

Slender diffuse, wiry caulescent perennial, the herbage strigulose, green or cinereous, the leaflets glabrous above, the inflorescence commonly nigrescent; stems numerous, ascending, 2-3 dm. long, simple or nearly so, forming low clumps; stipules 1-2.5 mm. long, the lowest triangular, more or less decurrent but free, the upper ones narrower; leaves 3.5-9 cm. long, with 11-17 linear-ob-

long or oval, obtuse or retuse leaflets, 3-13 mm. long; peduncles 1.5-6 cm. long; racemes loosely 10-25-flowered, the flowers early declined, the axis at length 3.5-14 cm. long; calyx-tube campanulate, 2.5 mm., the teeth 1 mm. long; petals bright violet with white wing-tips, banner sharply recurved, 6.5-8 mm., keel 5-6 mm. long; pod pendulous, stipitate, the stipe 1.5-2 mm. long, the body narrowly oblong-oblongeolate in outline, gently incurved or nearly straight, 1-1.5 cm. long, 2-3 mm. diam., cuneate at both ends, triquetrously compressed with acute ventral and rounded lateral angles, deeply sulcate dorsally, the pale green valves minutely strigulose, inflexed as a nearly complete septum.

Dry slopes and ridges, in limestone gravel among junipers and pinyons or at the edge of oak-thickets, 6050-7050 ft., rare and local, known only from the Needle Mts. and Highland Range, E. Lincoln Co., Nevada, and the Pine Valley Mts. in adjacent Utah.

72. A. ACUTIROSTRIS Wats., Proc. Amer. Acad. 20: 360. 1885.

Slender annual, strigulose or villosulous with appressed or incurved hairs, the herbage greenish or cinereous; stems either solitary and erect or branched at base and ascending, 3-25 cm. long; stipules deltoid, free, small; leaves 1.5-4 cm. long, with 9-15 obovate or cuneate, retuse leaflets, 3-8 mm. long, peduncles erect, 1.5-6 cm. long; racemes loosely 3-6-flowered, the flowers ascending, the axis 1-4 cm. long in fruit; calyx-tube campanulate, 1.5-2 mm., the teeth 1-1.5 mm. long; petals purplish, banner 5-7 mm., keel 4.5-6 mm. long, its blades narrowly triangular or cuspidate at apex; pod resupinate on contorted pedicels, erect or pendulous, linear-oblong in outline, gently incurved, 1.2-2.2 cm. long, 2.5-3 mm. diam., laterally compressed-triquetrous, the sulcate dorsal face narrower than the nearly flat lateral ones, the papery, strigulose valves inflexed as a complete septum.

Sandy deserts, with Larrea or Joshua-tree, mostly below 5200 ft., W. Colorado and Mohave Deserts, California, extending infrequently N. and E. into Clark and S. Nye Cos., Nevada; reported from Hawthorne, Mineral Co.

73. A. NUTTALLIANUS DC. var. IMPERFECTUS (Rydb.) Barneby, Leaflet West. Bot. 3: 109. 1942.

Our forms quite like the preceding in growth-habit, flower and pod; leaflets 7-13, elliptic or oval, acute or obtuse, strigulose; keel obtuse; pod ascending from arched but not twisted pedicels, linear-oblong, gently incurved, 1.2-2.1 cm. long, 2-3 mm. diam., triquetrous with obtuse lateral angles, sulcate (or when fully ripe nearly flat) dorsally, the papery valves either glabrous or strigulose, not inflexed or inflexed as a complete septum.

Sandy or gravelly deserts below 4200 ft., fairly frequent in

Clark, S. Esmeralda, S. Nye (and doubtless S. Lincoln) Cos., Nevada, the type (of Hamosa imperfecta Rydb., Bull. Torr. Club 54: 329. 1927) from Rhyolite, Nye Co. (Heller 9637); to SW. and N. Utah, W. and Centr. Arizona and SE. California.

Plants with and without septum in the pod occur in uniform populations but are otherwise inseparable, the epithet imperfectus (alluding to the absence of partition, hence inappropriate to much of our material) here taken up for both forms, that with developed septum (var. trichocarpus of Nevada references) being clearly distinct from var. trichocarpus T. & G. (of Texas to S. Arizona and S. Mexico).

74. A. NYENSIS Barneby, Leaflet. West. Bot. 7: 195. 1954.

Resembling the two preceding in general habit, flower and pod, gray-hirsutulous throughout with ascending and incurved hairs; stems 1-17 cm. long, the central one erect, very short, the lateral ones longer and prostrate; leaflets 7-13, oblong-obovate retuse, 2-7 mm. long; peduncles 3-15 (-25) mm. long; racemes 1-4-flowered, the axis up to 1.5 cm. long in fruit; petals whitish, veined with lilac, the banner 4-5.5 mm., the obtuse keel 4-4.5 mm. long; pod spreading or declined, linear-oblong, 1.3-1.8 cm. long, 3-4 mm. diam., gently and evenly incurved through $\frac{1}{4}$ - $\frac{1}{2}$ -circle, the valves hirsutulous, inflexed as a complete septum.

Calcareous gravel knolls, stiff clay slopes and flats, usually with Larrea, 2050-4500 ft., rare and local, known only from scattered stations in S. Nye and Clark Cos., Nevada, the type from the Spotted Range, Nye Co. (Ripley & Barneby 3430).

75. A. DIDYMOCARPUS H. & A., Bot. Beechey Voy. 334. 1838.

Slender annual, loosely strigulose or villosulous, the herbage greenish-canescenscent, the calyx pilosulous; stems (with us) prostrate, radiating, 5-20 cm. long; stipules small, free; leaves 1.5-5 cm. long, with 9-15 oblong-obovate, linear-oblong or cuneate retuse leaflets, 2-10 mm. long; peduncles slender, a little longer or shorter than the leaves; flowers 7-20, erect, subsessile and crowded into small ovoid heads about 1-1.5 cm. long; calyx-tube campanulate, 2-2.5 mm., the subulate teeth 1-1.5 mm. long; petals whitish, tinged with lilac, the banner 4-5.5 mm. long; pod erect, sessile, invested by the calyx, ovoid to subglobose, about 3 mm. long, keeled ventrally and divided dorsally by a deep groove into two cross-wrinkled, saclike, 1-seeded lobes, the pubescent valves inflexed as a narrow but nearly complete septum.

Sandy soil of desert valleys, with Larrea, foothills of the Funeral Mts., about 3400 ft., Nye Co. Nevada (C. L. Hitchcock 6193); also in Centr. and W. Mohave Desert and widespread in cismontane California.

An exclusively desert race of A. didymocarpus, the var. dispermus (Gray) Jeps., differing principally in its copiously white-hairy calyx, long calyx-teeth, and (reportedly) in the chromosome complement, ranges from S. Arizona and N. Sonora to the S. and E. Mohave Desert, California, and has been collected within a few miles of the Nevada line in NE. San Bernardino Co.; to be looked for in Clark Co.

76. A. AGRESTIS Dougl. ex Don, Gen. Hist. Dichl. Pl. 2: 258. 1852. (A. goniatus Nutt.).

Slender weak-stemmed perennial, the stems and herbage thinly strigulose or pilosulous or nearly glabrous, the inflorescence villous-pilose; stems few or solitary, arising from a subterranean root-crown or from widely forking subterranean caudex-branches, erect or decumbent, 8-25 cm. long; stipules 2-10 mm. long, all connate-amplexicaul, the lowest scarious, the longer upper ones with herbaceous blades; leaves 3-10 cm. long, with 13-21 lanceolate or oval retuse or obtuse leaflets, 4-18 mm. long; peduncles 1.5-11 cm. long; racemes densely 5-15-flowered, the erect flowers crowded into scarcely elongating ovoid or oblong heads and subtended by oblong herbaceous bracts, 3-7 mm. long; petals magenta-purple with white wing-tips, lilac, whitish or ochroleucous tinged with lilac, banner little recurved, 17-22 mm., keel 11.5-14 mm. long; calyx-tube cylindric or deeply campanulate, 5-7.5 mm., the teeth 3-5 mm. long; pod erect, obscurely stipitate, the glabrous stipe 1 mm. long or less, the body ovoid or oblong-ellipsoid, nearly straight, 7-10 mm. long, 3-5 mm. diam., truncate at base, abruptly cuspidate at apex, triquetrously compressed, carinate ventrally, the dorsal face widely but deeply sulcate, the papery valves densely silky-villous with lustrous hairs up to 1-2 mm. long, inflexed as a complete septum.

Moist meadows, stream-banks, grassy pockets on sagebrush hillsides, sometimes on summer-dry clay flats, ditches and lake-shores, commonly of middle altitudes but ascending to 10,600 ft. in the mountains, widespread and common in the Rocky Mts. and N. Great Plains from N. New Mexico to the upper Yukon Valley, E. to Minnesota and Kansas, and W. across the Great Basin to E. Washington, NE. California, N. Nevada (Washoe, Elko, Humboldt and White Pine Cos.) and S. Utah, apparently not common with us except in the NE. corner of the State. Note: A. cicer L. (Sp. Pl. 1067. 1753), an Old World species related to the preceding but differing in its taller diffuse stems, pale yellow petals and more strongly inflated pod (12-15 mm. long, 7-9 mm. diam.) has become sparingly naturalized in meadows and along creek-banks in western U. S., and is to be expected on ranch-lands in N. Nevada. Specimens in advanced fruit from Martin Creek R. S., Elko Co. (Train 895) are suggestive of A. cicer, but not sufficiently complete for definite identification.

77. *A. CANADENSIS* L. var. *BREVIDENS* (Gand.) Barneby, Leaflet. West. Bot. 4: 238. 1946 (*A. spicatus* Nutt.; *A. canadensis* var. *mortoni* and *A. mortoni* of Nevada references).

Stout caulescent perennial, the erect or ascending stems arising singly or few together from running rootstocks, sometimes forming wide clumps or patches, strigose nearly throughout with appressed dolabriform hairs, the herbage green or cinereous, the leaflets either glabrous or pubescent above; stems 1.5-5.5 dm. long; stipules all connate into a scarious sheath, 3-14 mm. long; leaves 5-15 cm. long, with 13-25, mostly oblong-elliptic, obtuse leaflets, 5-30 mm. long; peduncles erect, 5-15 cm. long; racemes densely many-flowered, the subsessile flowers nodding and retrorse-ly imbricated in oblong heads 4-8 cm. long; calyx-tube deeply campanulate or subcylindric, gibbous-saccate at base behind the pedicel, 5.5-8.5 mm. long, the teeth 1-2.5 mm., the upper pair commonly deltoid and shorter than the rest; petals greenish-white or sordid, the banner 13-17.5 mm. long; pod erect, sessile, oblong-cylindric or oblong-ellipsoid, 10-15 mm. long, 3-4.5 mm. diam., abruptly contracted into a cuspidate beak, 1.5-3 mm. long, terete but shallowly sulcate dorsally, the ventral suture prominent, the fleshy strigulose valves becoming woody or stiffly leathery, inflexed as a complete septum.

Stiff alkaline soil moist in spring, especially along ditches and about ephemeral pools or seeps, meadows and bottomlands, mostly with sagebrush but ascending along creeks into the timber-belt, 4000-8100 ft. in Nevada, widely distributed over the N. Great Basin, common and locally abundant in the N. half of Nevada, extending S. to White Pine, N. Nye, Mineral and Ormsby Cos.; other varieties in the Rocky Mts., eastern U. S., and a closely related form in E. Asia. Including *A. torreyi* Rydb. (N. Amer. Fl. 24: 448. 1929), the type from Empire City, Ormsby Co. (Torrey in 1865).

EXCLUDED SPECIES

- A. accidens* Wats. Reported from Nevada by Tidestrom, but of entirely cismontane range around the N. Sacramento Valley, California and N. to S. Oregon, hardly to be expected E. of the Sierra crest.
- A. albens* Greene. Mentioned above under *A. mohavensis* var. *hemigyris* (No. 68).
- A. arrectus* Gray. Reported by Tidestrom, probably in allusion to *A. eremiticus* var. *spencianus* which long passed under this name.
- A. bernardinus* Jones. "Charleston Mts., Purpus", according to Jones, but no specimens seen by the writer, or by Clokey. A slender, small-flowered species of calcareous mountains in the Mohave Desert, California, extending to within a few miles of the Nevada state line in the New York Mts. Readily

distinguished from all our species by the erect, narrowly oblanceolate, sharply triquetrous, glabrous pod, 2.5-4.5 cm. long, 3.5-5 mm. diam., borne on and readily disjoining from a gynophore, 1-2 mm. long.

A. diphyus Gray. Mentioned above under A. lentiginosus var. araneosus (No. 21 j).

A. lentiformis Gray.

A. lentiginosus var. palans Jones. Mentioned under A. lentiginosus var. araneosus (No. 21 j).

A. mortoni Nutt. Mentioned under A. canadensis var. brevidens (No. 77).

A. striatus Nutt. Reported from Pleasant Valley, Pershing Co., by Watson, the specimens (Stretch) not seen, but surely misidentified, the species, widely ranging within and to the E. of the Rocky Mts., extending W. of the Continental Divide only to NE. Washington.

A. tejonensis Jones. Reported by Tidestrom. This name is a synonym of A. parishii Gray, a species of cismontane California not to be expected in Nevada. The report is perhaps based on an early collection of A. aequalis (No. 13), not dissimilar in the bladderly-inflated pod but otherwise distantly related.

OXYTROPIS DC. "Locoweed; Crazyweed; Oxytrope"

Perennial caulescent or acaulescent herbs with the aspect of some Astragali: leaflets usually asymmetrical at base; keel-petals abruptly narrowed into a cuspidate or mucronate apex; pod more deeply grooved ventrally than dorsally, the valves not inflexed, but the seminiferous suture often intruded, sometimes forming a false partition.

A genus of some 300 species, of montane, continental and arctic climates in the N. Hemisphere, most numerous in Centr. Asia, the 22 N. American chiefly of the Rocky Mts. and of high latitudes, several notoriously toxic to cattle, sheep and horses, but too rare in Nevada to cause much trouble.

KEY TO SPECIES

1. Stipules very shortly adnate to the base of the petiole; pod pendulous, stipitate. 1. O. DEFLEXA
1. Stipules adnate through half their length or more to the dilated scarious or chartaceous petiole-bases; pods erect or spreading, sessile (2)
 2. Herbage, calyx and pod more or less viscid-glandular, the calyx-teeth and pod glandular-warty; bracts glabrous dorsally. 2. O. VISCIDA
 2. Herbage, calyx and pod eglandular, silky-pilose; bracts pilose dorsally (3)

3. Flowers several (10-25), large, loosely racemose, the axis 1.5-18 cm. long in fruit; calyx 8-12.5 mm. long; banner white, 15-26 mm. long; pod oblong-ellipsoid, erect.

3. *O. SERICEA*

3. Flowers few (2-12, if more than 5 then the pod bladderly - inflated), small, subcapitate, the axis 1 cm. long or less in fruit; calyx 4.5-8 mm. long; banner purplish, 7.5-12.5 mm. long (4)

4. Pod erect ellipsoid, about 3-4 times longer than wide, not inflated or barely tumid, the valves firmly papery or leathery. 5. *O. PARRYI*

4. Pod spreading ovoid or subglobose, bladderly-inflated, less than twice longer than wide, the valves papery-membranous. 4. *O. OREOPHILA*

1. *O. DEFLEXA* (Pall.) DC. var. *FOLIOLOSA* (Hook.) Barneby, Proc. Calif. Acad. Sci. IV, 27: 197. 1952.

Ours slender, acaulescent or nearly so, sparsely pilose, the herbage green; leaves 1.5-12 cm. long, with 15-29 ovate leaflets less than 15 mm. long; racemes subcapitately 2-10-flowered, the axis little elongating, up to 2.5 cm. long in fruit but usually much less; calyx-tube campanulate, 3-4 mm. long, the teeth 2.5-3 mm. long, separated by broad obtuse sinuses; petals purplish, the obcordate banner 7-10 mm., the keel 7-8.5 mm. long; stipe of the pod 1.5-2 mm. long, the body narrowly oblong-ellipsoid, 8-15 mm. long, 3-4.5 mm. diam., somewhat dorsoventrally compressed, sulcate ventrally, the papery valves pilosulous with pale or fuscous hairs.

Alpine crests and meadows of the Rocky Mts., in cool or moist soils near and above timber-line, Colorado to Alaska, W. to Centr. Idaho and the East Humboldt Mts., Elko Co., Nevada; also interruptedly E. in high latitudes to Baffin I., Newfoundland, and Quebec.

An inconspicuous little plant, resembling and sometimes growing with *Astragalus alpinus*. A related form, *O. deflexa* var. *sericea* T. & G. (Fl. N. Amer. 1: 342. 1838), a much commoner plant of middle and high elevations in the Rocky Mts. from N. New Mexico to Alaska extends feebly W. into the mountains of the Great Basin, occurring in Centr. Utah and in the White Mts., Mono Co., California, and is to be sought on the Nevada slope of that range and perhaps in the higher ranges of Nye and White Pine Cos. It differs from var. *foliolosa* in being usually more densely pilose and decidedly caulescent, in the loose secund, 10-25-flowered raceme, in the proportionately narrower calyx with teeth separated by narrow acute sinuses, and in the narrower oblanceolate banner.

2. *O. VISCIDA* Nutt. ex T. & G., Fl. N. Amer. 1: 341. 1838.

Cespitose acaulescent, the branches of the stout, forking caudex commonly beset with imbricated marcescent stipules; leaves

6-10 cm. long, with 25-29 green, sparsely pilose leaflets, less than 1 cm. long; racemes about 10-flowered, oblong, slightly exerted on erect or arcuate-ascending scapiform peduncles; petals whitish or red-purple, the banner about 12 mm. long; pod oblong-ellipsoid with acuminate beak, about 15 mm. long.

A widely dispersed and polymorphic Cordilleran and Arctic species, its whole range similar to that of the last and like it known in Nevada only from stony alpine meadows in the East Humboldt Mts., Elko Co., 10,000 ft. upward, apparently rare.

3. *O. SERICEA* Nutt. ex T. & G., Fl. N. Amer. 1: 339. 1838.

Robust caespitose, densely silky-pilose, the herbage silvery; leaves 3.5-30 cm. long, with 11-19 ovate, elliptic or lanceolate leaflets, 1-4 cm. long; scapes equalling or surpassing the leaves; racemes at first rather dense, ovate or oblong, commonly elongating and lax in fruit; petals white except for the purple-tipped keel; pod erect, sessile, narrowly oblong or ovoid-oblong, 1-2.5 cm. long, 4-7.5 mm. diam., a little obcompressed and sulcate ventrally, the fleshy, silky-pilose or -strigulose valves becoming stiffly leathery or woody.

A widely dispersed and common species of the Rocky Mts. and adjacent Plains, from W. Oklahoma and Centr. New Mexico to Montana, extending in scattered stations W. into the Great Basin, where found mostly in the sagebrush zone below 7000 ft., to Centr. Idaho, Centr. and S. Utah, and the East Humboldt Mts., Elko Co., Nevada, apparently very rare with us.

4. *O. OREOPHILIA* Gray, Proc. Amer. Acad. 20: 3. 1884.

Dwarf caespitose or pulviate, forming low tufts or sometimes dense cushions up to 3 dm. diam., silvery-pilose throughout; leaves 1-8.5 cm. long, with 7-17, mostly lanceolate leaflets, 3-9 mm. long; peduncles erect, ascending or prostrate, much shorter to much longer than the leaves; pod 9-17 mm. long, slightly obcompressed and ventrally sulcate, villous or hirsutulous.

Dry rocky crests at and above timberline, descending through open pine-forest to barren knolls or gullied bluffs in the sagebrush zone, 5600-11,500 ft., rather frequent on the plateaux of S.-Centr. Utah, NW. Arizona and W. to Centr. and S. Nevada; San Bernardino Mts., S. California.

Occurring with us in two forms, one densely pulvinate, found mostly on calcareous valley knolls in White Pine, Eureka and Lincoln Cos., the other consisting of rather few tufted crowns, of greater altitudes in the mountains of Clark Co. (Sheep and Charleston ranges).

5. O. PARRYI Gray, Proc. Amer. Acad. 20: 4. 1884.

Like the last, but never pulvinate, the leaves clustered in a few crowns and sometimes a little longer; racemes mostly 2-flowered, usually well exerted on ascending or prostrate scapes; pod 13-20 mm. long, shortly pilosulous.

Stony ridges and screes near or rarely well below timber-line, 8900-12,000 ft., in scattered stations in the mountains surrounding and within the Great Basin, from N. New Mexico to NW. Wyoming, Centr. Idaho and E. California, known in Nevada from the Snake and Egan ranges, White Pine Co., and the Toquima and Toiyabe ranges, Nye Co.

Index to species and varieties.

Astragalus

aboriginum - 3, 12, 69.
 accidens - 79.
 acutirostris - 2, 76.
 aequalis - 6, 17, 20, 30, 80.
 agrestis - 8, 11, 78.
 (albens) - 74, 79.
 alpinus - 5, 12, 70.
 alvordensis - 3, 14, 44.
 amphioxys - 9, 14, 54.
 andersonii - 8, 12, 65.
 argophyllus - 10, 17, 18, 55.
 arrectus - 79.
 (remotus) - 67.
 (artemisiarum) - 65.
 (artipes) - 64.
 atratus - 5, 9, 19, 71.
 owyheensis - 72.
 (phyllophorus) - 72.
 (stenophyllus) - 72.
 austinae - 7, 11, 66.
 beckwithii - 4, 18, 64.
 purpureus - 65.
 bernardianus - 79.
 bisulcatus - 4, 12.
 nevadensis - 23.
 bolanderi - 4, 13, 68.
 callithrix - 7, 15, 60.
 calycosus - 8, 14, 72.
 mancus - 73.
 monophyllidius - 73.
 scaposus - 73.
 (campylophyllus) - 24.
 canadensis - 9, 11.
 brevidens - 79.
 (mortoni) - 79.
 (candelarius) - 58.
 (exiguus) - 58.
 (canonis) - 50.
 casei - 10, 17, 48.
 chamaemeniscus - 5, 16, 51.
 cibarius - 4, 10, 19, 51.
 cicer - 78.
 coccineus - 7, 14, 61.
 (confertiflorus) - 22.
 convallarius - 3, 11, 28.
 finitimus - 29.
 (coulteri) - 40.
 curvicarpus - 3, 16, 17, 44.
 (decumbens) - 28.
 (demissus) - 23.
 didymocarpus - 1, 77.

Astragalus

dispermus - 78.
 (diphysus) - 39, 80.
 (latus) - 39.
 (diversifolius) - 28, 29.
 eremiticus - 4, 18, 67.
 spencianus - 68, 79.
 (eriocarpus) - 61.
 (filipes) - 25.
 flavus - 9, 11.
 candicans - 22.
 (freemontii) - 40.
 funereus - 7, 15, 59.
 geyeri - 2, 32.
 triquetrus - 33.
 gibbsii - 3, 12, 16, 43.
 (glareosus) - 58.
 (goniatus) - 78.
 haydenianus
 (nevadensis) - 23.
 (heliophilus) - 37.
 (hemigyrs) - 74.
 (hookerianus) - 27.
 hornii - 6, 16, 33.
 humistratus - 9, 11.
 sonorae - 22.
 (impensus) - 21.
 iodanthus - 10, 19, 20, 41.
 diaphanoides - 42.
 jejunos - 6, 12, 31.
 (jepsoni) - 23.
 kentrophyta - 2, 20.
 elatus - 21.
 implexus - 21.
 ungulatus - 21.
 kernensis - 5, 20, 41.
 charlestonensis - 41.
 layneae - 8, 15, 53.
 lemmoni - 8, 19, 74.
 lentiginosus - 5, 6, 10, 14, 19,
 20, 34.
 arenosus - 39.
 borreganus - 10, 18, 40.
 carinatus - 37.
 emotus - 38.
 floribundus - 37.
 fremontii - 19, 39.
 ineptus - 37.
 kennedyi - 40.
 latus - 39.
 macrolobus - 38.
 mokiensis - 18, 40.

Astragalus

(palans) - 39, 80.
 platyphyllidius - 38.
 salinus - 37.
 scorpionis - 39, 40.
 sesquimetalis - 38.
 stramineus - 18, 40.
 toyabensis - 39.
 tremuletorum - 37, 39.
 lonchocarpus - 4, 16, 30.
 (macounii) - 70.
 malacus - 5, 8, 15, 16, 52.
 marianus - 7, 17, 56.
 megacarpus - 4, 16, 62.
 minthorniae - 5, 8, 18, 20, 50.
 villosus - 16, 51.
 miser - 3, 12, 13, 27.
 oblongifolius - 28.
 tenuifolius - 28.
 mohavensis - 2, 10, 19, 73.
 hemigyris - 74.
 (mortoni) - 79, 80.
 musimonum - 9, 14, 54.
 newberryi - 7, 15, 60.
 (nudus) - 50.
 nuttallianus - 2.
 imperfectus - 76.
 trichocarpus - 77.
 nyensis - 2, 77.
 (oblatius) - 50.
 obscurus - 9, 20, 66.
 occidentalis - 5, 9, 12, 70.
 oophorus - 4, 18, 63.
 caulescens - 64.
 clokeyanus - 19, 64.
 lonchocalyx - 64.
 parishii - 80.
 pinonis - 9, 20, 29.
 platytropis - 5, 11, 34.
 porrectus - 3, 13, 43.
 praelongus - 6, 18, 46.
 preussii - 4, 5, 6, 18, 45.
 laxiflorus - 46.
 pseudiodanthus - 8, 16, 42.
 pterocarpus - frontispiece, 6,
 7, 47.
 pulsiferae - 6, 13, 14, 30.
 purshii - 7, 15, 57.
 glareosus - 58.
 interior - 58.
 lectulus - 58.
 pumilio - 59.

Astragalus

tinctus - 58.
 remotus - 4, 20, 67.
 robbinsii
 (occidentalis) - 70.
 sabulonum - 2, 32.
 (scaposus) - 73.
 serenoi - 6, 17, 49.
 sordescens - 50.
 (shockleyi) - 50.
 sileranus - 6, 13, 25.
 speirocarpus - 44.
 stenophyllus - 3, 13, 25.
 straturensis - 5, 19, 75.
 striatus - 80.
 (tegetarius) - 21.
 tejonensis - 80.
 tenellus - 3, 13, 24.
 strigulosus - 25.
 tephrodes - 10, 25, 17.
 brachylobus - 55.
 tetrapterus - 6, 17, 47.
 (capricornus) - 47.
 (cinerascens) - 47.
 thompsonae - 8, 14, 62.
 tidestromii - 8, 9, 15, 53.
 toanus - 3, 11, 23.
 toquimanus - 5, 20, 75.
 (torreyi) - 79.
 (triquetrus) - 33.
 (uintensis) - 55.
 uncialis - 10, 17, 56.
 utahensis - 7, 15, 59.
 (virgineus) - 32.
 (watsonianus) - 50, 61.
 (whitedii) - 44.
 speirocarpoides - 44.
 whitneyi - 4, 14, 26.
 confusus - 27.

Cystium

(griseolum) - 40.
 (kennedyi) - 40.
 (macrolobum) - 38.
 (ormsbyense) - 37.
 (sesquimetrace) - 38.
 (vulpinum) - 38.

Hamosa

- (imperfecta) - 77.
- (manca) - 73.
- (monophyllidia) - 73.

Homalobus

- (hitckcockii) - 28.
- (strigulosus) - 25.

Oxytropis

- deflexa - 81.
- sericea - 81.
- oreophila - 82.
- parryi - 83.
- sericea - 82.
- viscida - 81.

Phaca

- (argentata) - 27.

Tragacantha

- serenoi - 50.

Xylophacos

- (incurvus) - 58.