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## VI.

A REVISION OF THE NORTH AMERICAN CHENO-  
PODIACEÆ.

BY SERENO WATSON.

Read, April 14, 1874.

THE classification of the *Chenopodiaceæ* given by Moquin-Tandon in De Candolle's "Prodromus" twenty-five years ago has been ever since substantially accepted and followed, although several of his genera have not been sustained. In the present study of the North American genera, it has seemed best to deviate in some measure from his arrangement, partly to make the sequence more natural, in part because the distinctions upon which his divisions are founded do not hold good in the cases under consideration.

The great variations that occur in the floral envelopes in this order are worthy, from their bearing upon physiological questions, of a more careful study than has been given to them. Staminate flowers, wherever they occur, excepting a single genus, are accompanied by the normal calyx, regularly 4-5-cleft or -parted, and never in any way conspicuously appendaged. In perfect flowers, likewise, a calyx is always present, but with the number of the sepals not unfrequently reduced, very rarely bracteate or obscurely bracteolate, remaining unchanged in fruit or slightly enlarged, or the lobes becoming thickened or costate, or developing a thin horizontal wing. When the flowers become exceptionally pistillate, the calyx remains the same in character; but in the proper monœcious and diœcious genera the flowers are decidedly dimorphous, the pistillate being for the most part wholly without calyx and enclosed within bracts. These bracts assume very diverse forms and peculiarities, though their foliaceous character is generally evident, at least in the flower. The wings, when present, corresponding to the margins of the compressed bracts, are always vertical, as are also the dorsal crests. In *Grayia* and *Eurotia* (and *Ceratocarpus*), in which the bracts are obcompressed, the winged marginal nerve in *Grayia*

and the horned or awned costas of the latter correspond to the mid-nerves of the bracts.

This bracteate division (the *Atripliceæ*) is connected with the *Chenopodiæ* by the genera *Blitum* and *Monolepis*, with their often fleshy sepals reduced in number, and especially by *M. chenopodioides*, in which the solitary so-called sepal is evidently foliaceous. Some of the species of *Atriplex* show a still closer connection, as *A. hortensis* and others of the section *Dichospermum*, in which the fruit may upon the same plant be either horizontal and included within a normal calyx, or vertical and compressed between broad foliaceous bracts, but wholly without calyx. Other species have within the bracts, occasionally or constantly, a more or less regular calyx of several well-developed sepals. On the other hand, in *A. Gmelini* fertile flowers are sometimes found without either bracts or calyx.

The position of the seed as vertical or horizontal is mainly determined throughout the order by the nature of the calyx, being horizontal whenever the calyx is regular and appressed to the fruit, and for the most part vertical if it be either absent, or loose and urceolate or tubular, or reduced to fewer than the usual number of sepals. The character of the seed-integument (simple or double), upon which the *Eurotiæ* and *Camphoracæ* are separated from the *Chenopodiæ*, has less value than Moquin gave to it, as is apparent in the *Salicorneæ* and *Suedææ*. Among the North American genera, the only one (*Kochia*) referred by Moquin to the *Camphoracæ* has evidently a double testa.

A nectary or disk very rarely occurs in either male or female flowers. In *Sarcobatus* only, which in several respects a remarkable genus, do they become conspicuous. The pistillate flower has here a calyx and develops a horizontal wing similar to that of *Salsola*; but the inner portion of the envelope is in other respects very different and peculiar, and must probably be considered an expansion of a perigynous disk enclosing the membranous ovary. The male flower is even more anomalous, having neither calyx nor bracts, but a central peltate scale about which the stamens are arranged, and which appears to be an extraordinary development of a central nectary.

### *Synopsis of Genera.*

Suborder I. SPIROLOBÆ. Embryo spiral. Seed-integument double albumen none or scanty. Saline herbs or shrubs, with fleshy linear leaves the stems not jointed.

\* Embryo conical-spiral.

1. SALSOA. Flowers perfect, axillary, 2-bracted; calyx 4-5-parted, transversely winged in fruit: seed horizontal, with a membranous testa.

## \*\* Embryo flat-spiral.

2. *SARCOBATUS*. Flowers monœcious or diœcious, dimorphous, without bracts, the staminate in aments, the pistillate axillary and solitary; fruiting calyx a coriaceous sac, transversely winged: seed vertical, with a membranous testa.

3. *SUËDA*. Flowers mostly perfect, axillary, with small bractlets; calyx 5-cleft or -parted, rarely crested or somewhat winged in fruit: seed horizontal or vertical, the testa crustaceous.

Suborder II. *CYCLOLOBEÆ*. Embryo annular.

Tribe I. *CHENOPODIÆ*. Flowers usually perfect, not dimorphous, bractless, the calyx persistent. Seed-integument double: albumen mostly copious. Stems not jointed nor the leaves fleshy.

\* Seed horizontal. — *BETEÆ*.

4. *APHANISMA*. Calyx 3-fid, not becoming costate nor winged, persistent at the base of the capsular fruit; flowers minute, monandrous, axillary.

5. *TELOXYS*. Calyx 5-parted, subcarinate, partially enveloping the smooth fruit; flowers monandrous or pistillate, axillary and solitary, in repeatedly dichotomous cymes.

6. *CYCLOLOMA*. Calyx 5-cleft, becoming transversely winged, closely enveloping the pubescent fruit; flowers axillary and solitary, in spreading panicles.

7. *KOCHIA*. Calyx 5-cleft, persistent over the fruit, usually transversely winged; flowers solitary or few in the axils, spicate: leaves linear-terete: albumen scanty.

8. *CHENOPODIUM*. Calyx 5- or 2-3-cleft or -parted, at length subcarinate or subcristately costate, enclosing the fruit; flowers clustered in panicked spikes. (Seeds often vertical in § *Botryois*.)

\*\* Seeds mostly vertical. — *BLITEÆ*.

9. *ROUBIEVA*. Calyx 3-5-toothed, becoming saccate with a contracted apex, nerved and reticulated; flowers solitary or few in the axils: leaves pinnatifid.

10. *BLITUM*. Flowers perfect or pistillate; calyx 3-5-cleft, not appendaged, often fleshy, partially enclosing the fruit: stamens 1-5.

11. *MONOLEPIS*. Flowers polygamous; calyx of a single bractlike sepal, not appendaged: stamen 1: fruit naked.

Tribe II. *ATRIPLICEÆ* (including *Eurotiæ*). Flowers monœcious or diœcious, dimorphous; staminate flowers with a calyx, bractless; pistillate flowers very rarely with a calyx, usually enclosed in two more or less united bracts. Seed vertical, with copious albumen. Stems not jointed, nor leaves fleshy.

## \* Bracts compressed, free or more or less united: testa double.

12. *ATRIPLEX*. Fruiting bracts with the margins often dilated and the sides often appendaged: radicle inferior to superior.

## \*\* Bracts obcompressed, united, not appendaged: testa simple: radicle inferior.

13. *EUROTIA*. Fruit-envelope somewhat obcompressed, conical, not winged, very densely hairy-tufted, 2-beaked.

14. GRAYIA. Fruit-envelope strongly obcompressed, orbicular, longitudinally wing-margined, smooth, colored.

Tribe III. CORISPERMEÆ. Flowers perfect, not dimorphous, bractless. Calyx 1-3-sepaled, hyaline, marcescent. Seed compressed, vertical, with closely adherent pericarp: albumen copious. Stems not jointed and leaves not fleshy.

15. CORISPERMUM. Fruit elliptic, not mucicate, acutely margined: flowers solitary, axillary.

Tribe IV. SALICORNIEÆ. Flowers mostly perfect, not dimorphous, bractless, arranged by threes in close spikes. Stamens 1-2. Fleshy saline plants, with jointed stems and scalelike leaves.

16. SALICORNIA. Flower-clusters decussately opposite, sunk in the rachis of the spike; calyx saccate, fleshy, coherent to the rachis, becoming spongy: albumen very small: branches opposite.

17. SPIROSTACHYS. Flower-clusters spirally arranged; calyx 4-5-cleft, the sepals carinate: albumen rather copious: branches alternate.

### 1. SALSOLA, Linn.

Flowers perfect, 2-bracted. Calyx 5- (rarely 4-) sepaled, at length horizontally 5-winged, enclosing the fruit. Stamens 5-3. Ovary depressed-globose: style slender, with 2 linear stigmas, persistent. Fruit a membranous utricle, loosely enveloping the horizontal subglobose seed. Testa membranous: albumen none. — Saline plants with fleshy sessile subcylindrical leaves and axillary sessile solitary flowers.

1. *S. KALI*, Linn. Annual, herbaceous, erect or decumbent,  $\frac{1}{2}$ -2 feet high, diffusely branched, smooth or often roughly hispid; leaves alternate,  $\frac{1}{2}$ -1 inch long, semi-terete, amplexicaul, spinosely tipped, the floral leaves ovate-lanceolate to ovate, with a broad base, strongly nerved and spinose, and with the scarious margin often hispid-ciliate; bracts similar, somewhat smaller and unequal; fruiting calyx turbinate, truncate, the scarious sepals imbricated and connivent above into a short beak; wings pinkish, veined, orbicular, 3-4 lines broad. — Seashore from New England to Georgia. The smoother form, with the bracts and floral leaves naked, is the *S. Caroliniana* of Walter. The integument of the seed is plainly double.

*Salsola Kali*, Linn. Pursh, 197. Torrey, *Flora U. S.* 297; *Flora N. Y.* 2. 142. Beck, *Bot.* 298. Chapman, 378. Gray, *Manual*, 411.

*Salsola Caroliniana*. Walter, *Fl. Car.* 111. Michaux, *Flora*, 1. 174. Lam. *Dict.* 7. 295. Elliott, 1. 381. Röm. & Schult. *Syst.* 6. 229. Spreng. *Syst.* 1. 925. Bigelow, *Fl. Bost.* 106. Dietrich, *Syn.* 2. 997.

*Salsola Kali*, var. *Caroliniana*. Nuttall, *Genera*, 1. 199. Torr. *Fl. U. S.* 297.

*Salsola Kali*, var. *rosacea*. Moquin, DC. *Prodr.* 13<sup>o</sup>. 188.

*Salsola Tragus* and *Soda*. Muhl. *Cat.* 28; not Linn.

## 2. SARCOBATUS, Nees.

Flowers monœcious or diœcious, without bracts, dimorphous. Staminate flowers in close terminal aments, without perianth, the stamens irregularly arranged around the bases of stipitate peltate scales: filaments very short: anthers fleshy. Pistillate flowers solitary, axillary; the closed perianth compressed-ovate, adherent at the contracted somewhat 2-lipped apex to the base of the stigmas, and margined laterally by a narrow erect slightly 2-lobed border, which develops into a broad membranous veined horizontal wing. Ovary thin and hyaline, nearly filled by the ovule, the slender lateral style adherent to the inner wall of the cavity and terminated by two thick exerted unequal stigmas. Seed vertical, with a transparent membranous testa: embryo green; radicle inferior.—A subspinescent rigidly branched alkaline shrub, with alternate linear fleshy leaves.

1. *S. VERMICULATUS*, Torrey. Erect, 3–8 feet high, leafy, smooth or at first puberulent; leaves  $\frac{1}{2}$ – $1\frac{1}{2}$  inches long; male aments cylindrical,  $\frac{1}{4}$ –1 inch long, the scales rhomboid-ovate, acute, persistent, spirally arranged; stamens about 3 to each scale, soon deciduous; fruiting calyx coriaceous, 3 lines long, the winged margin 3–6 lines broad; pericarp distinguishable with difficulty; seed  $\frac{1}{2}$  line in diameter.—From the Upper Missouri and Platte to the Gila and the western border of the Great Basin. One of the more frequent of the various kinds of alkaline plants which are commonly known as “Grease-wood,” and sometimes very abundant. In the immature seed the embryo may be only curved or annular.

*Batis* (?) *vermiculata*. Hooker, Fl. Bor.-Am. 2. 128.

*Sarcobatus Maximiliani*. Nees in Reise Max. v. Wied, 1. 510 and Appx. 2. 247; Bot. Zeit. 2. 547. Seubert, Bot. Zeit. 2. 753, t. 7. Lindl. in Lond. Jour. Bot. 4. 1.

*Fremontia vermicularis*. Torrey in Frem. Rep. 95 and 317, t. 3; (Bot. Zeit. 5. 56; Lond. Jour. Bot. 4. 481); Emory's Rep. 411. Hook. Pl. Geyer in Lond. Jour. Bot. 5. 262.

*Sarcobatus vermicularis*. Torrey, Emory's Rep. 149; Sitgreave's Rep. 169; Stansbury's Rep. 394; Pac. R. R. Rep. 4. 180; Bot. Wilkes's Exp. 439. Engelmann, Pl. Up. Miss. 207. Cooper, Pac. R. R. Rep. 12. 17. Watson, King's Rep. 5. 295. Coulter, Hayden's Rep., 1872, 779. Porter, Fl. Colorado, 118.

Collectors:—James; 4 1 Fremont; 242 Geyer; Abert; Emory; Stansbury; Lyall; H. Engelmann; 23 Stretch; 185' Parry; 1844 Brewer; 3392 Bolander; 464 Torrey; 490 Vasey; 1000 Watson; Gray; 265, 266 Wolf.

## 3. SUÆDA, Forsk.

Flowers perfect, or rarely polygamous, minutely bracteolate. Calyx 5-parted or -cleft; the lobes fleshy, unappendaged or more or less strongly carinate or crested, or becoming somewhat winged, enclosing the fruit. Stamens 5. Styles 2, rarely 3-4, short and rather stout. Pericarp membranous, free. Seed compressed, vertical and with the radicle inferior, or horizontal; the testa smooth, black and crustaceous.—Herbs or shrubs with alternate subterete fleshy leaves, and axillary clustered or solitary flowers. (*Chenopodina*, Moq., *Schoberia*, C. A. Meyer, &c.)

\* Calyx-lobes not appendaged: leaves narrow at base.

† Herbaceous annuals.

1. *S. LINEARIS*, Torr. MS. in herb. Smooth, nearly prostrate or ascending, rather stout, the stems 1-2 feet long, with few ascending branches; leaves subterete,  $\frac{1}{2}$ -2 inches long, acute, the floral leaves short, ovate to lanceolate; calyx-lobes thick and strongly carinate or gibbous in fruit; stigmas 2, rarely 4; seed horizontal,  $\frac{3}{8}$  of a line broad, very obscurely reticulately marked under a lens.—Seashore lagoons, Carolina to Florida. A larger and stouter plant than *S. maritima* of Europe, the seed larger and less strongly marked. The true *maritima* is said by Hooker f. (in Fl. Arc.) to be common on the arctic coast, and to have been collected by Richardson. There are no arctic specimens in our herbariums. Moquin's species of this name is variously confused.

*Chenopodium maritimum*. Walter, Fl. Car. 111.

*Salsola linearis*. Elliott, 1. 332.

*Suæda linearis*. Moquin, Enum. Chenop. 180, in part.

*Chenopodina linearis*. Moquin, DC. Prodr. 132. 164, in part.

*Chenopodina maritima*. Chapman, 378; not L.

Collectors:—Walter; Leavenworth; Blodgett.

Var. *RAMOSA*. Erect and much branched, 1-2 feet high, the branches subsimple, slender, and ascending; floral leaves narrower, oblong to linear-lanceolate; seed smaller,  $\frac{1}{2}$  line broad.—On the seacoast from the mouth of the St. Lawrence to Southern New England and New York; Galveston (Lindheimer). Perhaps distinct, but the present material is insufficient for determination.

*Salsola salsa*. Michx. Flora, 1. 174. Pursh, 197. Nutt. Genera, 1. 199, in part. Bigelow, Fl. Bost. 107.

*Salsola salsa*, var. *Americana*. Persoon, Ench. 1. 296. Lam. Dict. 7. 288.

*Chenopodium maritimum*. Pursh, 198. Torrey, Fl. U. S. 296. Beck, Bot. 296. Hook. Fl. Bor.-Am. 2. 126? Hook. f., Fl. Arc. 300 and 333?

*Chenopodium salsum*, var. *Americanum*. Röm. & Schult. Syst. 6. 270.

*Suaeda linearis*. Moquin, Enum. Chenop. 130, in part.

*Chenopodina linearis*. Moquin, DC. Prodr. 13<sup>2</sup>. 164, in part.

*Chenopodina maritima*. Gray, Manual, 4 ed., 366. Matthew, Canad. Nat. 12. 159.

*Suaeda maritima*. Torrey, Flora N.Y. 2. 141. Gray, Manual, 410.

Collectors:—Torrey; Lindheimer; Eaton.

2. *S. DIFFUSA*. Erect, 1–1½ feet high, diffusely branching with usually slender flexuous elongated branches, smooth or more or less pubescent, green or often purple; leaves subterete, ½–1 inch long, acute or acuminate, the floral ones similar but shorter, usually rather distant on the branchlets; clusters 2–4-flowered; calyx cleft to below the middle, fleshy but not carinate; seed mostly vertical, ½ line broad, perfectly smooth. — Common on the alkaline plains from Nevada and the Upper Missouri to Northern Mexico and Western Texas on the Rio Grande.

*Chenopodium maritimum*. Torrey, Annals N.Y. Lyc. 2. 239.

*Suaeda maritima*. Watson in King's Rep. 5. 294.

Collectors:—James; 458 Gregg; Wright, 1848; 578 Wright, 1849, in part; 216 Palmer; 466, 66\* Torrey; 996 Watson; Hayden; Gray; Wheeler.

#### † Perennials.

3. *S. TORREYANA*. Woody at base, with herbaceous leafy branches 2–3 feet high, smooth or tomentose; leaves subterete, ½–1½ inches long, mostly acute, the floral ones similar; calyx rather large, deeply cleft; seed vertical, ¾ of a line broad, rather strongly tuberculate. — In alkaline soils from the North Fork of the Platte (Fremont) to Northern Nevada, and south to Northern Mexico and Southern California. Differing from all the forms of the foreign *fruticosa* in our herbariums by its large tuberculate seeds.

*Chenopodina linearis*. Torrey, Stans. Rep. 394. Durand, Fl. Utah, 175.

*Suaeda fruticosa*. Hook. & Arn. Bot. Beech. 387. Engelm., Pl. Upp. Miss. 206.

*Chenopodina Moquini*. Torrey, Pac. R. R. Rep. 7. 18.

*Suaeda fruticosa*, var. *multiflora*. Torrey, Ives's Rep. 25.

*Suaeda fruticosa*, var. Watson, King's Rep. 5. 294.

Collectors:—Douglas; Gregg; 622 Fremont; Stansbury; 461 Torrey; 998 Watson; Cooper.

4. *S. SUFFRUTESCENS*. Shrubby or subshrubby, 2–3 feet high, leafy, with slender diffuse or divaricate branches, the branches more or less densely tomentose; leaves numerous and mostly small, ½ inch long or less, linear to oblong, obtuse or acute; flowers solitary or clustered; calyx small, shortly lobed; seed mostly vertical, less than ½ line broad,



very obscurely tuberculate. — From Western Texas to Southern California and Northern Mexico, in saline plains. At least in large part the *S. fruticosa*, var. *multiflora* of Torrey.

*Sueda fruticosa*, var. *multiflora*. Torrey, Pac. R. R. Rep. 4. 130; Bot. Mex. Bound. 184.

Collectors: — 1345 Berlandier; 578 Wright, in part; Emory.

5. *S. CALIFORNICA*. Stout, shrubby, 2–3 feet high, with very leafy herbaceous ascending branches, smooth or somewhat pubescent; leaves broadly linear,  $\frac{1}{2}$ –1 inch long, acute, crowded upon the branchlets; flowers few in the axils; calyx cleft nearly to the base; seed vertical or horizontal, nearly a line broad, faintly reticulated. — Salt marshes of San Francisco Bay.

*Sueda fruticosa*. Moquin, DC. Prodr. 13<sup>2</sup>. 156, in part. Torr. Bot. Wilkes's Exp. 439.

Collectors: — 412 Bolander; Kellogg.

\* \* One or more of the calyx-lobes more or less crested or transversely winged: herbaceous annuals.

6. *S. DEPRESSA*, Watson. Low and mostly decumbent, branching from the base, smooth, the lowest branches sometimes opposite; leaves linear,  $\frac{1}{4}$ –1 inch long, broadest at base, the floral ones oblong- to ovate-lanceolate or ovate, acute, rather crowded upon the branchlets; calyx cleft to the middle, one or more of the acute lobes very strongly carinate or crested; seed vertical or horizontal,  $\frac{1}{2}$  line broad, very lightly reticulated. — From the Saskatchewan to Central Colorado and North-western Nevada.

*Salsola depressa*. Pursh, 197. R. & S., Syst. 6. 241. Poir. Suppl. 5. 191. Torrey, Nicollet's Rep. 159.

*Salsola salsa*. Nuttall, Genera, 1. 119, in part. James, Catalogue, 178.

*Salsola prostrata*. Torrey, Ann. N.Y. Lyc. 2. 239.

*Chenopodium Americanum*. Spreng. Syst. 1. 922. Dietr. Syn. 2. 994.

*Chenopodium calceoliforme*. Hook. Fl. Bor.-Am. 2. 126.

*Schoberia Americana*. C. A. Meyer in Ledeb. Fl. Alt. 1. 402.

*Sueda prostrata*. Moquin, Enum. Chenop. 130, in part.

*Sueda calceoliformis*. Moquin, l. c. 128.

*Chenopodina depressa*. Moquin, DC. Prodr. 13<sup>2</sup>. 164. Engelm. Pl. Upp.

Miss. 206. Gray, Proc. Phil. Acad., 1863, 75.

*Schoberia calceoliformis*. Moquin, DC. Prodr. 13<sup>2</sup>. 166. Torrey, Pac. R. R. Rep. 5. 364.

*Chenopodina prostrata*. Bourgeau, Palliser's Rep. 260.

*Sueda depressa*. Watson, King's Rep. 5. 294. Porter, Hayden's Rep., 1871, 492; Fl. Col. 118.

Collectors: — James; Drummond; Nicollet; Simpson; 287 Geyer; Bourgeau; 488 Hall & Harbour, in part; 997 Watson; 486 Vasey; Allen; Lemmon; 267 Wolf.

**Var. ERECTA.** Erect, 1–2 feet high, the branches short and rather strict; leaves usually somewhat narrower. — From the Saskatchewan to Central Colorado and Northern Nevada; Kern County, Southern California (Blake). Dr. Torrey reports an annual species from the Lower Sacramento, California (*S. maritima*, Bot. Wilkes's Exp. 438). The specimens have not been found.

*Sueda maritima*. Torrey, Fremont's Rep. 95; Pac. R. R. Rep. 4. 130; and Bot. Mex. Bound. 184? Engelm. Pl. Upp. Miss. 206. Porter, Fl. Col. 118.

*Chenopodina maritima*. Torr. & Gray, Pac. R. R. Rep. 2. 173?

*Chenopodina linearis*. Torrey, Pac. R. R. Rep. 7. 18?

Collectors:—Fremont; Bourgeau; 489 Hall & Harbour; 89 Anderson; Hall, cult.; 461\* Torrey; 485 Vasey; Gray; Hayden; 341 Greene; Blake; 276 Wolf.

**7. S. OCCIDENTALIS.** (*Schoberia*, Watson in King's Rep. 5. 295.) Erect, slender, 8–10 inches high, smooth, with elongated flexuous spreading branches; leaves linear,  $\frac{1}{2}$ –1 inch long, acute, narrow at base, the floral leaves somewhat widest; flowers few in the axils; calyx cleft nearly to the middle, with obtuse lobes, at length surrounded by a transverse irregularly lobed veinless wing, a line broad; seed horizontal,  $\frac{1}{2}$  line broad, obscurely reticulated. — Ruby Valley, Nevada; collected only by Watson (999). Closely resembling the last, but differing in habit and in the more decidedly winged fruit.

#### 4. APHANISMA, Nutt.

Flowers perfect. Calyx 3-cleft, adnate at base to the ovary, not becoming thickened or appendaged. Stamen 1. Ovary ovate: style short, persistent, with 2–3 very short stigmas. Pericarp rather thick and indurated, somewhat angular, surrounded at base by the dry calyx. Seed lenticular, with a very thin crustaceous testa. — A smooth herbaceous annual, with alternate sessile entire leaves and minute axillary sessile mostly solitary flowers.

**1. A. BLITOIDES, Nutt.** (Moquin in DC. Prodr. 13<sup>2</sup>. 54.) Slender, 1–1 $\frac{1}{2}$  feet high, rooting at base, branched; leaves thin, ovate, cordate-ovate or ovate-oblong,  $\frac{1}{4}$ –1 inch long, acute; fruit  $\frac{1}{2}$ – $\frac{1}{3}$  line broad; seed punctulate-rugose, shining. — Collected only by Nuttall at San Diego, California.

#### 5. TELOXYS, Moquin.

Flowers perfect or sometimes pistillate. Calyx 5- (rarely 4-) parted, the lobes more or less prominently carinate and subcrested. Stamen 1

(5, *Moquin*) or wanting. Ovary ovate: styles 2, free or united at base. Fruit partially covered by the loosely appressed calyx; pericarp membranous. Seed lenticular, with a crustaceous testa. — Herbaceous annuals, erect and diffuse; the minute solitary flowers very shortly pedicelled, axillary and terminal upon the repeatedly dichotomous nearly naked branches; terminal flowers abortive and deciduous, leaving the ultimate branchlets spinulose: leaves thin, alternate.

1. *T. ARISTATA*, Moquin. Glabrous, 6 inches high; leaves entire, linear to linear-lanceolate, 1–3 inches long; flowers enlarged in fruit, the loose calyx becoming  $\frac{1}{4}$  line long, with obtuse lobes, scarcely carinate, not crested; fruit dark brown, the seed acutely margined. — Northern Asia and reported from Alaska. The plant on which the species was originally founded was doubtfully and probably erroneously ascribed to Virginia.

*Chenopodium Virginicum*. Linn. Spec. 1. 222.

*Chenopodium aristatum* and var. *Virginicum*. Linn. Spec., 2 ed., 321. Gmelin, Fl. Sib. 3. 83, t. 15.

*Teloxys aristata*. Moquin, Ann. Sci. Nat. 2. 1. 289, t. 10; Enum. Chenop. 17; DC. Prodr. 13<sup>2</sup>. 59. Fenzl in Ledeb. Fl. Ross. 3. 693. Rothrock, Fl. Alaska, 455. Torrey, Pac. R. R. Rep. 4. 129.

2. *T. CORNUTA*, Torrey. Slender,  $\frac{1}{2}$ – $1\frac{1}{2}$  feet high, glabrous or somewhat glandular-puberulent, the calyx resinous-dotted; leaves lanceolate, repand-dentate with 2–3 distant lobes on each side, 1–2 inches long, attenuate to a slender petiole; flowers very small, mostly perfect; calyx-lobes acute, carinate with a short thick crest, more appressed; fruit light brown, depressed-globose; seed obtusely margined. — From Colorado to New Mexico, Western Arizona and Northern Mexico.\*

*Teloxys cornuta*. Torr. Pac. R. R. Rep. 4. 129; Bot. Mex. Bound. 182. Porter, Hayden's Report, 1870, 480; Fl. Colorado, 116.

Collectors: — No. 1735 Wright; 390 Gregg; Woodhouse; 2 Palmer; Greene.

## 6. CYCLOLOMA, Moquin.

Flowers perfect or sometimes pistillate. Calyx urceolate, 5-cleft, the concave acute lobes carinate, becoming closely appressed and developing a broad transverse membranous wing. Stamens 5. Ovary

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\* A third species was collected by Mandon (No. 1026) in the Andes of Bolivia, and may be named *T. MANDONI*. It is stout, 1–2 feet high, glandular-puberulent throughout; leaves rather thick, oblong-lanceolate, 2 inches long, sinuately pinnatifid; calyx-lobes strongly carinate, slightly crested, obtuse, appressed; fruit dark brown; seed obtusely margined.

depressed: styles 3 or 2. Pericarp membranous, pubescent. Seed lenticular.—An erect herbaceous annual, with alternate thin leaves, and very small solitary axillary flowers in open panicles.

1. *C. PLATYPHYLLUM*, Moquin. Diffuse, 6–15 inches high, more or less arachnoid-pubescent, becoming glabrous; leaves lanceolate, 1–2 inches long, acute, attenuate to a slender petiole, coarsely sinuate-toothed; calyx cleft to the middle, becoming with the irregularly lobed and toothed wing 2 lines broad, wholly covering the utricle; ovary very pubescent; fruit a line broad.—From Missouri to the Upper Platte and southward to Arkansas and New Mexico. Whole plant light green or often deep purple. First collected by Michaux and introduced by him into the gardens of Europe in 1796 or soon after, where it was cultivated under many different names.

*Salsola atriplicifolia*. Spreng. Nacht. h. Hall. 1. 35 (1801). Lam. Dict. 7. 297.

*Kochia atriplicifolia*. Roth, Neue Beyträge, 1. 177.

*Salsola radiata*. Desf. Ann. Mus. 2. 28, t. 34 (1803); Ann. of Bot. 2. 337. Spreng. Syst. 1. 923. Dietrich, Syn. 2. 996.

*Salsola platyphylla*. Michaux, Flora, 1. 174 (1803). Willd. Enum. 293. Persoon, Ench. 1. 297.

*Kochia dentata*. Willd. Hort. Berol., t. 28 (1806). Pursh, 206. Torrey, Ann. N. Y. Lyc. 2. 239; Nicolle's Rep. 158. Nuttall, Fl. Ark. 165.

*Salsola latifolia*. Lam. Dict. 7. 298.

*Chenopodium radiatum*. Schrad. Neues Journ., 1809, 85, t. 3. Persoon, Ench. 1. 297.

*Salsola Atriplicis*. Schult. Obs. Bot. 52.

*Amoreuxia platyphylla*. Moquin, Soc. Hist. Monsp., 1826.

*Cyclolepis platyphylla*. Moquin, Ann. Sci. Nat. 2. 1. 203.

*Cycloloma platyphyllum*. Moquin, Enum. Chenop. 18; DC. Prodr. 132. 60. Torrey, Fremont's Rep. 95; Sitgreave's Rep. 169; Pac. R. R. Rep. 4. 129. Engelm. Pl. Upp. Miss. 206. Gray, Am. Jour. Sci. 2. 34. 258. Porter, Hayden's Rep., 1870, 480; Fl. Col. 116.

*Amorea platyphylla*. Delile, Cat. h. Monsp., 1844.

Collectors:—James; Nuttall; Fremont; 1736 Wright; G. Engelmann; Bigelow; H. Engelmann; 274 Palmer; Patterson; Vasey.

## 7. KOCHIA, Roth.

Flowers perfect or pistillate, bractless, solitary or few in the axils of the leafy stems. Calyx herbaceous, subglobose, 5-cleft, persistent over the fruit and usually with a more or less complete transverse lobed wing. Stamens 5. Ovary depressed: styles 2, filiform. Pericarp membranous. Seed compressed, with a membranous testa: embryo green,

cotyledons thick : albumen scanty or none. — Perennials, woody at base, with scattered linear terete leaves.

1. *K. AMERICANA*. Stems erect and virgate, mostly simple, 6–18 inches high, tomentose and somewhat villous or nearly glabrous; leaves 3–12 lines long, cuspidate or acutish, ascending; flowers mostly with rudimentary stamens, 1–3 in each axil, densely white-tomentose, nearly a line broad in fruit and the membranous wing often as broad or broader, the cuneate-rounded segments nerved and subcrenulate; ovary ovate, densely tomentose at the apex, much shorter than the calyx and the elongated exerted styles; fruit nearly smooth, scarcely apiculate; seed  $\frac{3}{8}$  of a line broad, without albumen, the acuminate radicle-sheath partially including the cotyledons. — Foothills and valleys from Northern Nevada to Southern Wyoming and southward to Arizona and Southern Colorado. It much resembles *K. prostrata* of the Old World, to which it has hitherto been referred, but which differs especially in its glabrous utricle being prominently beaked below the style, in its larger seed with a scanty albumen, and in the radicle-sheath less prolonged. The genus shows an approach to *Suaeda* and the *Spirolobæ* in the want of albumen and the somewhat more than annular embryo. The *Kochia dioica* of Nuttall proves to be *Chenopodium Endolepis*, the *Endolepis Suckleyana* of Torrey.

*Kochia prostrata*. Hook. Pl. Geyer in Lond. Jour. Bot. 5. 262; not Schrad. Watson, King's Rep. 5. 293, in part. Coulter, Hayden's Rep., 1872, 779.

Collectors : — 465 Torrey; 992 Watson; Greene; Wheeler.

Var. *VESTITA*. Densely villous throughout and subtomentose; ovary oblong, nearly equalling the calyx, very pubescent. — Shores of Great Salt Lake (991 Watson), and on the line of the Pacific Railroad in Nevada or Utah (Burgess).

## 8. CHENOPODIUM, Linn.

Flowers perfect, or sometimes pistillate, bractless. Calyx 5- (rarely 3–4-) parted, the lobes usually somewhat carinate or crested. Stamens 5. Ovary depressed: styles 2, rarely 3 or 4, slender. Pericarp membranous, closely investing the seed and more or less completely enveloped by the dry calyx. Seed lenticular, with crustaceous testa, sometimes vertical in § *Botryois*. — Herbaceous and mostly annual, usually white-mealy or glandular, with alternate petioled leaves and sessile clustered flowers in axillary and terminal or paniced spikes.

§ 1. Annuals, usually more or less farinose, not pubescent nor glandular, nor sweet-scented. Embryo completely surrounding the albumen. — *Chenopodium*, Moquin.

\* Pericarp very easily separated from the seed. Leaves entire or rarely sinuate-dentate, often hastate-lobed. Native species.

1. *C. BOSCIANUM*, Moq. Erect, slender, 2 feet high, loosely branched, nearly glabrous; leaves thin, oblong- to linear-lanceolate, 1–2 inches long, acute, attenuate into a long slender petiole, the lower sinuate-dentate or often all entire; flowers very small, solitary or in small clusters upon the slender branchlets; calyx green, not strongly carinate, partially covering the at length naked seed, which is half a line broad. — Pennsylvania and Kentucky to “Carolina” (Chapman) and Texas.

*Chenopodium Boscianum*. Moquin, Enum. Chenop. 21; DC. Prodr. 13<sup>2</sup>. 61. Chapman, 376.

*Chenopodium polyspermum*, var. *spicatum*. Gray, Manual, 2 ed., 363.

*Chenopodium album*, var. *Boscianum*. Gray, Manual, 407, excl. syn. *C. Berlandieri*.

Collectors: — 246 Drummond; 2398 Berlandier; Short; Porter; Green.

2. *C. FREMONTII*, Watson. Erect, slender, 1–2 feet high, branching, somewhat mealy; leaves broadly triangular-hastate,  $\frac{1}{4}$ –1 inch long, with obtuse or abruptly acute lobes, truncate or cuneate at base, the upper sometimes becoming oblong to linear-lanceolate, entire, with long petioles; flowers small, mealy, scattered in few-flowered clusters upon the slender open paniced branchlets, the sepals strongly carinate, nearly covering the mature fruit; seed half a line broad. — From Colorado to the Sierra Nevada and southward to New Mexico.

*Chenopodium Fremontii*. Watson, King's Rep. 5. 287. Porter, Fl. Col. 117.

Collectors: — Fremont; 570, 1734 Wright; 973 Watson; 484 Vasey; Cooper; 337 Greene.

Var. *INCANUM*. Densely farinose, low and rather stout, 3–6 inches high, diffusely branched; flowers crowded in close contracted panicles; leaves thick,  $\frac{1}{2}$  inch long or less, hastately lobed. — Colorado and New Mexico.

Collectors: — Marcy; 722 Fendler; 339 Greene.

3. *C. LEPTOPHYLLUM*, Nutt. Densely mealy or rarely nearly glabrous,  $\frac{1}{2}$ –1 $\frac{1}{2}$  feet high, simple or branched, often strict; leaves linear,  $\frac{1}{2}$ –1 inch long, entire, acute and usually mucronate, rather

shortly petioled; flowers small, closely clustered, in dense or interrupted spikelets; calyx-lobes strongly carinate, scarcely covering the fruit; seed  $\frac{1}{2}$  line broad.— From Colorado to Nevada and southward to New Mexico; also collected by Professor D. C. Eaton at Absecon in New Jersey.

*Kochia dioica*. James, Catalogue, 178; not Nuttall. Torrey, Ann. N.Y. Lyc. 2. 239.

*Chenopodium*, n. sp. Torrey, Nicollet's Rep. 159.

*Chenopodium zosterifolium*. Torrey, Fremont's Rep. 95; not Hooker.

*Chenopodium leptophyllum*. Nutt. MS. in herb.

*Chenopodium album*, var. *leptophyllum*. Moquin, DC. Prodr. 13<sup>2</sup>. 71. Watson, King's Rep. 5. 287. Coulter, Hayden's Rep., 1872, 779.

Collectors:—James; 283 Nicollet; Fremont; 1731 Wright; Eaton; 971, 972 Watson; 338 Greene; 264 Wolf.

**Var. SUBGLABRUM.** Nearly glabrous, loosely branched and paniced, the clusters few-flowered and scattered on the branchlets.— Sandhills of the Platte (Hayden).

**Var. OBLONGIFOLIUM.** Rather stout, 6–10 inches high, branched, densely mealy; leaves oblong, often slightly hastate,  $\frac{1}{2}$ – $\frac{3}{4}$  inch long, obtuse or acutish; flowers in dense clusters in short close spikes.— From Colorado to New Mexico; 717 Fendler; 1732, 1733 Wright.

\*\* Pericarp persistent upon the smooth seed. Leaves more or less sinuate-dentate except in *C. olidum* and *polyspermum*. Most of the species introduced.

4. *C. BERLANDIERI*, Moq. Somewhat mealy or nearly smooth, 2–3 feet high, the branches slender and loosely spreading; leaves rhombic-oblong or oblong-lanceolate, an inch long or less, often subhastate and usually sinuate-dentate and very acutely or setaceously acuminate, the lobes or teeth acute; flowers mostly in slender loose interrupted spikes, nearly as large as in *C. album*, but the seed smaller ( $\frac{1}{2}$  line wide).— Texas; Western Florida.

*Chenopodium Berlandieri*. Moquin, Enum. Chenop. 23; DC. Prodr. 13<sup>2</sup>. 63.

*Chenopodium album*, var. *Boscianum*. Gray, Manual, 407, in part.

Collectors:—526, 968, 1906 Berlandier; 281 Lindheimer; Chapman.

5. *C. OLIDUM*. Rather stout, farinose, heavy scented, 3–18 inches high, branching; leaves rather thick, oblong to broadly ovate, 6–9 lines long, often slightly hastate, entire, obtuse or acute, apiculate, on slender petioles; flowers usually large, nearly a line in diameter in fruit, in close clusters rather loosely paniced; pericarp mealy, very closely adherent to the large seed.— Colorado to Salt Lake Valley

and southward to New Mexico and Arizona. Seeds gathered by the Indians of Arizona for food.

*Chenopodium album*. Watson, King's Rep. 5. 287, in part.

Collectors:—382 Fremont; 718, 721, 725<sup>b</sup> Fendler; Hall & Harbour; 970 Watson; Hall, cult. from Powell's seeds; 258 Wolf.

6. *C. ALBUM*, Linn. Usually 2–4 feet high, erect, simple or branched, more or less mealy; leaves subrhombic-ovate, 1–3 inches long, obtuse or acute, cuneate at base, at least the lower ones sinuate-dentate, the upper usually entire and lanceolate to linear, or all narrowly lanceolate to linear; flowers rather large, densely clustered in usually close spikes, the panicle strict and close or somewhat spreading; calyx about  $\frac{3}{4}$  of a line wide in fruit, the lobes strongly carinate, nearly or quite covering the seed.—Everywhere introduced. Western specimens are mostly near the typical form, quite mealy, nearly simple, and with close contracted panicles. The var. *VIRIDE*, which is the more common eastward, is less mealy and with a less dense inflorescence.

*Chenopodium lanceolatum*. Muhl. in Willd. Enum. 1. 291.

*Chenopodium subspicatum*. Torrey, Ann. N.Y. Lyc. 2. 239, not of Nuttall; Marcy's Rep. 296.

*Chenopodium ficifolium*? Hook. & Arn. Bot. Beech. 157?

*Chenopodium album*, var. *concatenatum*. Moquin, Enum. Chenop. 30.

*Chenopodium album*, Linn. Hook. Fl. Bor.-Am. 2. 127; Comp. Bot. Mag. 2. 61; Pl. Geyer in Lond. Jour. Bot. 5. 261. Benth. Pl. Hartw. 332. Torrey, Nicollet's Rep. 159; Fremont's Rep. 95; Emory's Rep. 411; Pac. R. R. Rep. 4. 129; Bot. Mex. Bound. 182. Scheele, Linnæa, 22. 151. Engelm. Pl. Upp. Miss. 617. Seemann, Bot. Herald, 53. Parry, Pl. Minnesota, 617. Cooper, Pac. R. R. Rep. 12. 68. Gray, Proc. Amer. Acad. 5. 167; Manual, 407. Chapman, 376. Hook. f., Fl. Arct. 300. Bourgeau, Palliser's Rep. 260. Watson, King's Rep. 5. 287. Bolander, Catalogue, 25. Porter, Hayden's Rep., 1871, 492; Fl. Col. 116. Coulter, Hayden's Rep., 1872, 779. Torr. Bot. Wilkes's Exp. 436.

Collectors:—Richardson; Fremont; 1933 Hartweg; 725 Fendler; Lyall; Gray; Horn; 737 Brewer; Peckham; 725<sup>a</sup> Palmer; 245 Anderson; 969 Watson.

7. *C. POLYSPERMUM*, Linn. Not mealy, erect,  $\frac{1}{2}$ –2 feet high, simple or branched; leaves thin, ovate-oblong, 1–2 inches long, entire, obtuse or acute, cuneate at base; flowers small, in few-flowered clusters usually scattered in short very slender axillary spikes or panicles; calyx smooth, scarcely carinate, not covering the fruit; seed less than half a line broad.—Introduced into the Eastern states; rare.

*Chenopodium polyspermum*. Gray, Manual, 406.

8. *C. HYBRIDUM*, Linn. Not mealy, rather stout, erect, 2–4 feet high, simple or sparingly branched above; leaves usually large, 2–6



inches long, broadly ovate, acuminate, subcordate at base, sinuate-dentate with 2-3 distant teeth on each side; flowers in small clusters in slender terminal and axillary panicles; seed  $\frac{3}{4}$  of a line broad, the margin acutish. — Introduced eastward, but indigenous from Kentucky, Texas, and New Mexico to Oregon.

*Chenopodium urbicum?* Hooker, Fl. Bor.-Am. 2. 127.

*Chenopodium hybridum*, var. *simplex*. Torrey, Ann. N.Y. Lyc. 2. 239.

*Chenopodium hybridum*, Linn. Torrey, Nicolle's Rep. 159; Pac. R. R. Rep. 4. 129. Nuttall, Fl. Ark. 165. Scheele, Roemer's Texas, 445. Carey, Am. Jour. Sci. 2. 7. 170. Gray, Proc. Acad. Phil., 1863, 75; Manual, 407. Bourgeau, Palliser's Rep. 260. Watson, King's Rep. 5. 287. Porter, Hayden's Rep., 1871, 492; Fl. Col. 117. Coulter, Hayden's Rep., 1872, 779.

Collectors: — James; Richardson; 284 Nicolle; 142, 189 Fremont; 715 Fendler; 280 Lindheimer; Wright; Lyall; Parry; 485 Hall & Harbour; 974 Watson; Vasey; 257 Wolf.

9. *C. MURALE*, Linn. Slightly mealy, stout, ascending or decumbent, 1-2 feet high; leaves mostly large, broadly triangular to lanceolate, 1-3 inches long, acute, truncate or cuneate at base, coarsely sinuate-dentate; flowers in small clusters in axillary usually rather dense spicate panicles, mostly shorter than the leaves; seed acutely margined. — Introduced eastward, and found on the western coast from San Francisco to Southern California.

*Chenopodium urbicum*. Bolander, Catalogue, 25.

*Chenopodium murale*, Linn. Hook. & Arn. Bot. Beechey, 157. Carey, Am. Jour. Sci. 2. 7. 170. Bromfield, Hook. Lond. Jour. Bot., 1848, 211. Chapman, 376. Gray, Manual, 407.

Collectors: — 96, 2387 Brewer; Horn; Gregg; Greene.

Var. *FARINOSUM*. Leaves glaucous-mealy beneath; flowers densely clustered in short axillary spikes; pericarp membranous and not closely adherent. — A remarkable and probably distinct form, reported as common in moist places near San Francisco (2489 Brewer).

10. *C. URBICUM*, Linn. Erect, 1-3 feet high; flowers in slender spicate panicles, at least the upper ones exceeding the leaves; margin of the seed obtuse or acutish; otherwise like *C. murale*. — Introduced, in the Eastern states.

*Chenopodium rhombifolium*. Muhl. in Willd. Enum. 1. 288. R. & S., Syst. 6. 256. Bromfield, Hook. Jour. Bot., 1848, 211. Carey, Am. Jour. Sci. 2. 7. 169.

*Chenopodium urbicum*, var. *rhombifolium*. Moquin, Enum. Chenop. 32; DC. Prodr. 13<sup>2</sup>. 70. Gray, Manual, 407.

*Chenopodium urbicum*, Linn. Engelm. Pl. Upp. Miss. 206. Gray, Manual, 407.

- § 2. Not mealy, but more or less glandular-pubescent, aromatic. Seed obtusely margined, scarcely a third of a line broad, often vertical in a 2-3-sepaled calyx. Embryo imperfectly annular. — § BOTRYOIS, Moquin. Introduced from Tropical America.

11. *C. BOTRYS*, Linn. Viscid throughout, erect, 1-2 feet high, branched; leaves ovate to oblong, 1-2 inches long, obtuse, truncate or cuneate at base, sinuately pinnatifid and the lobes usually toothed; flowers subsolitary in naked slender diffuse axillary panicles; calyx-lobes acute, loosely enclosing the fruit; pericarp persistent. — Collected in Oregon and Utah, and common eastward.

*Chenopodium Botrys*, Linn. Pursh, 198. Nuttall, Genera, 1. 199. Elliott, 1. 130. Hooker, Comp. Bot. Mag. 2. 61. Chapman, 376. Gray, Man. 407. Watson, King's Rep. 5. 288.

*Ambrina Botrys*, Moquin. Torrey, Flora N.Y. 2. 134.

Collectors: — 854 Kell. & Harford; 975 Watson.

12. *C. AMBROSIOIDES*, Linn. Smoothish, scarcely glandular, erect or ascending, 2-3 feet high, usually stout and branched; leaves lanceolate, 2-5 inches long, sinuate-dentate, or the upper linear-lanceolate and entire, acute, attenuate to a short petiole; flowers in dense axillary clusters or short simple dense axillary spikes upon the leafy branches; calyx-lobes obtuse, appressed; styles 3, sometimes 4; pericarp deciduous. — Eastward, and in California from San Francisco to San Diego.

*Chenopodium ambrosioides*, Linn. Hooker, Comp. Bot. Mag. 2. 61. Hook. & Arn. Bot. Beech. 157. Nuttall, Fl. Ark. 165. Engelm. Pl. Upp. Miss. 206. Torrey, Pac. R. R. Rep. 7. 18. Gray, Manual, 408.

*Ambrina ambrosioides*, Spach. Torrey, Flora N.Y. 2. 135.

*Roubieva ambrosioides*. Carey, Am. Jour. Sci. 2. 7. 169.

*Chenopodium anthelminticum*. Bolander, Catalogue, 25; not Linn.

Collectors: — 6461 Bolander; 32, 2402 Brewer; 426 Cooper; 3202 Berlandier; Lindheimer; Parry.

Var. *ANTHELMINTICUM*, Gray. Spikes more elongated, often compound and bractless; leaves usually more deeply toothed; said to be perennial. — From the Mississippi and Texas eastward.

*Chenopodium anthelminticum*, Linn. Michaux, Flora, 1. 173. Raf. Med.

Flora, 1. 103, fig. 21. Hooker, Comp. Bot. Mag. 2. 61. Moquin, DC.

Prodr. 132. 73. Torrey, Bot. Mex. Bound. 182. Chapman, 377.

*Ambrina anthelmintica*, Spach. Torrey, Flora N.Y. 2. 135.

*Roubieva anthelmintica*. Carey, Am. Jour. Sci. 2. 7. 169.

*Chenopodium ambrosioides*, var. *anthelminticum*. Gray, Manual, 408.

*Doubtful Species.*

13. *C. CARNOSULUM*, Moquin, DC. Prodr. 13<sup>2</sup>. 64. Described from a specimen in herb. Hooker, said to be from California, but collector unknown. The only certain locality is Port Gregory in extreme Southern America, where it was collected by R. O. Cunningham. It resembles reduced small-leaved forms of *C. Fremontii*, but has the leaves more shortly petioled and the flowers more crowded and axillary.

9. *ROUBIEVA*, Moquin.

Flowers perfect or pistillate, solitary or mostly 2-3 together in the axils. Calyx deeply urceolate, 3-5-toothed, in the pistillate flowers much smaller, becoming contracted at the apex and saccate, 3-5-nerved and reticulately veined. Stamens 5, included. Ovary glandular at the top: styles 3, exserted in the pistillate flowers. Achenium membranous, glandular-dotted, the styles somewhat lateral. Seed vertical. — A perennial heavy-scented South American herb, with alternate pinnatifid leaves.

1. *R. MULTIFIDA*, Moquin. Prostrate or ascending, diffuse, glandular-puberulent, leafy; leaves lanceolate,  $\frac{1}{2}$ -1 $\frac{1}{2}$  inches long; perfect and pistillate flowers intermingled; fruiting calyx nearly a line long, obovate; pericarp membranous, persistent. — Rarely occurring in some of the Atlantic states.

*Chenopodium multifidum*, Linn. Gray, Manual, 408.

*Roubieva multifida*. Moquin, Ann. Sci. Nat. 2. 1. 292, t. 10; DC. Prodr. 13<sup>2</sup>. 80. Carey, Am. Jour. Sci. 2. 7. 167; Bot. Zeit. 8. 528. Gray, Manual, 2 ed., 364. Smith, Proc. Acad. Phil., 1867, 22.

10. *BLITUM*, Tourn.

Flowers perfect or pistillate, bractless. Calyx 2-5-parted or -cleft, unchanged in fruit or fleshy and juicy, not appendaged. Stamens 1-5. Styles 2. Fruit compressed, vertical, partially enclosed in the appressed calyx. Pericarp usually not adherent to the compressed-globose or lenticular seed. Embryo surrounding the albumen. — Herbs, mostly annual, with alternate petioled leaves and densely clustered flowers.

§ 1. Annual or biennial, glabrous. Flowers in axillary heads or the uppermost interruptedly spicate. Calyx becoming more or less fleshy.

1. *B. RUBRUM*, Reich. Stout, erect, 1-3 feet high, branched and leafy; leaves triangular-hastate to lanceolate, 2-3 inches long, acute, cuneate

at base, sparingly sinuate-dentate, the upper narrowly lanceolate and entire; flower-clusters densely spicate upon the branchlets; calyx-lobes 2-4, obtuse, rather fleshy; stamens 1-2; margin of the seed obtuse or acutish.—Seacoast of the Northern states and in saline places inland to the Saskatchewan. Not separable from the European form.

*Chenopodium rubrum*. Linn.

*Blitum maritimum*. Nuttall, Genera, 2. Addenda. Moquin, Enum. Chenop. 44; DC. Prodr. 13<sup>2</sup>. 82. Torrey, Fl. U. S. 5; Fl. N.Y. 2. 136. Bourgeau, Palliser's Rep. 260. Porter, Hayden's Rep., 1870, 481.

*Blitum polymorphum*. C. A. Meyer, Ledeb. Fl. Alt. 1. 13. Watson, King's Rep. 5. 288.

*Blitum rubrum*. Reich. Fl. Germ. Exc. 582; Moquin, DC. Prodr. 13<sup>2</sup>. 83. Hook. Fl. Bor.-Am. 2. 127.

Collectors:—Bourgeau; Torrey; Clinton; Oakes.

Var. HUMILE, Moquin. Stems 3-6 inches long, prostrate or ascending; leaves an inch long or less, ovate to lanceolate, often hastate, rarely toothed; flowers in solitary or subspicate clusters.—From the Saskatchewan to Central Colorado, Northern Nevada and North-eastern California.

*Chenopodium humile*. Hook. Fl. Bor.-Am. 2. 127.

*Blitum polymorphum*, var. *humile*. Moquin, Enum. Chenop. 46. Watson, King's Rep. 5. 288. Coulter, Hayden's Rep., 1872, 779.

*Blitum rubrum*. Newberry, Pac. R. R. Rep. 6. 87.

*Blitum rubrum*, var. *humile*. Moquin, DC. Prodr. 13<sup>2</sup>. 84. Cooper, Pac. R. R. Rep. 12. 68. Bourgeau, Palliser's Rep. 260. Porter, Hayden's Rep., 1871, 492.

Collectors:—Drummond; Bourgeau; Newberry; 462 Torrey; 978 Watson; 272 Wolf.

2. B. CAPITATUM, Linn. Erect, simple or sparingly branched, 1-2 feet high; leaves broadly triangular to lanceolate, 1-3 inches long, often somewhat halbert-shaped or hastate, cuneate or hollowed at base, sharply sinuate-toothed or entire; flower-clusters usually large, in interrupted terminal simple naked spikes and solitary in the axils of the upper leaves; stamens 1-5; calyx becoming fleshy and the clusters red and berry-like; seed small and somewhat acutely margined, the pericarp adherent.—From the Northern border states to Hudson Bay, Great Bear Lake and Oregon, and southward in the mountains to New Mexico and Utah.

*Blitum capitatum*, Linn. Michaux, Flora, 1. 2. Pursh, 4. Richardson, Appx. to Frankl. Journ. 27. Hook. Fl. Bor.-Am. 2. 126. Seemann, Bot. Herald, 53. Torrey, Flora N.Y. 2. 136; Pac. R. R. Rep. 4. 129. Bourgeau, Palliser's Rep. 260. Rothrock, Fl. Alaska, 455. Matthew, Canad. Nat. 12. 158. Gray, Manual, 408. Watson, King's Rep. 5. 288. Porter,

Hayden's Rep., 1870, 481; 1871, 492; Fl. Col. 117. Coulter, Hayden's Rep., 1872, 779.

Collectors :—Richardson; 720 Fendler; Bourgeau; Lyall; Hall & Harbour; 976, 977 Watson; 481 Vasey.

§ 2. Herbaceous, mostly perennial, somewhat mealy. Calyx not becoming fleshy. Flowers in dense terminal spikes (or axillary in *B. glaucum*).—§ AGATHOPHYTON, Moquin.

3. *B. GLAUCUM*, Koch. Annual, low,  $\frac{1}{2}$ –1 foot high, usually decumbent, branching, glaucous-mealy, the upper surface of the leaves smooth; leaves ovate to oblong-lanceolate,  $\frac{1}{2}$ –1 inch long, obtuse, attenuate to a slender petiole, sinuate-dentate; flowers clustered in axillary spikes shorter than the leaves; calyx small, not covering the fruit.—Introduced in the Eastern states from Europe, but apparently indigenous on the Saskatchewan and in Colorado in saline localities.

*Chenopodium glaucum*, Linn. Hook. Fl. Bor.-Am. 2. 127. Bromfield in Hook. Journ. Bot., 1848, 211. Carey, Am. Jour. Sci. 2. 7. 169. Moquin, DC. Prodr. 13<sup>2</sup>. 72. Engelm. Pl. Upp. Miss. 206. Bourgeau, Palliser's Rep. 260. Gray, Manual, 407. Porter, Fl. Col. 117.

*Blitum glaucum*. Koch, Syn. Fl. Germ. 608.

Collectors :—Drummond; Bourgeau; 482 Vasey; Greene; 254 Wolf.

4. *B. BONUS-HENRICUS*, C. A. Meyer. Stout, erect, 1–2 feet high, mostly simple; leaves broadly triangular-hastate, 2–3 inches long, obtuse or acute, hollowed at base, subsinuate or entire; flowers somewhat densely paniculately spiked; calyx deeply parted, nearly equalling the fruit; stamens 5; styles 2–5; pericarp adherent; seed obtusely margined.—European; scarcely introduced.

*Chenopodium Bonus-Henricus*, Linn. Pursh, 197. Torrey, Fl. U. S. 294.

*Blitum Bonus-Henricus*. C. A. Meyer, Ledeb. Fl. Alt. 1. 11. Moquin, DC. Prodr. 13<sup>2</sup>. 84. Gray, Manual, 408.

5. *B. CALIFORNICUM*. Resembling the last, but the leaves acuminate, sharply and unequally sinuate-dentate; calyx more or less deeply 5-cleft, nearly enveloping the fruit; seed less compressed, nearly globose,  $\frac{3}{4}$ –1 line broad; flowers often pedicelled, loosely clustered.—California, from the Sacramento to Fort Tejon and San Diego. Known in the southern part of the state as “Soap-plant.”

*Roubieva anthelmintica*. Hook. & Arn. Bot. Beech. 387.

*Chenopodium anthelminticum*, var. (?) *hastatum*. Moquin, DC. Prodr. 13<sup>2</sup>. 74.

*Blitum Bonus-Henricus*, var. *erosum*. Moquin, DC. Prodr. 13<sup>2</sup>. 85.

*Blitum Bonus-Henricus*. Torrey, Pac. R. R. Rep. 4. 129; same, 7. 18; Bot. Mex. Bound. 182.

*Blitum rubrum*? Torr. Bot. Wilkes's Exp. 437.

Collectors :—Coulter; Fremont; Bigelow; Parry; Torrey; 104 Xantus; 244, 1065 Brewer; 448 Cooper; 855 Kellogg & Harford.

## 11. MONOLEPIS, Schrad.

Flowers polygamous, bractless, the calyx of a single persistent scalelike or foliaceous sepal, not appendaged. Stamen 1, with didymous anther-cells. Styles 2, filiform. Utricle compressed, persistent upon the vertical flattened seed. Embryo surrounding the albumen; radicle inferior. — Low annual herbs, with petioled leaves, and flowers in axillary clusters.

1. *M. CHENOPODIOIDES*, Moquin. Glabrous or somewhat mealy; stems ascending, much branched from the base, 3–12 inches high; leaves lanceolate-hastate, 1–3 inches long, acute or acuminate, attenuate at base and the lateral lobes acute, sparingly sinuate-dentate or entire, the upper leaves much smaller,  $\frac{1}{2}$  inch long or less; flower-clusters dense, often reddish; sepal fleshy and foliaceous, oblanceolate or spatulate, acute; pericarp adherent, minutely subreticulately pitted; seed  $\frac{1}{2}$  line broad, the margin acutish. — From the Saskatchewan to New Mexico, Arizona, and Northeastern California.

*Blitum chenopodioides*. Nuttall, Genera, 1. 4. James, Catalogue, 172. Torrey, Ann. N.Y. Lyc. 2. 240. Hook. Fl. Bor.-Am. 2. 126.

*Blitum Nuttallianum*. Roem. & Schult. Mant. 1. 65. Moquin, Enum. Chenop. 45.

*Monolepis Nuttalliana*. Engelm. Pl. Upp. Miss. 206. Bourgeau, Palliser's Rep. 260. Gray, Proc. Phil. Acad., 1863, 75.

*Monolepis chenopodioides*. Moquin, DC. Prodr. 132. 85. Engelm. Pl. Upp. Miss. 206. Watson, King's Rep. 5. 288. Porter, Hayden's Rep., 1871, 492; Fl. Col. 117. Coulter, Hayden's Rep., 1872, 779.

*M. chenopodioides*, var. *trifida*. Torrey, Ives's Rep. 25; not Moq.

Collectors: — Richardson; Nicolle; 477 Fremont; Newberry; Bourgeau; 54 Palmer; Torrey; 486 Hall & Harbour; 491 Vasey; 979 Watson; Hayden; 340 Greene; Bolander & Kellogg.

2. *M. SPATHULATA*, Gray. Decumbent or ascending, 3–6 inches high, with elongated leafy branches, subpuberulent or glabrous; leaves narrowly spatulate,  $\frac{1}{2}$  inch long or less, acute, entire; clusters dense, 10–20 flowered; sepal spatulate, obtuse; pericarp separating from the seed, minutely papillose; seed less than  $\frac{1}{4}$  line broad. — Mono Pass, California (6373 Bolander), and by Kellogg, but locality not given.

*Monolepis spathulata*. Gray, Proc. Am. Acad. 8. 389. Watson, King's Rep. 5. 289.

3. *M. PUSILLA*, Torrey. Erect, dichotomously much branched from the base, 2–6 inches high, slender, somewhat mealy becoming glabrous, often reddish; leaves oblong, 3–6 lines long, obtuse, entire, shortly

petioled; clusters 1-5-flowered; sepal obtuse; pericarp adherent, minutely tuberculate; seed less than  $\frac{1}{4}$  line broad, acutish on the margin. — Alkaline valleys of Northwestern Nevada.

*Monolepis pusilla.* Torrey; Watson, in King's Rep. 5. 289.

Collectors: — Stretch; 228 Anderson; 980 Watson; Gray.

12. ATRIPLEX, Tourn.

Monœcious or diœcious. Staminate flowers bractless, the campanulate calyx 3-5-cleft or -parted, with as many stamens. Pistillate flowers 2-bracted, without calyx \* or rarely with 2-4 free hyaline sepals: bracts erect, free or more or less united, becoming enlarged and enclosing the fruit; the margins usually somewhat dilated, toothed or entire, and the sides often thickened and muricate. Styles 2, filiform, free or united at base. Fruit compressed, sessile or stipitate; the pericarp thin and membranous. Seed vertical, with a thin crustaceous or coriaceous testa: radicle inferior, ascending, or superior. — Herbs or shrubs, mealy or scurfy-tomentose. Leaves flat, alternate or opposite, often hastate or sinuate-dentate. Flowers usually clustered, axillary, or in simple or paniced spikes, the male and female distinct upon the same or separate plants or mingled in the clusters.

SECT. I. Annuals: radicle inferior or subsascending: bracts free or nearly so.

§ 1. Bracts ovate-rhombic to triangular or hastate, often appendaged, the margin foliaceous, entire or toothed; leaves subhastate.

Spikes naked; leaves petioled, green . . . . . 1. *A. patula.*

Spikes mostly leafy; leaves nearly sessile, gray scurfy.

Introduced, rare . . . . . 2. *A. rosea.*

§ 2. Bracts ovate to linear, mostly 4-6 lines long, entire and not margined nor appendaged (except in No. 3), only the apex foliaceous.

\* Leaves alternate.

Subdiœcious; leaves hastate, subentire; bracts linear-lanceolate, often toothed at base, 3-nerved, styles included; calyx 5-cleft. Western . . . . . 3. *A. phyllostegia.*

Androgynous spikes dense, apparently male; leaves rhombic, sinuate-dentate; bracts ovate-oblong, small; styles exserted; calyx 4-parted. California . . . . . 4. *A. spicata.*

Leaves oblong, entire; bracts broadly ovate or oblong; radicle nearly superior . . . . . 5. *A. Alaskensis.*

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\* The Garden Orache, *A. hortensis*, rarely occurs escaped from cultivation, in which some of the flowers are as in *Chenopodium*, with a regular 5-lobed calyx closely covering a horizontal seed, the remainder having two broad bracts enclosing a vertical seed, without calyx.

**\*\* Leaves mostly opposite, entire.**

- Weak and slender; leaves long, linear; flowers axillary, androgynous; bracts linear. Vancouver's Is. . . . . 6. *A. zosteræfolia*.  
 Erect; leaves oblong, obtuse, distant; bracts ovate-rhombic. Alaska. . . . . 7. *A. Gmelini*.

SECT. II. Annuals: radicle superior (except in 8): leaves mostly alternate.

§ 3. Bracts ovate, sessile, entire and not foliaceous nor appendaged in fruit.

\* Lower leaves opposite; bracts free; radicle inferior.

- Flowers axillary; leaves small, crowded . . . . . 8. *A. Californica*.

**\*\* Leaves alternate; bracts united.**

- Flowers axillary, solitary; fruiting bracts  $\frac{1}{4}$ " long leaves small, entire, crowded. Nevada . . . . . 9. *A. pusilla*.

- Male flowers in short spikes; pistillate solitary; fruiting bracts 1" long, pubescent; leaves 1' long, thin, entire. Upper Missouri . . . . . 10. *A. Endolepis*.

- Male flowers in interrupted spikes; pistillate very small, solitary; leaves 3-6" long, ovate, subentire. Mexico. 11. *A. monilifera*.

- Flowers axillary, clustered, staminate above; fruiting bracts 3" long, subhastate, smooth; leaves rounded, dentate. Rocky Mountains . . . . . 12. *A. Sucklejana*.

§ 4. Fruiting bracts small, oblong to cuneate-orbicular, united to above the middle, 3-nerved, rarely appendaged, the truncate or rounded apex narrowly margined and few-toothed; leaves entire.

- Erect; calyx 3-4-cleft; fruiting bracts ovate-oblong, truncate, obtusely 3-toothed leaves triangular- or cordate-ovate. Nevada . . . . . 13. *A. truncata*.

- Low, ascending; calyx 5-cleft fruiting bracts ovate-oblong, truncate, entire or suberose; leaves subcordate-ovate. Colorado . . . . . 14. *A. saccaria*.

- Low, slender; fruiting bracts ovate-oblong, truncate, 3-toothed, very small; leaves linear, short. Colorado. 15. *A. Wolfii*.

- Ascending; fruiting bracts sessile, broadly cuneate, submarginate, the rounded summit sharply 3-5-toothed; leaves oblanceolate. Atlantic coast . . . . . 16. *A. arenaria*.

- Male spikes dense; fruiting bracts very small, sessile, suborbicular, with 3-5 small teeth above; leaves ovate to oblong, sessile. California . . . . . 17. *A. microcarpa*.

- Male spikes slender; fruiting bracts broadly cuneate, pedicelled, the rounded summit sharply 5-toothed; leaves oblanceolate to linear. New Mexico . . . . . 18. *A. Wrightii*.

§ 5. Fruiting bracts small, axillary, cuneate-orbicular, margined above the united base and coarsely toothed, doubly tooth-crested or naked; leaves oblong to lanceolate, 1' long or less.

- Fruiting bracts broad, with equal triangular teeth, sides doubly crested; styles exerted; leaves oblanceolate, subentire, petioled . . . . . 19. *A. Texana*.



- Erect; fruiting bracts denticulate, not mucronate; styles included; leaves lanceolate, entire. California . . . 20. *A. Coulteri*.
- Procumbent; fruiting bracts acuminate, unequally toothed, the sides naked or subcrested; leaves obovate, petioled, entire. California . . . . . 21. *A. Barclayana*.
- Suberect; fruiting bracts margined nearly to the base, 7-toothed, the middle tooth largest; styles very short; leaves undulate, sinuate. Key West . . . 22. *A. cristata*.
- § 6. Fruiting bracts orbicular,  $1\frac{1}{2}$ - $2\frac{1}{4}$ " broad, with a double herbaceous toothed margin, the sides carinate or rarely appendaged; leaves narrow, 1' long or less.
- \* Apex of the fruiting bracts not foliaceous.
- Fruiting bracts  $1\frac{1}{4}$ " wide, radiately toothed, not appendaged; leaves oblanceolate to linear, subdentate at the apex. New Mexico . . . . . 23. *A. elegans*.
- Fruiting bracts  $2-2\frac{1}{4}$ " wide, gash-toothed, rarely somewhat appendaged; leaves lanceolate, entire. California . . . . . 24. *A. coronata*.
- \*\* Fruiting bracts tooth-crested, with an acuminate foliaceous apex; leaves lanceolate, subentire.
- Flowers androgynous, axillary; fruiting bracts with a broad terminal lobe, doubly or triply tooth-crested; leaves shortly petioled. Arizona . . . . . 25. *A. Powellii*.
- Male flowers in a naked panicle; fruiting bracts with a narrow apex, shortly appendaged; leaves sessile. California . . . . . 26. *A. bracteosa*.
- § 7. Fruiting bracts rhombic-orbicular, united, indurated, subcompressed,  $2-4$ " long, usually conspicuously appendaged and the foliaceous margin toothed and undulate; leaves triangular and subhastate, the lower opposite.
- Male spikes short and dense; leaves petioled. Rocky Mountains . . . . . 27. *A. argentea*.
- Male spikes elongated, slender; leaves sessile; distantly branched. New Mexico to California . . . 28. *A. expansa*.
- SECT. III. Perennials, more or less shrubby, appressed-scurfy: radicle usually superior: leaves alternate.
- § 8. Fruiting bracts orbicular to ovate, toothed, usually more or less appendaged and somewhat spongy.
- \* Fruiting bracts slightly compressed; leaves  $\frac{1}{2}$ -2' long.
- Erect, woody; fruiting bracts united to above the middle  $2$ " long or less, usually appendaged. Rocky Mountains . . . . . 29. *A. Nuttallii*.
- Erect, woody; bracts lanceolate, the linear apex only free, in fruit  $4-6$ " long and strongly crested. Arizona. 30. *A. acanthocarpa*.
- Decumbent, subwoody at base; bracts axillary, ovate,  $3$ " long in fruit, united, usually crested, often not toothed; leaves thick, broad, obtuse. California . . . 31. *A. leucophylla*.

\*\* Leaves small, numerous; fruiting bracts more or less compressed, mostly small, cuneate-orbicular.

- Tall; spikes dense, paniced; fruiting bracts compressed, toothed and usually tuberculate. Arizona . . . . . 32. *A. polycarpa*.
- Slender; fruiting bracts axillary or spicate, convex, toothed, usually crested; lower leaves opposite. Arizona . . . . . 33. *A. Greggii*.
- Fruiting bracts axillary, orbicular, compressed, toothed, 3-nerved, not appendaged; leaves mostly opposite. Mexico . . . . . 34. *A. oppositifolia*.
- § 9. Tall and shrubby; spikes paniced; fruiting bracts orbicular or ovate, membranous or spongy, not appendaged nor margined; leaves ovate to rhombic, entire; radicle ascending (superior in No. 36).
- Bracts rounded, compressed, united to above the middle; branches terete, unarmed. Arizona . . . . . 35. *A. lentiformis*.
- Bracts rounded, compressed, free; branches angled, spinescent. Nevada . . . . . 36. *A. Torreyi*.
- Bracts broadly ovate, convex, united to the middle; branches terete, unarmed. Southern California . . . . . 37. *A. Breweri*.
- § 10. Bracts thick, scurfy, with broad rounded entire margins, not appendaged nor veined; erect, shrubby.
- Bracts sessile; leaves ovate to oblanceolate, entire, subsessile. Great Basin . . . . . 38. *A. confertifolia*.
- Bracts shortly pedicelled; leaves rounded, sharply dentate, petioled. Arizona . . . . . 39. *A. hymenelytra*.
- § 11. Shrubby; fruiting bracts united, indurated, not appendaged, with four broad membranous veined wings.
- Leaves narrow; fruit 4-6" broad. Great Basin . . . . . 40. *A. canescens*.

SECT. I. Annuals, somewhat succulent. Radicle inferior or somewhat ascending. Fruiting bracts herbaceous or coriaceous, free or nearly so. Flowers androgynous, or subdioecious, in leafy or naked spikes.

§ 1. Bracts ovate-rhombic to triangular or hastate, often crested, the margin foliaceous, entire or toothed: leaves usually more or less hastate, the lowest opposite.

1. *A. PATULA*, Linn. Erect or decumbent, 1-4 feet high, branched, dark green and glabrous or somewhat scurfy; leaves lanceolate-hastate, 1-4 inches long, the lower on the stems and branches opposite, obtuse or acute, entire or sparingly sinuate-toothed, petioled, the upper lanceolate to linear; flowers in subdioecious naked and usually somewhat interrupted spikes, the lower clusters axillary; fruiting bracts ovate-triangular or rhombic-hastate, compressed, united at base, becoming 3-6 lines long, obscurely 3-nerved, with a broad herbaceous entire or toothed

margin, the sides often strongly mucronate; seed dark, a line broad; radicle lateral. — The typical form scarcely occurs in this country.

*Atriplex patula*, Linn. Hooker f., Arctic Flora, 300 and 338. Elliott, 2. 577. Torrey, Flora N. Y. 2. 137. Gray, Manual, 409. Porter, Fl. Col. 117.

Var. *HASTATA*, Gray. Stout, at least the lower leaves broadly triangular-hastate, entire or toothed with shallow sinuses. — The American form appears to differ from the European (*A. hastata*, Linn.) in its more usually entire leaves and greater scurfiness. Found in salt and brackish localities on the coast from New Brunswick to Virginia, and inland; from the Saskatchewan to Central Colorado, and in salt marshes near San Francisco.

*Atriplex laciniata*. Pursh, Flora, 199.

*Atriplex laciniata*, var. *Americana*. Torrey, Flora U. S. 1. 293.

*Chenopodium rubrum*. Hook. Fl. Bor.-Am. 2. 127, in part.

*Atriplex Purshiana*. Moquin, Enum. Chenop. 55; DC. Prodr. 13<sup>2</sup>. 98. Dietrich, Syn. 5. 532.

*Atriplex hastata*, Linn. Engelm. Pl. Upp. Miss. 206. Gray, Pac. R. R. Rep. 12. 46. Matthew, Canad. Nat. 12. 159. Chapman, 377. Torr. Bot. Wilkes's Exp. 437.

*Atriplex patula*, var. *hastata*. Gray, Manual, 409.

Collectors: — James; Nuttall; Suckley; 2445 Bolander; Greene; Burgess; 259, 262 Wolf.

Var. *SUBSPICATA*. A low and often simple form, 3–12 inches high, usually quite scurfy; leaves lanceolate-hastate,  $\frac{1}{2}$ –1 inch long. — From the Saskatchewan to the Missouri.

*Chenopodium subspicatum*. Nuttall, Genera, 1. 199. Spreng. Syst. 1. 919. Moquin, Enum. Chenop. 34.

*Atriplex angustifolia*. Hook. Fl. Bor.-Am. 2. 128, in part.

*Atriplex laciniata*, var. *Americana*. Torrey, Nicollet's Rep. 159.

*Atriplex rosea*. Hook. Pl. Geyer in Lond. Jour. Bot. 5. 261.

*Atriplex hastata*. Bourgeau, Palliser's Rep. 260.

Collectors: — Nuttall; Nicollet; Bourgeau; Hall.

Var. *LITTORALIS*, Gray. Slender; leaves linear-lanceolate to linear, rarely subhastate or toothed. — From New Brunswick and Canada to New York; Oregon. A narrow-leaved form rather than a variety, simulated by the upper portions of stems of var. *hastata*.

*Atriplex littoralis*. Bourgeau, Palliser's Rep. 260. Gray, Proc. Amer. Acad. 8. 398.

*Atriplex angustifolia*. Hook. & Arn. Bot. Beechey, 157?

*Atriplex patula*, var. *littoralis*. Gray, Manual, 409.

Collectors: — Nuttall; Kellogg; 432 Hall.

2. *A. ROSEA*, Linn. (Gray, Manual, 409.) Subdecumbent, grayish scurfy, 1–2 feet high; leaves ovate-rhombic to -triangular,  $\frac{1}{2}$ – $1\frac{1}{2}$  inches long, sessile or very shortly petioled, sinuate-dentate, the upper ovate; spikes more leafy at base; fruiting bracts nearly as in the last, 2–3 lines broad, the margin toothed. — Of rare occurrence in the Eastern states; introduced from Europe.

§ 2. Bracts ovate to linear, mostly 4–6 lines long (small in *A. spicata*), entire and not margined nor appendaged (except in *A. phyllostegia*), only the apex foliaceous: leaves petioled.

\* Leaves alternate.

3. *A. PHYLLOSTEGIA*. Usually stout, erect or ascending,  $\frac{1}{2}$ – $1\frac{1}{2}$  feet high, simple or branched, smooth or somewhat mealy, leafy; leaves rhombic-triangular or hastate to ovate,  $\frac{1}{2}$ –2 inches long, acute or acuminate, entire or sparingly sinuate-dentate; flowers subdioecious, the clusters axillary and in short subnaked spikes; calyx 5-toothed or -cleft; bracts free or nearly so, linear-lanceolate, scurfy, becoming 4–6 lines long and 2 lines wide, sessile or often pedicelled, compressed, foliaceous above but somewhat coriaceous at base and strongly 3-nerved, sometimes with a sparingly lacinate marginal lobe below and occasionally with the sides herbaceously appendaged; ovary sometimes surrounded by 3 hyaline sepals half shorter than the young bracts; styles nearly equalling or shorter than the bracts; radicle ascending. — In the valleys and on the foothills of Northwestern Nevada and in Mojave Valley, Southern California, — only the latter specimens in fruit.

*Obione phyllostegia*. Torrey; Watson, King's Rep. 5. 291.

Collectors: — H. Engelmann; 231 Anderson; Cooper; 986 Watson; Lemmon.

4. *A. SPICATA*. Stout, erect, 2 feet high, diffusely branched, more or less mealy; leaves ovate-rhombic, 2 inches long, acute, cuneate to a short petiole, coarsely and irregularly sinuate-dentate; flowers androgynous in dense axillary and terminal naked closely paniced spikes, the staminate nearly concealing the fertile ones; calyx large, 4-parted; bracts ovate-oblong,  $1\frac{1}{2}$  lines long, free, densely farinose, herbaceous, not margined nor appendaged, apparently not much enlarged in fruit; styles long and exerted; nearly mature seed  $\frac{1}{2}$  of a line broad; radicle inferior. — Collected only by Brewer (1190) in San Joaquin Valley, California, east of Mt. Diablo, in alkaline soil.

5. *A. ALASKENSIS*. Stout, erect or ascending, a foot high or more, glabrous; leaves thick, oblong to oblong-ovate,  $1\frac{1}{2}$ –2 inches long,

obtuse or acutish, subcuneate at base, entire, the upper linear-lanceolate and acuminate; fruiting bracts clustered in the axils, subcompressed, oblong to broadly ovate or suborbicular, 2-6 lines long, acutish or acuminate, united at base, entire, coriaceous, with a short or somewhat elongated foliaceous apex; pericarp loose and membranous; seed a line broad; radicle superior or nearly so. — Collected by Dr. A. Kellogg, at Barlow's Cove, Alaska, in fruit.

\*\* Leaves mostly opposite, entire.

6. *A. ZOSTERÆFOLIA*. Weak and slender, ascending, a foot high or less, diffusely branched, glabrous or slightly scurfy; leaves fleshy, linear, 1-4 inches long,  $1\frac{1}{2}$  lines broad; flowers in axillary clusters and in short axillary androgynous spikes; calyx deeply 5-cleft; bracts linear, somewhat unequal, 1-2 lines becoming 4-6 lines long, free, fleshy; immature seed less than half a line broad; radicle slightly ascending; mature fruit unknown. — Collected only by Scouler at the Straits of De Fuca.

*Chenopodium* (?) *zosteræfolium*. Hook. Fl. Bor.-Am. 2. 127. Moquin, Enum. Chenop. 35.

*Atriplex Gmelini*, var. *zosteræfolia*. Moquin in DC. Prodr. 13<sup>2</sup>. 97.

7. *A. GMELINI*, C. A. Meyer. Erect, slender,  $\frac{1}{2}$ -1 foot high, subsimple, glabrous; leaves opposite, 3-5 pairs, thin, oblong, an inch long, obtuse, cuneate to a slender petiole, entire or very obscurely dentate; flowers axillary and in a short crowded terminal spike; calyx deeply 5-cleft; bracts ovate-rhombic, united at base,  $1\frac{1}{2}$ - $2\frac{1}{2}$  lines long, obtuse or acute, foliaceous at the apex; seed  $\frac{1}{2}$  line broad; radicle inferior. — From Eschscholtz Bay to Norton Sound, and probably including all the *A. littoralis* of northern collectors. It was wrongly identified by Meyer with Gmelin's figure, which apparently concerns a narrow-leaved form of *A. patula*. Among the crowded clusters are occasionally found pistillate flowers entirely naked, with neither calyx nor bracts.

*Atriplex Gmelini*. C. A. Meyer, in Bong. Veg. Sitch. 160, excl. syn. Hook. Fl. Bor.-Am. 2. 128. Fenzl in Ledeb. Fl. Ross. 3. 732. Moquin, Enum. Chenop. 59; DC. Prodr. 13<sup>2</sup>. 96. Hook f., Fl. Arc. 338. Rothrock, Fl. Alaska. 455.

*Atriplex angustifolia*, var. *obtus*a. Chamisso in Linnæa, 6. 569.

*Atriplex angustifolia*. Hook. Fl. Bor.-Am. 2. 128, in part.

(?) *Atriplex littoralis*. Hook. Fl. Bor.-Am. 2. 128. Hook. & Arn. Bot. Beech. 129. Fenzl in Ledeb. Fl. Ross. 3. 729, in part. Seemann, Bot. Herald, 39. Hook. f., Fl. Arc. 300. Rothrock, Fl. Alaska, 455.

Collectors : — Bannister.

Sect. II. Annuals. Radicle superior (except in *A. Californica*).

Leaves alternate or in a few species subopposite.

§ 3. Bracts ovate, sessile, united, more or less compressed, not foliaceously margined nor appendaged: flowers axillary and androgynous, or the upper clusters staminate: (bracts free and lower leaves opposite in *A. Californica*). Species not closely allied to each or any other.

8. *A. CALIFORNICA*, Moquin. Stems a foot high, erect or decumbent at base, leafy, canescent; leaves narrowly lanceolate, 3-8 lines long, acute at each end, sessile, entire; flowers axillary; calyx 4-parted or deeply 4-cleft; bracts rhombic-ovate, becoming  $1\frac{1}{2}$  lines long, not indurated; styles included; seed  $\frac{1}{2}$  line broad. — California, by several collectors, but localities not given. Said to be perennial, though apparently annual.

*Atriplex Californica*. Moquin, DC. Prodr. 13<sup>2</sup>. 98. Dietrich, Syn. 5. 534.

Collectors: — "685 Coulter; 276 Bridges; Kellogg & Harford.

9. *A. PUSILLA*. (*Obione*, Torrey; Watson, King's Rep. 5. 291.) Slender, 2-6 inches high, diffusely much-branched, leafy, hoary-scurfy throughout; leaves broadly ovate to oblong-lanceolate, 2-4 lines long, acute, sessile, entire, mostly crowded on the branches; flowers minute, subsolitary or one of each sex in the axils; calyx deeply 5-cleft; bracts ovate,  $\frac{1}{2}$  line long in fruit, acutish; styles exerted; seed nearly filling the theca, the testa thin and transparent. — Northwestern Nevada, in alkaline localities (65 Anderson; 988 Watson; Gray; Lemmon).

10. *A. ENDOLEPIS*. Erect, 6-10 inches high, glabrous or farinose, branching from the base; leaves thin, lanceolate, an inch long, acute, sessile, entire; male clusters terminal and axillary, somewhat arachnoid, the lobes of the urceolate 5-toothed calyx strongly inflexed, with a somewhat prominent fleshy crest upon the back; pistillate flowers solitary in the lower axils, sessile; fruiting bracts ovate, a line long, membranous, pubescent; ovary surrounded by 3-4 entire or lobed hyaline sepals, which are free and much shorter than the bracts; styles slightly exerted; seed  $\frac{2}{3}$  of a line broad. — On the Upper Missouri and head-waters of the Yellowstone. The pistillate flowers escaped notice on the specimens of the earlier collectors.

*Kochia dioica*. Nuttall, Genera, 1. 200. Torrey, Nicolle's Rep. 158. Nees, Neuwied's Trav., Appx. 19. Moquin, Enum. Chenop. 94; DC. Prodr. 13<sup>2</sup>. 133. Engelm. Pl. Upp. Miss. 206.

*Salsola dioica*. Sprengel, Syst. 1. 923. Dietr. Syn. 2. 996.

*Endolepis Suckleyana*. Torrey, Pac. R. R. Rep. 12. 47, t. 3.

Collectors: — Nicolle; Fremont; Suckley; Allen; Gray; Parry.

11. *A. MONILIFERA*. Low, slender, branching from the base, the stems decumbent or ascending, 3–6 inches long, leafy, hoary-farinose; leaves broadly ovate to lanceolate, 3–6 lines long, acute, obtuse or cordate at base, sessile, entire or somewhat repand-dentate; male flowers in dense globose clusters, mostly in terminal naked subpanicked spikes, the calyx 5-cleft to the middle; flowering bracts minute, solitary in the axils, ovate, acute, entire, enclosing two shorter sepals alternate with them; styles exserted; mature fruit unknown. — Collected by Dr. Gregg in the dried bed of a lake in Bolson de Mapimi, Chihuahua; “Quelito,” used for greens.

12. *A. SUCKLEYANA*. Prostrate or ascending, the stems a foot long or more, stout and somewhat fleshy, smooth or coarsely scurfy, leafy; leaves suborbicular to ovate or rhombic,  $\frac{1}{2}$ –1 inch long, obtuse, abruptly narrowed into a slender petiole exceeding the blade, acutely repand-dentate; flowers in axillary clusters, the staminate above; calyx 3–4-parted to the base; fruiting bracts  $2\frac{1}{2}$ –3 lines long, ovate-rhombic and subhastate, flattened, surrounded by a very narrow crenate-denticulate margin; seed large, filling the cavity, the testa very thin. — From Milk River, Northern Montana, to South Park, Colorado.

*Obione Suckleyana*. Torrey, Pac. R. R. Rep. 12. 47, t. 4. Engelm. Pl. Upp. Miss. 206. Porter, Fl. Col. 118.

Collectors: — Suckley; Hayden; Meehan.

§ 4. Fruiting bracts 1–2 lines long or less, oblong to cuneate-orbicular, united to above the middle, coriaceous or somewhat indurated, only the truncate or rounded apex narrowly margined and few-toothed, the sides 3-nerved, rarely appendaged: spikes leafy or the staminate naked and slender (in *A. microcarpa* and *Wrightii*): leaves entire.

13. *A. TRUNCATA*, Gray. Rather stout, erect and mostly strict, 1–3 feet high, sparingly branched, leafy, canescent, scurfy above; leaves broadly ovate,  $\frac{1}{2}$ – $1\frac{1}{2}$  inches long, truncate or cordate at base, acute, sessile or the lower shortly petioled; spikes more or less leafy; calyx mostly 3–4-parted; fruiting bracts  $1\frac{1}{2}$  lines long, ovate-oblong, sessile or shortly pedicelled, united up to the truncate herbaceous summit, which is obtusely 3-toothed, the sides rarely subtuberculate. — Frequent from Oregon to Northwestern Nevada.

*Atriplex patula*, var. Hook. Fl. Bor.-Am. 2. 128.

*Atriplex patula*. Newberry, Pac. R. R. Rep. 6. 87.

*Obione truncata*. Torrey; Watson, King's Rep. 5. 271.

*Atriplex truncata*. Gray, Proc. Amer. Acad. 8. 398.

Collectors: — 223 Stretch; 40 Anderson; Newberry; 987 Watson; Gray; 438 Hall.

14. *A. SACCARIA*. Ascending, 3–5 inches high, diffusely branched, leafy, densely scurfy; leaves very broadly ovate,  $\frac{1}{2}$  inch long, subcordate at base, acute, very shortly petioled or sessile; flowers axillary; calyx 5-cleft to the middle; fruiting bracts nearly as in the last, but not at all appendaged, pedicelled and often deflexed, the truncate summit entire or suberose. — Collected by Dr. A. Gray in 1872, on the desert plains of Southern Wyoming or Northern Utah.

15. *A. WOLFII*. Low, slender, 6 inches high, branching from the base, scurfy-canescens and reddish; leaves linear, 4–6 lines long, acute, sessile; flowers very small, in androgynous axillary clusters; calyx deeply 5-cleft; fruiting bracts as in *A. truncata*,  $\frac{1}{2}$ – $\frac{3}{4}$  line long, sessile, the herbaceous summit somewhat broader than the body, with a quadrilateral tooth on each side and a small acute tooth in the centre; styles very short. — Collected by Mr. Wolf, upon Lt. Wheeler's survey, on alkaline flats at Saguache, Central Colorado.

16. *A. ARENARIA*, Nutt. Ascending,  $\frac{1}{2}$ –1 foot high or more, diffusely branched, leafy, silvery-mealy; leaves thin, oblanceolate,  $\frac{3}{4}$ –1  $\frac{1}{2}$  inches long, acute or obtuse, attenuate to a short petiole; flowers axillary, androgynous; fruiting bracts sessile, broadly cuneate,  $1\frac{1}{2}$ –3 lines broad, acutely 3–5-toothed at the rounded herbaceous summit, the sides strongly reticulated and not appendaged, or with 2–3 hooked projections, or more rarely doubly crested. — On the seacoast from Nova Scotia to Key West.

*Atriplex arenaria*. Nuttall, Genera, 1. 198. Spreng. Syst. 1. 918. Dietrich, Syn. 5. 535. Gray, Manual, 409.

*Obione arenaria*. Moquin, Enum. Chenop. 71; DC. Prodr. 13<sup>2</sup>. 107. Torrey, Flora N. Y. 2. 138. Chapman, 377. Smith, Proc. Acad. Phil., 1867, 22. Matthew, Canad. Nat. 12. 159.

17. *A. MICROCARPA*, Dietrich. Slender,  $\frac{1}{2}$ –1 foot high, "procumbent" or erect, somewhat branched, leafy, canescens; leaves ovate to oblong, 3–5 lines long, obtuse or acutish, cuneate at base, sessile; flowers in small axillary clusters, the staminate dense and mostly terminal; calyx deeply 5-cleft; fruiting bracts but half a line broad, orbicular or obovate, sessile, the summit narrowly margined with 3–5 small herbaceous teeth, the sides naked or minutely bi-tuberculate; styles short. — San Diego, California; collected by Barclay and Newberry. Mr. Bentham has published a second *A. microcarpa* in Fl. Australiensis, 5. 176.

*Obione microcarpa*. Benth. Bot. Sulphur, 48. Moquin, DC. Prodr. 13<sup>2</sup>. 111. Walpers, Ann. 1. 567.

*Atriplex microcarpa*. Dietrich, Syn. 5. 536.

*Obione arenaria*? Torrey, Ives's Rep. 25. Hook. & Arn. Bot. Beechey, 157?



18. A. WRIGHTII. Slender, erect, a foot high, simple or sparingly branched, leafy below, glaucous-mealy; leaves oblanceolate to linear,  $\frac{1}{2}$ –1 inch long, 3–4 lines long upon the branches, acute or the lower obtuse; male flowers in naked terminal spikes; fruiting bracts axillary, a line long, broadly cuneate upon a short pedicel, acutely 5-toothed at the rounded summit, the sides reticulated, with rarely 1–2 straight projections. — New Mexico (1743 Wright) and Arizona (Palmer).

*Obione elegans*, var. (?) *radiata*. Torrey, Bot. Mex. Bound. 183, in part.

§ 5. Fruiting bracts  $1\frac{1}{2}$  lines long or less, axillary, cuneate-orbicular, subindurated, united at base, herbaceously margined above and coarsely toothed, the sides doubly tooth-crested or naked: leaves thin, oblong to lanceolate, an inch long or less: male clusters subterminal or in slender naked spikes: grayish puberulent.

19. A. TEXANA. Erect or ascending,  $\frac{1}{2}$ – $1\frac{1}{2}$  feet high, slender, branched; leaves oblanceolate, 1 inch long, acute, attenuate to a slender petiole, sparingly dentate or entire; male clusters subterminal; calyx 5-cleft; fruiting bracts  $1\frac{1}{2}$  lines long, broadly cuneate, the upper portion margined with several nearly equal triangular subdenticulate teeth, the sides reticulated and crested with a double row of acute teeth; styles elongated and exserted. — Western Texas.

*Obione elegans*, var. *tuberculata*. Torrey, Bot. Mex. Bound. 183.

Collectors: — Wright; Schott; cult. hort. Camb.

20. A. COULTERI, Dietrich. “Fruticose” (?), erect, 1–2 feet high, slender, branched; leaves lanceolate, 4–6 lines long,  $\frac{1}{2}$ –1 line broad, attenuate at each end, acute and mucronate, subundulate, entire; fruit sessile, a line long, with a narrow denticulate margin from near the base, the sides obsoletely nerved, not appendaged; styles not exserted. — California; collected only by Coulter.

*Obione Coulteri*. Moquin, DC. Prodr. 13<sup>2</sup>. 113.

*Atriplex Coulteri*. Dietrich, Syn. 5. 537.

21. A. BARCLAYANA, Dietrich. Slender, with long procumbent branches; leaves obovate, 8–12 lines long, 4–5 lines broad, obtuse, the upper oblong and acutish, mucronulate, long-petioled, entire, subcoriaceous; fruiting bracts scarcely a line broad, sessile, unequally 8–10 toothed above, the terminal tooth largest, the sides naked or obsoletely nerved or slightly doubly tooth-crested. — Known only from a specimen in the Hooker herbarium, collected by Hinds at Magdalena Bay.

*Obione Barclayana*. Benth. Bot. Sulph. 48. Walpers, Ann. 1. 567. Moquin, DC. Prodr. 13<sup>2</sup>. 112.

*Atriplex Barclayana*. Dietrich, Syn. 5. 537.

22. *A. CRISTATA*, HBK. Slender, decumbent or ascending, 1–1½ feet high, branching, leafy; leaves oblanceolate to obovate, ½–1 inch long, usually obtuse, mucronulate and undulate, sinuate-dentate or the upper entire; flowers axillary or the male often in naked slender terminal spikes; fruiting bracts 1½ lines long, margined nearly to the base, the terminal tooth most prominent, with three smaller on each side; styles very short, included.—Tropical America and the West Indies; Key West, collected only by Blodgett. Said to be perennial and sometimes becoming woody at base, but the Floridan specimens appear to be annual.

*Atriplex cristata*. HBK., Nov. Gen. & Sp. 2. 192.

*Obione cristata*. Moquin, Enum. Chenop. 73; DC. Prodr. 13<sup>2</sup>. 110. Chapman, 377.

§ 6. Fruiting bracts united, orbicular, compressed, indurated, 1½–2½ lines broad, surrounded by a double herbaceous toothed margin, the sides carinate, usually not appendaged: flowers mostly axillary: leaves narrow, an inch long or less.

\* Apex of fruiting bracts not foliaceous.

23. *A. ELEGANS*, Dietrich. Erect, slender, ½–1 foot high, branching, leafy; leaves oblanceolate to linear, 6–9 lines long, obtuse or acute, entire or with a few teeth near the apex; fruiting bracts 1½ lines broad, very shortly pedicelled, the margins sharply and radiately toothed, the sides more or less prominently carinate, not appendaged.—New Mexico and Arizona to Northern Mexico.

*Obione elegans*. Moquin, DC. Prodr. 13<sup>2</sup>. 113.

*Atriplex elegans*. Dietrich, Syn. 5. 537.

*Obione radiata*. Torrey, Bot. Mex. Bound. 183.

*Obione elegans*, var. (?) *radiata*. Torrey, Bot. Mex. Bound. 183, in part.

Collectors:—1375 Coulter; 571 Wright; 715 Thurber; 219 Palmer.

24. *A. CORONATA*. Stout, becoming woody at base, erect, 1–2 feet high, branched, leafy, hoary-farinose; leaves lanceolate, ½–1 inch long, attenuate to the base or to a short petiole, acute, entire; flowers minute; calyx 5-cleft; fruiting bracts 2–2½ lines long, the margins gash-toothed, the sides rarely slightly tuberculate.—San Joaquin Valley, California, in alkaline soil (1189 Brewer), and near Fort Mojave (Cooper).

\*\* Fruit 1–2 lines long, with a foliaceous acuminate apex and the sides tooth-crested: leaves lanceolate, entire or subdenticulate.

25. *A. POWELLII*. Erect, slender, 1–2 feet high, branched, leafy, grayish; leaves ½–1 inch long, acuminate, attenuate to a short petiole,

the upper sessile and abruptly rounded at base; flowers androgynous; calyx very small, 5-cleft; bracts  $1\frac{1}{2}$ –2 lines long, united below, panduriform, the terminal lobe entire, the margin below it gash-toothed, the sides doubly or triply tooth-crested; styles short; seed not filling the theca. — Cultivated from Arizona seeds; fruit collected by the Indians for food.

26. *A. BRACTEOSA*. (*Obione*, Durand & Hilgard, Pacific R. R. Rep. 5. 13, t. 14.) Erect, "2–3 feet high," branched, leafy, hoary-farinoso; leaves  $\frac{1}{2}$ –1 inch long, rather thin, acuminate, sessile; male flowers in dense globose clusters in a naked terminal panicle, the calyx deeply 5-cleft; fruiting bracts  $1\frac{1}{2}$  lines long, in small axillary clusters, orbicular with a short cuneate base, the terminal lobe linear or lanceolate, margins irregularly gash-toothed and the sides shortly mucronate. — Collected only by Heermann on Posé Creek, California.

§ 7. Fruiting bracts rhombic-orbicular, subcompressed, 2–4 lines long, indurated, closed, usually strongly mucronate and with a herbaceous toothed and undulate margin: male flowers mostly in terminal spikes: leaves triangular and subhastate, the lower opposite.

27. *A. ARGENTEA*, Nutt. Erect, ascending, or decumbent,  $\frac{1}{2}$ – $1\frac{1}{2}$  feet high, diffusely branched and leafy, grayish scurfy or nearly glabrous; leaves rather thick, deltoid or triangular-ovate or subrhombic, often subhastate,  $\frac{1}{2}$ –2 inches long, acute or obtuse, petioled or the upper sessile; calyx deeply 5-cleft; fruiting bracts shortly pedicelled, united nearly or quite to the apex, the more or less dilated free margins extending nearly to the base, often parted at the apex, more or less acutely and deeply toothed, the sides usually appendaged with herbaceously tipped projections or with a double toothed crest. — From the Upper Missouri to Colorado and North Eastern California. A variable species.

*Atriplex argentea*. Nuttall, Genera, 1. 198. James, Catalogue, 178. Spreng. Syst. 1. 918. Dietrich, Syn. 5. 538. Torrey, Ann. N.Y. Lyc. 2. 240. Coulter, Hayden's Rep., 1872, 779.

*Obione* (?) *argentea*. Moquin, Enum. Chenop. 76; DC. Prodr. 13<sup>2</sup>. 115. Torrey, Nicolle's Rep. 158. Engelmann, Pl. Upp. Miss. 206. Newberry, Pac. R. R. Rep. 6. 87. Gray, Pac. R. R. Rep. 12. 47; Proc. Philad. Acad., 1863, 75. Porter, Hayden's Rep., 1870, 481; Fl. Col. 117. Watson, King's Rep. 5. 290.

*Atriplex arenaria*. Hook. Pl. Geyer in Lond. Jour. Bot. 5. 261 ?

Collectors: — Nicolle; 97, 621 Fremont; Suckley; 484 Hall & Harbour; 985 Watson; Vasey; Hayden; Gray; Greene; Allen.

28. A. **EXPANSA**. Resembling the last, but stouter, erect, more divaricately and distantly branched, with thinner triangular subhastate leaves, sessile or very nearly so, the terminal staminate spikes usually slender and leafless toward the apex, interrupted. — From New Mexico and Southern Colorado to Southern California. Described by Mr. Wright as growing in the bottoms of the Rio Grande in intricately entangled masses 6–10 feet in diameter and 4–6 feet high.

*Obione argentea*. Torrey, Emory's Rep. 149; Pac. R. R. Rep. 2. 173; Bot. Mex. Bound. 182.

Collectors: — 708 Fendler; 574 Wright; Emory; Bigelow; 460 Torrey; Greene.

Sect. III. Perennials, more or less shrubby, closely appressed scurfy, mostly diœcious. Radicle usually superior. Leaves mostly alternate.

§ 8. Fruiting bracts orbicular to ovate, with a toothed margin and the sides usually more or less appendaged, somewhat spongy: flowers axillary or spicate.

\* Fruiting bracts rather large, slightly compressed: leaves over half an inch long, alternate.

29. A. **NUTTALLII**. Erect, 1–2 feet high, branching mostly from the base; leaves narrowly oblong or oblanceolate,  $\frac{1}{2}$ –2 inches long, obtuse or acutish, narrowed at base, sessile, entire; calyx 5-cleft; bracts ovate, united to above the middle, the orifice scarcely contracted, mostly sessile, becoming suborbicular and  $1\frac{1}{2}$ –2 lines long, not compressed, the margin and summit irregularly gash-toothed and the sides usually muricate or tooth-crested. — From the Saskatchewan to Colorado and Northern Nevada.

*Atriplex canescens*. Nuttall, Genera, 1. 197; not of James. Spreng. Syst. 1. 961. Hook. Fl. Bor.-Am. 2. 128; Pl. Geyer, Lond. Jour. Bot. 5. 261 (?) Dietr. Syn. 5. 537. Bourgeau, Palliser's Rep. 260. Porter, Hayden's Rep., 1871, 492.

*Obione canescens*. Moquin, Enum. Chenop. 74; DC. Prodr. 13<sup>2</sup>. 112. Torrey, Nicollet's Rep. 158; Fremont's Rep. 95, in part; Stansbury's Rep. 395, in part. Durand, Fl. Utah, 174, in part. Engelm. Pl. Upp. Miss. 206? Cooper, Pac. R. R. Rep. 12. 47? Gray, Proc. Phil. Acad., 1863, 75. Watson, King's Rep. 5. 289, in part. Coulter, Hayden's Rep., 1872, 779? Porter, Fl. Col. 117.

*Atriplex Gordonii*. Hook. Pl. Geyer in Lond. Jour. Bot. 5. 261?

Collectors: — Richardson; Nicollet; Fremont; Burke; Bourgeau; Stansbury; 308 Hall & Harbour; 981 Watson; Canby; Gray; Hayden; Burgess.

30. *A. ACANTHOCARPA*. (*Obione*, Torrey, Bot. Mex. Bound. 183, mostly.) Erect, 1–2 feet high or more, branched, leafy; leaves oblong-lanceolate or oblanceolate, often subhastate,  $\frac{1}{2}$ – $1\frac{1}{2}$  inches long, acute or acutish, cuneate to a short petiole, usually undulate, sinuately toothed or entire; flowers dioecious, the male clusters dense in naked terminal paniced spikes; calyx 5-cleft; fertile clusters axillary, few-flowered; bracts sessile or pedicelled, lanceolate, the linear apex only free, becoming thick and spongy and 4–6 lines long, the margins gash-toothed and the sides strongly appendaged with rigid flattened processes; seed a line long, filling the cavity. — From the Rio Grande Valley to Sonora; collected by Gregg (459) and Wright (573, 1739).

31. *A. LEUCOPHYLLA*, Dietrich. Stems decumbent or ascending, stout, hardened at base, leafy; leaves thick, obovate or orbicular to elliptical,  $\frac{1}{2}$ – $1\frac{1}{2}$  inches long, obtuse or acutish, cuneate at base, sessile, entire; flowers in loose axillary clusters; calyx large, 5-cleft; bracts sessile, ovate, united, becoming  $2\frac{1}{2}$ – $3\frac{1}{2}$  lines long and spongy, the tips free, margin entire or somewhat toothed, the sides usually tuberculately crested; seed  $1\frac{1}{2}$  lines long. — On the seashore from San Francisco to Santa Barbara, California.

*Obione leucophylla*. Moquin, DC. Prodr. 132. 109. Benth. Pl. Hartw. 332.

Bolander, Catalogue, 25. Torr. Bot. Wilkes's Exp. 437.

*Atriplex leucophylla*. Dietrich, Syn. 5. 536.

Collectors: — Chamisso; 1934 Hartweg; Wilkes; 425 Bolander; 309 Brewer; Kellogg & Harford.

\*\* Fruiting bracts more or less compressed, mostly small: leaves numerous, about 3 lines long or less, entire, more or less opposite in *A. Greggii* and *oppositifolia*.

32. *A. POLYCARPA*. Erect, 2–3 feet high, diffusely much branched, the branches terete, slender, rigid, leafy; leaves thick, mostly minute,  $\frac{1}{2}$ –3 lines long, obovate to spatulate, obtuse, cuneate at base, sessile; flowers in dense paniculate naked spikes; calyx deeply 5-cleft; bracts sessile, free, compressed, cuneate-orbicular, becoming 1– $1\frac{1}{2}$  lines broad, spongy and not at all indurated, the entire margin above the base finely gash-toothed or sharply dentate, the sides usually more or less prominently tuberculate; styles short; pericarp loose; seed  $\frac{1}{2}$  line broad, the radical highly lateral. — From Fort Mojave eastward through Arizona.

*Obione polycarpa*. Torrey, Emory's Rep. 150; Pac. R. R. Rep. 4. 130; Ives's Rep. 25.

Collectors: — Emory; Bigelow; Cooper; Palmer.

33. *A. GREGGII*. Slender, 6–15 inches high, leafy; leaves alternate or the lower opposite, oblong or spatulate, 3–6 lines long, obtuse or acutish, cuneate at base, mostly sessile; flowers in small axillary clusters or slender interrupted nearly naked spikes; calyx 5-cleft; bracts united only at base, cuneate-orbicular, becoming  $1\frac{1}{2}$ –3 lines broad, margined from below the middle, the margin dentate and the convex sides usually tooth crested. — New Mexico to Sonora.

*Obione canescens*, var. Torrey, Bot. Mex. Bound. 183.

*Obione acanthocarpa*. Torrey, Bot. Mex. Bound. 183, in part.

Collectors: — 1346 Berlandier; 462 Gregg; Emory; Thurber; Bigelow; 572, 1137, 1138 Wright.

34. *A. OPPOSITIFOLIA*. Woody at base and apparently perennial, erect, 1 foot high, strict, branched, leafy; leaves thick, 1–2 lines long, nearly equalling or exceeding the nodes, mostly opposite, oblong-lanceolate, acutish, sessile and broadest at base; flowers axillary, sessile, diœcious (?); fruiting bracts united, orbicular, a line broad, shortly pedicelled, the margin radiately toothed, sides 3-nerved, not appendaged. — In the Rio Grande Valley on the Mexican side, collected only by Berlandier (No. 3201, “Matamoras to San Fernando”).

§ 9. Fruiting bracts orbicular or ovate, membranous or spongy and not at all herbaceous, free or partly united, 1–2 lines broad, not margined nor appendaged, more or less compressed, nearly entire: radicle ascending (superior in *A. Torreyi*): leaves alternate, entire, ovate to rhombic or subhastate: tall and shrubby, diœcious, the flowers in naked axillary and terminal paniced spikes.

35. *A. LENTIFORMIS*. Diffusely branched, 2–12 feet high, the branches terete, unarmed; leaves ovate- to oblong-rhombic or subhastate,  $\frac{1}{2}$ – $1\frac{1}{2}$  inches long, cuneate at base; calyx 5-parted; bracts strongly compressed, united to above the middle, the circular free margins obscurely crenate; styles short; seed  $\frac{3}{4}$  of a line broad, dark. — Southern California (Posé Creek and Ft. Yuma) and eastward through Arizona.

*Obione lentiformis*. Torrey, Sitgreave's Rep. 169, t. 14 (and Flora, 38. 362); Pac. R. R. Rep. 4. 129.

*Obione Barclayana*. Dur. & Hilg. Pac. R. R. Rep. 5. 13; not of Benth. Torrey, Ives's Rep. 25.

*Obione acanthocarpa*, var. (?) Torrey, Bot. Mex. Bound. 183.

Collectors: — Woodhouse; Emory; Bigelow; Heermann; Thomas; Palmer.

36. A. TORREY. (*Obione*, Watson, King's Rep. 5. 290.) Diffusely and rigidly branched, 2-5 feet high, the leafy branches strongly angled, the branchlets divaricate and spinescent, bluish gray; leaves ovate-to oblong-triangular, or subhastate,  $\frac{1}{2}$ -1 inch long; spikes dense; calyx deeply 4-cleft; bracts orbicular to reniform, free, strongly compressed, obscurely denticulate; styles short; seed  $\frac{3}{8}$  of a line broad, light colored; radicle superior and projecting.—East of the Sierra Nevada in the desert valleys of Nevada and on the Mojave.

Collectors: — 463 Torrey; 984 Watson; Cooper; Burgess.

37. A. BREWERI. Tall, 6 feet high or more, grayish, the branches terete, unarmed, leafy; leaves ovate or subdeltoid, 1-2 inches long, cuneate at base; flowers mostly diœcious; calyx deeply 4-cleft; fruiting bracts ovate to orbicular, convex, united at the margin to the middle, entire, scarcely over a line long; styles short; seed  $\frac{3}{8}$  of a line long, subcompressed, with a loose and somewhat thickened pericarp.—On the seashore at Santa Monica and Santa Barbara, California.

Collectors: — Fremont; 459 Torrey; 75 Brewer.

§ 10. Bracts thick and scurfy,  $\frac{1}{2}$  inch broad, with suborbicular free entire margins, not veined nor appendaged: flowers spicate or axillary: leaves alternate: erect diffusely branched shrubs, leafy and very scurfy.

38. A. CONFERTIFOLIA. 1-5 feet high, subspinescent; leaves ovate or obovate to oblanceolate, 2-8 lines long, obtuse or acutish, cuneate at base, sessile or shortly petioled, entire; flowers in small axillary clusters; calyx 5-cleft; bracts sessile, united at the cuneate base around the seed and broadly margined above; seed a line broad, filling the cavity.—Abundant in alkaline valleys throughout the Great Basin, from Southern Idaho and Wyoming to New Mexico and Northern Mexico.

*Obione confertifolia*. Torrey, Fremont's Rep. 318 (and Bot. Zeit. 5. 57; Walpers's Ann. 1. 567); Stansbury's Rep. 395; Pac. R. R. Rep. 2. 173; Bot. Mex. Bound. 183; Ives's Rep. 25. Durand, Fl. Utah, 174. Watson, King's Rep. 5. 289. Coulter, Hayden's Rep., 1872, 779.

*Obione spinosa*. Moquin, DC. Prodr. 13<sup>3</sup>. 108. Engelm. Pl. Upp. Miss. 206.

*Atriplex spinosa*. Dietrich, Syn. 5. 536.

Collectors: — 24, 761, 767 Fremont; Stansbury; 253 Stretch; 468 Torrey; Bigelow; Palmer; 2834 Brewer; 983 Watson; H. Engelmann; Gray; 862 Kellogg & Harford; Allen.

39. A. HYMENELYTRA. Two to three feet high; leaves deltoid, orbicular, or rhombic,  $\frac{1}{2}$ -1 inch in diameter, truncate or cuneate at

base, petioled, coarsely and acutely dentate; flowers axillary or paniculately spicate; calyx large, 5-parted nearly to the base; fruiting bracts shortly pedicelled, the wing-like reniform margin submembranous; styles elongated, exserted; seed a line broad. — In alkaline plains from Southeastern California to Southern Utah.

*Obione hymenelytra*. Torrey, Pac. R. R. Rep. 4. 129, t. 20; Bot. Mex. Bound. 182; Ives's Rep. 25. Anderson, Fl. Nevada, 125. Watson, King's Rep. 5. 290.

Collectors:—Fremont; Emory; Bigelow; Schott; Wheeler.

§ 11. Fruiting bracts indurated, not scurfy, united to the apex, not muricately appendaged, with four broad wings, distinct and not evidently marginal, membranous, veined, entire or toothed: leaves narrow, entire, the lower often opposite: an erect diffusely branched shrub, monœcious or diœcious.

40. *A. CANESCENS*, James. One to two feet high; leaves narrowly oblong or oblanceolate,  $\frac{1}{2}$ –2 inches long, obtuse or acutish, narrowed at base, sessile; flowers axillary or in naked spikes; calyx 5-cleft; bracts at first ovate, adherent below to the pedicel of the ovary and contracted above to a very narrow orifice, subcompressed in fruit and more or less pedicelled, the wings 4–6 lines in diameter and extending above the narrow toothed apex; seed ovate,  $\frac{2}{3}$ –1 line long. — From Colorado to Northern Nevada, and southward to New Mexico, Northern Mexico, and Southern California. Has been often confounded with *A. Nuttallii*.

*Calligonum canescens*. Pursh, Flora, 370.

*Atriplex canescens*. James, Catalogue, 178. Torrey, Ann. N.Y. Lyc. 2. 239.

*Pterochiton occidentale*. Torrey, Fremont's Rep. 318 (and Bot. Zeit. 5. 57; Walpers, Ann. 1. 567).

*Pterochiton canescens*. Nuttall, Pl. Gambel. in Jour. Acad. Phil. 1. 184.

*Obione tetraptera*. Benth. Bot. Sulphur, 48 (and Walpers, Ann. 1. 567).

*Obione canescens*. Torrey, Fremont's Rep. 95, in part; Emory's Rep. 411; Sitgreave's Rep. 169; Marcy's Rep. 296; Stansbury's Rep. 395, in part; Pac. R. R. Rep. 4. 7 and 130; same, 7. 18 (?); Bot. Mex. Bound. 182, and 183 in part; Ives's Rep. 25. Torr. & Gray, Pac. R. R. Rep. 2. 173 (?) Durand, Fl. Utah, 174, in part. Watson, King's Rep. 5. 289, in part.

*Obione occidentalis*. Moquin, DC. Prodr. 13<sup>2</sup>. 112. Dur. & Hilg. Pac. R. R. Rep. 5. 13. Torrey, Bot. Mex. Bound. 184.

*Atriplex Berlandieri*. Moquin, Enum. Chenop. 65. Dietrich, Syn. 5. 537.

*Obione Berlandieri*. Moquin, DC. Prodr. 13<sup>2</sup>. 114.

*Atriplex occidentalis*. Dietrich, Syn. 5. 537.

Collectors:—James; 45, 94, 204, 211, 433 Fremont; 190, 191, 1347, 1450 Berlandier; 343, 575, 1740, 1741 Wright; 522 Gregg; 709 Fendler; Emory; Abert; Marcy; Stansbury; 139 Bigelow; Parry; Cooper; 982 Watson; 487, 488 Vasey; 861 Kellogg & Harford; 343 Greene; Thompson.



**Var. ANGUSTIFOLIA.** Leaves linear, often more or less revolute.

*Obione occidentalis*, var. *angustifolia*. Torrey, Bot. Mex. Bound. 184.

Collectors :— Gregg ; Edwards ; 576, 1742 Wright.

### 13. EUROTIA, Adanson.

Flowers diœcious or monœcious. Male flowers bractless, the calyx 4-parted with unappendaged lobes and as many stamens ; filaments slender, exserted. Pistillate flowers without calyx, bibracteate. Bracts sessile, somewhat obcompressed, united to the apex, becoming enlarged and rather rigidly membranous, not winged, 2-horned at the apex, the sides densely covered with long spreading tufted hairs. Ovary oblong-ovate, sessile, hairy, firmly membranous : styles 2, exserted, somewhat hairy. Seed vertical, obovate, the testa simple : cotyledons broad and green ; radicle inferior.— Low pubescent undershrubs, with alternate entire leaves, and small clustered axillary and subspicate flowers.

1. *E. LANATA*, Moquin. White-tomentose throughout with stellate hairs (becoming rufous),  $\frac{1}{2}$ – $1\frac{1}{2}$  feet high, erect, with strict ascending leafy branches ; leaves linear to narrowly lanceolate, with revolute margins,  $\frac{1}{2}$ – $1\frac{1}{2}$  inches long, obtuse ; calyx-lobes ovate, acute, hairy ; bracts lanceolate, 2–3 lines long in fruit, with two short horns at the apex, penicillate with four dense spreading tufts of silvery-white hairs ; utricle filling the theca and loosely enveloping the seed, which is  $1\frac{1}{2}$  lines long.— From the Saskatchewan to New Mexico, and westward to the Sierra Nevada ; a valuable forage-plant. Quite distinct from *E. ceratoides* of the Old World.

*Diota lanata*. Pursh, 602. Nuttall, Genera, 2. 207. James, Catalogue, 189. Spreng. Syst. 3. 836.

*Eurotia ceratoides*. Hook. Fl. Bor.-Am. 2. 126 ; not Mey. Bourgeau, Palliser's Rep. 260. Torr. Bot. Wilkes's Exp. 438.

*Eurotia lanata*. Moquin, Enum. Chenop. 81 ; DC. Prodr. 13<sup>2</sup>. 121. Torrey, Fremont's Rep. 95 ; Emory's Rep. 149 and 409 ; Pac. R. R. Rep. 2. 124 and 4. 130 ; Bot. Mex. Bound. 184. Engelm. Pl. Upp. Miss. 206. Gray, Pac. R. R. Rep. 12. 47 ; Am. Jour. Sci. 2. 34. 258. Watson, King's Rep. 5. 292. Coulter, Hayden's Rep., 1872, 779. Porter, Fl. Col. 118.

Collectors :— James ; Drummond ; Nicollet ; 42, 440 Fremont ; 1333 Berlandier ; 713, 714 Fendler ; 579, 1744 Wright ; Abert ; Emory ; 107 Geyer ; 31 Beckwith ; H. Engelmann ; 328 Parry ; Bourgeau ; 990 Watson ; 366 Vasey ; 857 Kell. & Harford ; Hayden.

### 14. GRAYIA, Hook. & Arn.

Flowers diœcious or sometimes monœcious. Calyx of the bractless staminate flowers mostly 4-parted, the 4–5 stamens central, with short

subulate filaments. Pistillate flowers without calyx, enveloped in the strongly obcompressed membranous bracts, which are united into an orbicular flattened sac, with a small naked orifice at the apex, adherent below to each other and to the pedicel of the ovary, becoming enlarged, reticulately veined and somewhat wing-margined vertically. Ovary narrowly ovate-oblong: styles 2, slender, at first exserted. Pericarp thin and membranous, orbicular. Seed vertical, with a simple membranous testa; embryo annular; radicle inferior. — A subscespicious undershrub, with alternate entire leaves, the small flowers in axillary clusters or terminal spikes.

1. *G. POLYGALOIDES*, Hook. & Arn. Erect, diffusely branched, 1–3 feet high, the branchlets frequently spinescent; leaves rather fleshy, glabrous or at first with the young branches somewhat mealy, oblanceolate, spatulate, or obovate, 6–15 lines long, obtuse or acute, narrowed at base and sometimes petioled; male flowers in axillary clusters, the pistillate mostly spicate; fruiting perianth 3–6 lines in diameter, sessile, smooth, emarginate, thin, white or pinkish, the seed usually central, about  $\frac{2}{3}$  of a line broad. — Frequent throughout the Great Basin in alkaline soils, from the Columbia to Utah and South-eastern California.

*Chenopodium* (?) *spinosum*. Hook. Fl. Bor.-Am. 2. 127. Moquin, Enum. Chenop. 34.

*Grayia polygaloides*. Hook. & Arn. Bot. Beechey, 387. Hook. Icones, t. 271; Pl. Geyer, Lond. Jour. Bot. 5. 262. Torrey, Fremont's Rep. 319; Stansbury's Rep. 394; Bot. Wilkes's Exp. 437. Torr. & Gray, Pac. R. R. Rep. 2. 124. Durand, Fl. Utah, 174. Anderson, Cat. Fl. Nevada, 125. Watson, King's Rep. 5. 292. Coulter, Hayden's Rep., 1872, 779.

*Grayia spinosa*. Moquin, DC. Prodr. 13<sup>2</sup>. 119.

Collectors: — Tolmie; Fremont; Stansbury; 802 Wilkes; 30 Beckwith; H. Engelmann; 114, 166 Stretch; 277, Anderson; 989 Watson; 858 Kellogg & Harford; Gray.

## 15. CORISPERMUM, A. Juss.

Flowers perfect, ebracteate. Calyx 1- (rarely 2–3-) sepaled, hyaline, or none; sepals ovate to suborbicular, erose or lacerate at the apex. Stamens 1–5, hypogynous, one longer. Ovary ovate: styles 2. Fruit (caryopsis) elliptic, vertical, plano- or concavo-convex, the margin acute or narrowly winged, the membranous pericarp closely adherent to the seed. Embryo green, slender, surrounding the copious sub-fleshy albumen; radicle inferior. — Annual herbs, with alternate sessile linear leaves, the flowers spicate, solitary in the axils of reduced leaves.

1. *C. HYSSOPIFOLIUM*, Linn. More or less floccose- or villous-pubescent, erect,  $\frac{1}{2}$ – $1\frac{1}{2}$  feet high, diffusely branched; leaves  $\frac{3}{4}$ – $1\frac{1}{2}$  inches long, 1–2 lines wide, cuspidate, the floral bracts reduced more or less abruptly from linear-lanceolate to ovate, acute or acuminate, membranously margined; sepals rarely wanting; shorter stamens more or less perfectly developed; fruit  $1\frac{1}{2}$ –2 lines long, narrowly winged, obtuse, often mucronate with the projecting styles. — From the Arctic Ocean to the Great Lakes and the Missouri River, to New Mexico, Chihuahua, and the Columbia. Quite variable, but none of the differences seem specific.

*Corispermum hyssopifolium*, Linn. Pall. Fl. Ross. 2. 112, t. 98. Pursh, Flora, 4. James, Catalogue, 172. Hook. Fl. Bor.-Am. 2. 125. Torrey, Sitgreave's Rep. 170; Pac. R. R. Rep. 4. 130; Bot. Mex. Bound. 184; Ives's Rep. 25. Seemann, Bot. Herald, 53. Engelm. Pl. Upp. Miss. 206. Hook. Pl. Geyer in Lond. Jour. Bot. 5. 261. Hook. f., Pl. Arc. 300. Bourgeau, Palliser's Rep. 260. Rothrock, Fl. Alaska, 455. Watson, King's Rep. 5. 293. Gray, Manual, 409. Torr. Bot. Wilkes's Exp. 438.

*Corispermum hyssopifolium*, var. *Americanum*. Nuttall, Genera, 1. 4. Torrey, Ann. N.Y. Lyc. 2. 240.

*Corispermum Americanum*. Nuttall, Fl. Arkansas, 165.

Collectors:—Drummond; Wilkes; Wright; Parry; H. Engelmann; Bourgeau; Hall; Clinton; Lapham; Scammon; 993 Watson; Vasey; 37 Wolf.

Var. *MICROCARPUM*. Spikes slender, elongated; fruit a line long. — New Mexico.

Collectors:—711 Fendler; 580, 1170 Wright; Palmer.

## 16. SALICORNIA, Tourn.

Flowers mostly perfect, deeply immersed by threes in the rachis of a jointed spike, decussately opposite in the axils of cupshaped bracts, the lateral ones of each cluster lower and often staminate. Calyx a fleshy rhomboidal sac with thickened margin, and an anterior opening, enclosing the flower and fruit, adherent by a narrow line to the rachis, and becoming thickened and spongy in fruit, deciduous. Stamens 1–2, with large oblong anthers on short filaments, at length exserted. Ovary oblong, posterior to the axis of the flower: styles 2–3, short, free. Pericarp adherent to the seed, membranous. Seed vertical, obovate-oblong, escaping through the thin base of the calyx; albumen very small and lateral; embryo conduplicate, thick, green, the radicle inferior and posterior. — Low mostly herbaceous fleshy leafless saline plants, with oppositely branched jointed stems; spikes cylindrical. The spongy calyx is composed mainly of spiral vessels.

1. *S. MUCRONATA*, Bigel. Annual, herbaceous, stout, erect, 2–12 inches high, shortly branched; spikes 1–2½ inches long, 1½–2 lines broad, very closely jointed, rather obtuse; scales acutely pointed, becoming divaricate and conspicuous; middle flower a half higher than the lateral ones or less, occupying nearly the whole length of the joint; fruit pubescent; seed ½–¾ of a line long. — On the seacoast from Nova Scotia to Virginia. The specimen of Gronovius in herb. Clayton on which Linnæus founded his *S. Virginica* has been identified by Dr. Gray as *S. herbacea*.

*Salicornia mucronata*. Bigelow, Fl. Bost., 2 ed., 2; not Lagasca. Torrey, Fl. N. Y. 2. 140. Matthew, Canad. Nat. 12. 159. Gray, Manual, 1 ed., 377.

*Salicornia Virginica*. Moquin, DC. Prodr. 13<sup>2</sup>. 145, in part; not Linn. Gray, Manual, 410.

*Salicornia Bigelovii*. Torrey Bot. Mex. Bound. 184.

Var. *SUFFRUTESCENS*. Stout, woody at base, 1–2 feet high, much branched, spikes rather acute, and seed ¾–1 line long; otherwise like the northern herbaceous plant, of which it is probably but a well-developed form. — Key West (Blodgett); Santiago, at the mouth of the Rio Grande (Schott).

*Salicornia mucronata*. Torrey, Bot. Mex. Bound. 184; also Lagasca ??

2. *S. HERBACEA*, Linn. Annual, herbaceous, erect, rather slender; ½–1½ feet high, usually diffusely branched; spikes 1–3 inches long, becoming 1–1½ lines wide, narrower and longer jointed than in the last; scales narrow, truncate or shortly acute; middle flower twice higher than the lateral ones, slightly shorter than the joint; fruit pubescent; seed ¾ to nearly a line long. — Seacoast and saline localities from Nova Scotia to Georgia, and inward to the Saskatchewan and Salt Lake Valley; “Oregon.” Differing from the Old World form only in the usually somewhat longer-jointed and less densely flowered spikes. The radicle is occasionally found twisted upon itself and erect.

*Salicornia herbacea*, Linn. Michaux, Flora, 1. 1. Pursh, 2. Elliott, 1. 3. Hook. Fl. Bor.-Am. 2. 125. Torrey, Nicolle’s Rep. 159; Emory’s Rep. 411; Flora N. Y. 2. 140. Moquin, DC. Prodr. 13<sup>2</sup>. 144. Engelm. Pl. Upp. Miss. 206. Durand, Fl. Utah, 174. Chapman, 378. Bourgeau, Palliser’s Rep. 260. Matthew, Canad. Nat. 12. 159. Gray, Manual, 410. Watson, King’s Rep. 5. 293. Coulter, Hayden’s Rep., 1872, 779. Porter, Fl. Col. 118.

*Salicornia Virginica*, Linn. Pursh, Flora, 2. Nuttall, Genera, 1. 145. Porter, Hayden’s Rep., 1870, 481.

*Salicornia herbacea*, var. *prostrata*. Bourgeau, Palliser’s Rep. 260; not Moquin.

Collectors:—677 Fremont; Abert; Bourgeau; 994 Watson; Hayden; Scoville; Burgess; Gray; Allen.

3. *S. AMBIGUA*, Michx. Stems decumbent and rooting at the joints or ascending, from a rather woody perennial rootstock,  $\frac{1}{2}$ –1 foot long, simple or simply branched, "greenish turning lead-color;" spikes  $\frac{1}{2}$ –1 inch long, slender, short-jointed, the scales short, acutish or acute; flowers nearly equal in height and equalling the joint; seed pubescent,  $\frac{1}{3}$  of a line long. — Seacoast from Massachusetts to Florida and Texas; Oregon and California. *S. fruticosa* of the Old World differs in being erect, stouter and more branched, the seed larger and smooth.

*Salicornia ambigua*. Michx., Flora, 1. 2. Elliott, Sketch, 1. 4. Spreng. Syst. 1. 18. Torrey, Flora N.Y. 2. 141; Bot. Wilkes's Exp. 438. Chapman, Flora, 378.

*Salicornia radicans*. Hook. Fl. Bor.-Am. 2. 125.

*Arthrocnemum* (?) *ambiguum*. Moquin, Enum. Chenop. 112; DC. Prodr. 13<sup>2</sup>. 151.

*Arthrocnemum fruticosum*, var. *Californicum*. Moquin, DC. Prodr. 13<sup>2</sup>. 151. Newberry, Pac. R. R. Rep. 6. 88.

*Salicornia fruticosa*. Torrey, Pac. R. R. Rep. 5. 364.

*Salicornia herbacea*. Cooper, Pac. R. R. Rep. 12. 68. Bolander, Catalogue, 25. Collectors:—Blodgett; Scouler; Chamisso; Wilkes; 264 Drummond; Lindheimer; Wright; Lyall; Cooper; 2491 Brewer; Allen.

### 17. SPIROSTACHYS, Sternberg.

Flowers perfect, arranged spirally by threes in a crowded spike, in the axils of fleshy sessile bracts. Calyx of 4 (rarely 5) concave carinate imbricated sepals, more or less united. Stamens 1–2, with slender filaments at length exerted. Ovary oblong, axial: styles 2, rarely 3, usually distinct. Fruit vertical, the membranous pericarp free from the seed. Seed oblong, with a double membranous testa: albumen rather copious, nearly three-fourths surrounded by the embryo; radicle inferior and basal, much longer than the cotyledons. — Alkaline or saline jointed shrubs with alternate leafless branches, the branchlets fleshy, green, with short scalelike leaves.

Much confusion has existed in regard to the genera of this tribe (*Salicorneæ*) since the time of Moquin, whose errors have been pointed out by Fenzl, Bunge, and more recently and fully by Sternberg. The present genus was founded upon the South American species *S. Ritteriana*, the only other species known. *Arthrocnemum* and *Halostachys*, to which they have been referred, are genera with opposite branches, &c., like *Salicornia*. An Asian genus, *Halopeplis*, is distinguished mainly by its superior radicle.

1. *S. OCCIDENTALIS*. Erect, diffusely branched, 2–5 feet high. Leaves very short, broadly triangular and amplexicaul, acute, often nearly

obsolete; spikes numerous, sessile or nearly so, cylindrical, 3–10 lines long; bracts rhomboidal; flowers crowded, slightly exserted; calyx becoming spongy and enclosing the fruit; seed less than a fourth of a line long.—Throughout the Great Basin from Northern Nevada and Utah to Arizona and Western Texas; California, in San Joaquin Valley, near the Sacramento (Brewer).

*Arthrocnemum fruticosum* Torrey, Stansbury's Rep. 394; not Moq. Durand, Fl. Utah, 174.

*Arthrocnemum macrostachyum*. Torrey, Bot. Mex. Bound. 184; Ives's Rep. 25; not Bunge.

*Halostachys occidentalis*. Watson, King's Rep. 5. 293. Coulter, Hayden's Rep., 1872, 779.

Collectors:—760 Fremont; Emory; 577, 1745 Wright; Stansbury; 100 Thurber; 139 Bigelow; Schott; Newberry; H. Engelmann; 467 Torrey; Palmer; 1191 Brewer; 994 Watson; Wheeler; Burgess.