

PROVENCHERIA

3

Mémoires de l'Herbier Louis-Marie

Faculté d'Agriculture, Université Laval

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FLORA

OF THE

PRAIRIE PROVINCES

A HANDBOOK

TO THE FLORA OF THE PROVINCES OF

MANITOBA, SASKATCHEWAN AND ALBERTA

by

BERNARD BOIVIN

Herbier Louis-Marie, Université Laval

and Department of Agriculture, Ottawa

Part II

Digitatae, Dimerae, Liberae

(Continued)

## 2. SCLERANTHUS L.

KNAWEL

Sepals fused; the tube becoming thick and hard and enclosing the utricule. Petals lacking.

1. S. ANNUUS L. -- Knewel, German Knotgrass (Gnavelle, Herbe aux alouettes) -- Leaves opposite and connate in the manner of a Caryophyll. Puberulent annual with numerous stems. Flowers green. Calyx lobes membranous-margined, slightly longer than the tube. Early to mid summer. Uncommon weed of roadsides and cultivation.-- NS-O, S-BC, (US), Eur.

A Manitoba report by Montgomery 1964 is not substantiated by any specimen at OAC or elsewhere (Montgomery in litt.).

## Order 44. CHENOPODIALES

Like the Polygonales, seems to be derived from the Caryophyllales, with the fruit reduced to a 1-seeded utricule or achene. But the flowers typically 5-merous and the embryo, visible through the seed coat, is annular or spirally curled.

- a. Flowers bractless, or exceptionally subtended by herbaceous bracts ..... 78. Chenopodiaceae
- aa. Each flower subtended by scarious bracts ..  
..... 79. Amaranthaceae p. 129

## 78. CHENOPODIACEAE (GOOSEFOOT FAMILY)

Herbs often thickish or fleshy. Hairs often short and thick,  $\pm$  subglobular. A family usually readily recognized by the curled embryo and the usually semi-fleshy and alternate leaves.

- a. Fleshy herb with vestigial leaves ..... 12. Salicornia
- aa. Leaves well developed.
  - b. Shrubby.
    - c. Very spiny ..... 13. Sarcobatus
    - cc. Not spiny.
      - d. Leaves flat ..... 5. Atriplex
      - dd. Strongly revolute ..... 7. Eurotia
  - bb. Annual herbs.
    - e. Fruit hidden between a pair of bracts.
      - f. Bracts free at least above the middle ..... 5. Atriplex
      - ff. Bracts fused to the tip and enclosing the fruit ..... 4. Spinacia
    - ee. Fruit not hidden.
      - g. Fruit flanked by a pair of fused bracts; pistillate flower without perianth ..... 6. Suckleya
      - gg. Pistillate flower and fruit bractless, or the bracts neither fused nor hiding the fruit.
        - h. Calyx much reduced and not surrounding the fruit.



- i. Main leaves hastate to rhomboid-lanceolate ..... 3. Monolepis
- ii. Leaves  $\pm$  linear ..... 11. Corispermum
- hh. Fruit surrounded by the marcescent calyx ..... Group A

## Group A

Annual herbs. Fruit surrounded by the marcescent calyx. Bracts lacking or small.

- a. Flowers unisexual, the staminate ones borne in a conspicuously differentiated terminal spike ..... 8. Axyris
- aa. Flowers all perfect or some of them pistillate.
  - b. Upper leaves and bracts stiff and ending in a sharp and spiny point ..... 15. Salsola
  - bb. Foliage not spinescent.
    - c. Fruit surrounded by a continuous horizontal wing ..... 2. Cycloloma
    - cc. Not winged or with a discontinuous series of winged lobes.
      - d. Foliage glabrous or glandular or mealy.
        - e. Calyx thin ..... 1. Chenopodium
        - ee. Calyx fleshy.
          - f. Flowers in axillary glomerules of 3 ..... 14. Suaeda
          - ff. Fruits in large strawberry-like glomerules ..... 1. Chenopodium
      - dd. Foliage pubescent, the leaves and bracts long ciliate.
        - g. Inflorescence densely pubescent, including the calyx ..... 10. Bassia
        - gg. Calyx glabrous, or the lobes sometimes ciliate ..... 9. Kochia

## 1. CHENOPODIUM L. GOOSEFOOT, PIGWEED

The basic and unspecialized type of the family. Flowers bractless, perfect,  $\pm$  5-merous, with a persistent calyx enveloping the fruit.

- a. Fruit a large strawberry-like glomerule.... 1. C. capitatum
- aa. Fruit not or very little fleshy and the inflorescence less congested.
  - b. Leaves narrowly lanceolate to linear, entire or nearly so.
    - c. Grayish-mealy, especially on the undersurface of the leaves ..... 5. C. leptophyllum
    - cc. Pale green and nearly glabrous.... 4. C. subglabrum
  - bb. Leaves oblong-lanceolate to deltoid, mostly coarsely toothed.



- d. Leaves deltoid, nearly as broad as long and ± truncate at base ..... 6. C. Framontii
- dd. Leaves ovate to oblong-lanceolate, rounded to cuneate at base.
  - e. Plants glabrous and green.
    - f. Leaves entire or essentially so ..... 9. C. polyspermum
    - ff. Leaves lobed.
      - g. Seeds mostly vertical, 0.8-1.0 mm wide ..... 3. C. rubrum
      - gg. Seeds horizontal, 1.4-3.0 mm wide ..... 10. C. hybridum
  - ee. More or less mealy-puberulent, especially in the inflorescence and undersurface of the leaves, the latter paler to whitish below.
    - h. Seeds mostly borne vertically, 1 mm wide or less ..... 2. C. glaucum
    - hh. Seeds nearly all horizontal, 1 mm wide or more.
      - i. Early flowering, the main leaves typically ovate ..... 8. C. album
      - ii. Late flowering, the main leaves oblong and subentire .. ..... 7. C. strictum

1. C. capitatum (L.) Asch. (Blitum capitatum L.) -- Strawberry-Blite, Indian Paint (Blette) -- Calyx becoming fleshy and bright red at maturity. Leaves triangular-hastate, coarsely dentate. Fruiting calyces aggregated in strawberry-like fruits, these partly axillary, partly in terminal leafless racemes. Early summer. Infrequent but conspicuous in disturbed or shallow soils. -- Mack-Aka, NS, NB-BC, US, (Eur).

An Alberta report of C. Bonus Henricus L. by Groh 1950 was based on H. Groh, Edson, 1935 (DAO), a sheet since reidentified to C. capitatum.

C. foliosum (Moench) Asch. was reported by Wahl 1954, page 9, as was C. virgatum (L.) Ambrosi by Aellen 1929, page 44. Both from Alberta and both based on a sheet, A.H. Brinkman 2858, Battle, woods, Aug. 28, 1927 (Aellen; DAO, photo), revised by Aellen to C. capitatum more than a quarter of a century ago. We concur.

2. C. glaucum L. var. pulchrum Aellen (var. salinum (Standley) Boivin; C. salinum Standley) -- Leaves tending to be the smallest, whitish-mealy below, nearly glabrous above. Erect to creeping and very branchy. Leaves broadly lanceolate and coarsely few-toothed. Fruit peltate or mostly erect, i.e. laterally compressed, and about 1 mm wide. Mostly after mid summer. Mostly exsiccated saline shores, often weedy. -- (K)-Mack, Aka, Q-BC, US.

In our variety the glomerules are gathered on ultimate branchlets bearing reduced leaves almost to the tip, tepals are



mostly obovate and the inflorescence is often farinose-puberulent. The eurasian var. glaucum is none too readily recognized by its flowering branchlets almost devoid of reduced leaves, except towards the base, its mostly elliptic or oblong tepals and its glabrous inflorescence. In Eastern Canada both varieties will be met with as infrequent weeds.

3. C. rubrum L. (var. humile (Hooker) Watson; C. chenopodioides (L.) Aellen; C. humile Hooker) -- Fat Hen, French Spinach--Stamens only 1-2 and the fruiting calyx reddish and slightly fleshy. Plant erect to depressed, glabrous or nearly so. Foliage thickish. Leaves  $\pm$  rhombic-triangular, lobed, the lobes inclined forward. Glomerules less than 5 mm wide, rather numerous. Fruit erect, 1 mm wide or less. Mid summer. Saline shores, rarely weedy. -- sMack, Y, (NF-SPM), NS, NB-BC, US, Eur.

The basis for an Alberta report of C. ambrosioides L. by Groh 1950 seems to be the collection G.H. Turner 43, Fort Saskatchewan, garden, Aug. 4, 1937 (DAO), since revised to C. rubrum by Dr. H.C. Wahl in 1953.

Sometimes divided in two or, more rarely, in three species. Plants of more open habitats, and especially of pioneering habitats, are more or less depressed (C. humile); obviously an ecological form. More luxuriant specimens have rarely been segregated as C. chenopodioides.

4. C. subglabrum (Watson) Nelson (C. leptophyllum Nutt. var. subglabrum Watson) -- Similar to the following, but barely puberulent and thus pale green in colour. Main stem leaves usually quite glabrous, becoming slightly mealy in the inflorescence. The latter broad and diffuse, with scattered flowers. First half of summer. Rare or inconspicuous pioneer on wind eroded sand. -- (swO)-Man-S, US.

A species of eroded dunes, it is almost skeletal and thus easily overlooked. It may be much more common than herbarium sheets indicate. Thus far we have only one Manitoba record: Boivin & Laishley 13188, entre Oak Lake et Routledge, à 4 milles au nord du lac de Chênes, dune active, 4 juillet 1959 (DAO).

5. C. leptophyllum Nutt. (var. oblongifolium Watson; C. dessicatum Nelson; C. pratericola Rydb., ssp. dessicatum (Nelson) Aellen) -- Grayish-mealy, and usually virgate, annual herb of light soils. Leaves narrow and entire or with a pair of weak lobes, grayish-mealy at least below. Fruits mostly horizontal, about 1 mm wide. Around mid summer. Steppes, especially on light or wind-eroded soils. -- Y, NS, swQ-BC, US, Eur, (CA).

6. C. Fremontii Watson (C. atrovirens Rydb.) -- Mostly occurring as a native annual in dry woods. A rather gracile and stiffly erect herb. Leaves usually thin and wilting very quickly. Spikes of glomerules very remotely moniliform. Fruit horizontal, 1.2-1.5 mm wide. Early to mid summer. Dry woods; often under shrubs, especially Prunus, sometimes on shores. -- swMan-BC, US, (CA).

An extension of range to Yukon by Hultén 1950 was based on Anderson & Brown 10347, near Carcross, alkali flat, 30 July, 1946 (CAN; DAO, photo), since revised to C. rubrum.



Thicker-leaved plants are sometimes identified C. atrovi-  
rens.

7. C. STRICTUM Roth (var. glaucophyllum (Aellen) Wahl; C. glaucophyllum Aellen) -- Resembling the following, but flowering later and commonly larger. Lower leaves ovate and shallowly serrate but the middle and upper oblong and  $\pm$  entire. Calyx lobes  $\pm$  elliptic. Fruit 1 mm wide or slightly larger. Late summer and early fall. Waste places and disturbed soils, especially in towns. -- sQ-sS, BC, US.

Introduced plants in North America are usually distinguished as var. glaucophyllum but the soundness of the distinction is questionable. The eurasian material at hand does not conform in its reputed differences with the neogean phase. Seems likely that here many varietal identifications were made on the basis of geography rather than morphology.

Most floras do not distinguish this species but it appears to be rather widely distributed in both Canada and the U.S.A. In the field C. strictum is rather readily spotted by its preference for towns and waste-lots, its late flowering, its branching and its leaf dimorphism. C. strictum does not attract attention and does not begin to flower until late August or early September, at a time when C. album is already heavily loaded with ripe fruits and shedding them. C. strictum is also heavily branched down to the base, the many lower branches are closely set together and often nearly as long as the stem. The stem leaves are rather similar to those of C. album but the branch leaves are mostly entire and oblong-elliptic. Because of its heavy branching and size, usually a good meter tall, C. strictum does not lend itself to making good specimens and the average herbarium sheet is likely to be a mere snipping or a selected small (hence often depauperate) individual. But the later flowering time, the narrower shape of the calyx lobes and the smaller fruits should provide good diagnostic features.

8. C. album L. (f. lanceolatum (Muhl.) Aellen; C. Berlandieri Moq., var. farinosum (Ludwig) Aellen; C. Boscianum Moq.; C. dacoticum Standley; C. lanceolatum Muhl.; C. paganum Reich.; C. Zschackei Murray) -- Pigweed, Lamb's Quarters (Chou gras, Poulette grasse) -- The common middling type. Annual erect herb,  $\pm$  mealy, especially on the lower leaf surfaces. Main leaves more or less ovate and coarsely toothed. Calyx lobes deltoid. Seed  $\pm$  1.5 mm wide, borne horizontally. Mostly mid summer. Common weed of disturbed soils and humanized places, seemingly native on shallow soils over rocky outcrops. -- (G), Mack-Aka, L-NF-(SPM), NS-BC, US, (CA), Eur.

Plants with larger leaves and fruits have been distinguished as C. Bushianum Aellen or C. paganum. The merit of the distinction is not clear to us.

Native plants are reputedly distinguishable (as C. Boscianum or C. Berlandieri) by their ovary wall free from the achene or by being more prominently keeled on the sepals, characters which have also been detected in a number of european specimens at hand. We are not yet satisfied that seemingly native plants



can be convincingly discriminated on these or any other characters.

9. *C. POLYSPERMUM* L. (var. *acutifolium* (Sm.) Gaudin) -- Allseed (Limoine, Poirée sauvage) -- Leaves glabrous, thin and entire, the main ones ovate to lanceolate. Seed maturing purple-red, then black, about 1 mm across, horizontal. Second half of summer. Rare town weed: Wallwort. -- NB-O, S, US, Eur.

10. *C. hybridum* L. var. *gigantospermum* (Aellen) Rouleau -- Sowbane (Pied d'oie) -- Large, thin, ovate leaves with  $\pm$  3 pairs of large teeth or lobes. Flowers mostly in terminal panicles. Fruit greenish. Mid to late summer. Infrequent in dry woods and casually weedy. -- Y, NB-BC, US.

American plants are supposed to have larger seeds, but our specimens do not conform to this pattern. However, our Canadian specimens do have black, shiny and essentially smooth seeds, while our European ones (var. *hybridum*) have seeds that are dull and finely but clearly rugose-reticulate.

A Saskatchewan report of *C. Bonus-Henricus* L. by Groh 1950 was based on two sheets of which the first, Shevkenek 127, Qu'Appelle Valley, 1938 (DAO) is now filed under *C. hybridum* var. *gigantospermum*, while the other, Carmichael 37, Regina, 1941 (DAO) has since been revised to *Atriplex hortensis*.

## 2. CYCLOLOMA Moq.

## WINGED PIGWEED

Calyx developing a peripheral wing at maturity. Otherwise as in *Chenopodium*.

1. *C. atriplicifolium* (Sprengel) Coulter -- Tumbleweed -- Resembling *Chenopodium* but lightly lanate and not mealy. Leaves  $\pm$  oblanceolate, coarsely toothed. Flowers in moniliform spikes. Fruit about 3 mm across including the wing. Seed concave above, convex below. Mid to late summer. Disturbed sands: Agassiz Delta, Grande-Clairière. -- swQ-sMan, US.

We have been unable to substantiate a report from Baildon, Sask., by Russell 1944, 1954, Groh 1950 and Breitung 1959, repeated by Boivin 1966.

## 3. MONOLEPIS Schrader

Calyx reduced to a single sepal which thus takes on the appearance of a small bract.

1. *M. Nuttalliana* (R. & S.) Greene -- Povertyweed -- Rather resembling *Chenopodium glaucum* in general habit and leaf shape but the inflorescence much more leafy. Leaves not white below, merely slightly mealy. Fruit apiculate. Early summer. Native on saline shores, but mainly found as a weed of disturbed soils. -- Mack-Aka, Q-(O)-Man-BC, US, (CA, SA).

## 4. SPINACIA L.

## SPINACH

Resembling *Atriplex* but the pistillate bracteoles fused all around and forming an accessory envelope around the seed. Flowers dioecious.



1. S. OLERACEA L. -- Spinach (Epinard, Spinage) -- Fruit with 2-4 long spiny lobes. Leaves hastate to triangular, rather large. Staminate flowers in spikes of glomerules. Pistillate flowers in axillary glomerules. Early summer. Sometimes cultivated, rarely occurring as a waste ground or roadside weed. -- Mack, (Aka), Alta, (US), Eur.

## 5. ATRIPLEX L.

ORACHE

Flowers dimorphic, the pistillate ones reduced to a naked ovary between 2 bracteoles. Staminate flowers as in Chenopodium. Pistillate bracts fused at base only.

a. Shrubby ..... 1. A. Nuttallii  
aa. Annual herbs.

b. Pistillate bracteoles orbicular and entire ..... 2. A. hortensis  
bb. Bracts variously shaped and cut.

c. The whole plant, and especially the leaves, more or less silvery, being densely covered by a scaly or mealy puberulence.

d. Pistillate bracteoles coarsely toothed to summit ..... 4. A. argentea  
dd. Entire above the middle ..... 5. A. Powellii

cc. Leaves glabrous or lightly mealy.

e. Terminal spikes entirely staminate, the pistillate flowers borne only in inconspicuous axillary clusters.... 6. A. dioica

ee. Terminal spikes at least partly pistillate, except in entirely staminate plants ..... 3. A. patula

1. A. Nuttallii Watson var. Nuttallii (A. canescens AA., var. aptera AA.) -- Salt-Sage, Moundscale -- Semi-shrubby, producing numerous erect herbaceous shoots from a woody base. Foliage densely mealy-puberulent and grayish-silvery. Herbaceous shoots simple, but with numerous axillary tufts of small leaves. Dioecious. Staminate flowers in yellow, moniliform, flexuous, and bractless spikes of glomerules. Pistillate flowers in a leafy terminal spike of glomerules. Mid summer. Eroded hills and badlands, sometimes in steppes on saline soils. -- swMan-Alta, US.

Leaves mostly 0.5-1.0 cm wide and rather elliptic-lanceolate to oblong-lanceolate. Other varieties occur further south, including a var. falcata M.E. Jones with narrower and rather linear leaves.

All previous reports of A. canescens (Pursh) Nutt. and of its var. aptera (Nelson) C.L. Hitchc, from our area were based on specimens of A. Nuttallii. This remark includes the Moodie collection from Rosedale (GH; DAO, photo).

2. A. HORTENSIS L. (A. nitens Schrank) -- Orach, French Spinach (Bonne-dame, Arroche) -- Fruit larger, suborbicular,  
ATRIPLEX 124



entire, flat,  $\pm$  1 cm across. Tall, conspicuous, virgate herb. Leaves triangular, rather large, the lower remotely dentate, the upper entire, whitish-mealy below. Mid summer. Sometimes cultivated and readily spreading to waste places and railway yards.-- swMack, (Aka), Q-BC, US, Eur -- Cv. ATROSANGUINEA -- Stem leaves and fruits more or less tinged in bright red: Hoosier. -- S.

3. A. patula L. var. patula (var. hastata (L.) Gray; A. hastata L.) -- Spearscale (Belle dame, Bonne dame) -- Resembling a Chenopodium, but with about 3 main pairs of stem leaves being opposite. Diffusely branched. Leaves deltoid to lanceolate,  $\pm$  dentate, the 2 lower teeth much larger. Flowers in terminal spikes which are bractless at least above the middle. Mid summer and early fall. Native in saline places and a frequent weed of towns and disturbed soils. -- (seK)-Mack, (Aka, NF)-SPM, (NS-NB)-Q-BC, US, Eur -- Var. oblanceolata (Vict. & Rouss.) Boivin (A. glabriuscula AA.) -- Terminal spikes conspicuously bracted, the bracts mostly entire and lanceolate or oblanceolate. Sea shores. -- (G, K, L)-NF, NS, NB-Q(O-nMan, US) -- Var. LITTORALIS (L.) Gray -- As var. patula, but the leaves narrower,  $\pm$  linear, and entire. A coastal variation rarely appearing inland as a weed. -- (K), NS-Man, BC, (US), Eur.

As per a tradition now over 200 years old, the larger-leaved (i.e. deltoid-hastate) extreme is often segregated as A. hastata. It is not clear to us how this distinction facilitates in any way the intellectual apprehension of this polymorphic species.

4. A. argentea Nutt. -- Saltbush, Silverscale -- A whitish silvery annual with  $\pm$  deltoid leaves. Very leafy. Glomerules axillary, not forming distinct spikes. First half of summer. Open saline soils. -- swMan(Melita)-swS-BC, US.

5. A. Powellii Watson -- Like the preceding but smaller. Bracteoles entire, at least in the upper half. Upper leaves more reduced. Mid to late summer. Badlands: Steveville, Rosedale. -- sAlta, wUS.

6. A. dioica (Nutt.) Macbr. (Endolepis Suckleyi Torrey) -- Rillscale -- Staminate glomerules pinkish and forming lightly bracted terminal spikes. Pistillate glomerules inconspicuous in the lower axils. Leaves lanceolate, subacuminate, somewhat glaucous, glabrous or nearly so. Early to mid summer. Saline flats. -- swS-Alta, US.

#### 6. SUCKLEYA Gray

Pistillate flowers as in Atriplex but the bracteoles fused laterally to the ovary instead of hiding it.

1. S. Suckleyana (Torrey) Rydb. -- Leaves flabellate and flabellately dentate. Somewhat mealy. Diffusely branched and resembling Amaranthus albus in habit. Fruit ovate-rhomboid, often with a pair of lobes on the angles, bifid at apex. Summer. Saline shores, sometimes weedy, but rather rare. -- S-seAlta, (US).



## 7. EUROTIA Adanson

Pistillate flowers and bracteoles much as in Suckleya. Bracteoles with a conspicuous tuft of long hair.

1. E. lanata (Pursh) Moq. -- Winter-Fat, White Sage -- Densely stellate-pubescent throughout. Semi-shrubby in the manner of Atriplex Nuttallii. Dioecious. Leaves linear, revolute. Inflorescence  $\neq$  long-pilose. Early summer. Dry hills. -- swMan (Virden)-Alta, US.

## 8. AXYRIS L.

Staminate flowers in a terminal, naked spike of glomerules. Pistillate flowers solitary, axillary. Otherwise resembling Chenopodium.

1. A. AMARANTHOIDES L. -- Russian Pigweed -- Terminal spike conspicuously differentiated, yellowish, and elongate. Other spikes much smaller and terminating the branches. Lightly to densely stellate-puberulent throughout. Leaves lanceolate. Calyx membranous. Mid summer. Frequent weed in disturbed soils, invading native habitats in shaded places. -- swMack, (NS)-PEI, Q-BC, US, Eur.

At times seemingly native, but the earliest Canadian collection goes back only to 1886.

## 9. KOCHIA Roth

As Chenopodium, but the mature calyx developing a peripheral wing or ridge, yet this character not obvious in our only species. Not mealy-pubescent.

1. K. SCOPARIA (L.) Roth (K. trichophila Hort.) -- Summer-Cypress, Burning Bush (Petits soldats, Petits Pins) -- Very branchy and very leafy annual. Densely puberulent with tufts of long hairs in the inflorescence. Leaves linear. Bracts very long-ciliate. Calyx glabrous. The whole plant often turning red in the fall. Late summer. Cultivated ornamental, frequent weed of streets, roadsides and waste places. -- NS, sQ-BC, (US), Eur.

The weed is perhaps distinct from the cultivated ornamental, but we know not how to differentiate them clearly.

## 10. BASSIA All.

As Kochia, but the mature calyx developing 5 spirally coiled horns. However most herbarium specimens are collected too early when this character is not yet readily observed.

1. B. HYSSOPIFOLIA (Pallas) Ktze. -- Rather similar to Kochia and easily confused with it, but not so branchy and the calyx as densely pilose as any other part of the inflorescence. Bracts lacking the long, spreading cilia of Kochia. After mid summer. Infrequent weed of railways and roadsides in alkaline areas. -- swS-BC, US, CA, (Eur).



## 11. CORISPERMUM L.

Flower much reduced, with only 1-(2) stamens and the calyx reduced to 1 sepal.

1. C. hyssopifolium L. var. hyssopifolium (C. marginale Rydb.; C. simplicissimum Lunell) -- Bud-Seed, Tick-Seed -- Flowers not in glomerules, but solitary in the axil of large bracts. Very branchy and glabrous to stellate-pubescent, not mealy. Inflorescence a terminal spike, rather dense and the bracts hiding the fruits. Seed discoid, with a peripheral wing 0.3-0.6 mm wide. Mid summer. Loose sands. -- Mack-(Y-Aka), Q-Alta, US, (CA), Eur -- Var. rubricaula Hooker (C. nitidum Kit.) -- Spikes not so dense. Bracts smaller, 1-3 mm wide, mostly narrower than the fruits. -- wO-S-(Alta-BC), US, Eur -- Var. emarginatum (Rydb.) Boivin (C. orientale Lam. var. emarginatum (Rydb.) Macbr.; C. villosum Rydb.) -- Seed fairly large, 3-4 mm long, and merely sharp-margined, without a marginal wing. -- swQ-Alta-(BC, US, Eur).

Within our range our three varieties present themselves like mere extremes of variations, but in Eurasia their ranges appear to be highly individualized.

## 12. SALICORNIA L. GLASSWORT, SAMPHIRE

Fleshy plants with vestigial leaves. Flowers in 3's and more or less embedded in a depression of the next internode above. Calyx fleshy. Stamens only 1-(2).

1. S. europaea L. var. prona (Lunell) Boivin (S. rubra Nelson) -- Sand-Fire, Glasswort (Corail, Passe-pierre) -- Small herb reduced to its fleshy stem and branches, often turning red in late summer. Annual. Internodes swollen into joints. Each joint with a membranous-margined collar at the upper end. Flowers inconspicuous, in terminal spikes of opposite glomerules. Mid summer. Saline shores. -- sMack-Y-(Aka), Man-BC, US.

All the inland material belongs to our variety in which the stem internodes pass abruptly into the much shorter inflorescence internodes, the latter usually 1.5-2.5 mm long. Uppermost stem internode generally more than twice longer than the lowermost inflorescence internode. In the East Coast and Old World var. europaea the spike is less strongly contrasted and its internodes are mostly (2)-4-(5) mm long; the uppermost stem internode usually less than twice as long as the adjacent spike internode.

## 13. SARCOBATUS Nees GRAESEWOOD

Staminate flowers in catkins which show a marked similarity to the spikes of Equisetum, each flower being reduced to 3 stamens and a stipitate, peltate scale. Pistillate flower solitary, axillary. Fruit with a broad horizontal and circular wing.



1. S. vermiculatus (Hooker) Torrey -- Greasewood, Pulpy Thorn -- Very spiny shrub growing in large colonies. Young branches pale to whitish. Leaves fleshy, linear, alternate above to opposite or verticillate below. Early summer. Highly alkaline flats at the bottom of the major coulées. -- swS-seAlta-seBC, US.

#### 14. SUAEDA Forsk.

SEA BLITE

Flowers in axillary glomerules of 3. Calyx fleshy. Otherwise resembling Chenopodium.

1. S. maritima (L.) Dum. var. maritima -- Seablite (Blanchette, Salanguet) -- Annual herb with a strong tendency to turn dirty black during the second half of summer. Very branchy. Leaves linear, fleshy. Bracts much as the leaves, 1.0-1.5 mm wide, oblong to linear, of uniform width, but shorter than the leaves. Mid summer to early fall. Seashores. -- (Mack-Y)-Aka, NS-Q, nMan, WBC, US, Eur -- Var. americana (Pers.) Boivin (S. depressa (Pursh) Watson; S. erecta (Watson) Nelson) -- Bracts more sharply differentiated from the leaves. Lower leaves  $\pm$  1 mm wide, linear of uniform width. Bracts much shorter, 1.5-3.0 mm wide, at the base, ovate to narrowly triangular-lanceolate, gradually narrowed from the base. Alkaline shores, sometimes weedy. -- seK-Y, (NF), NS-BC, US.

The more southern S. intermedia Watson has reported from Alberta by Hitchcock 1964, but this may have been only a lapsus calami as we have been unable to substantiate this report. There was no justifying sheet at WTU in 1967 and there was no specimen under that name in any of the herbaria visited. A systematic review of all the Saskatchewan and Alberta sheets of Suaeda at DAO in 1967 failed to turn up any S. intermedia masquerading under another name.

#### 15. SALSOLA L.

SALTWORT

Flowers as in Chenopodium, but with 2 bracts. Fruit developing a circular horizontal wing as in Cycloloma and Sarcobatus.

1. S. KALI L. var. TENUIFOLIA Tausch (S. pestifer Nelson) -- Russian Thistle (Chardon de Russie) -- Annual herb at first soft and fleshy, soon hardening into a bundle of horribly spinescent foliage. Very branchy. First leaves filiform, and soft, the later ones and the bracts shorter and ending into a whitish, stiff and very sharp point. Flower axillary, solitary, subtended by 3 bracts, i.e., the foliage bract and the 2 floral bracts. Mid summer to frost. Very common weed of bare or disturbed soils, seemingly native on eroded dunes. -- NS-BC, US, Eur.

Typical var. Kali is native along the East Coast and in the Old World. Its leaves are shorter, the main ones not over 3 cm and usually not over 2 cm; they are also as thick, stiff, and spinescent as the shorter and later leaves.



## 79. AMARANTHACEAE (AMARANTH FAMILY)

Each flower subtended by a scarious bract and 2 scarious bracteoles. Otherwise similar to the Chenopodiaceae.

## 1. AMARANTHUS L. AMARANTH

The basic genus of the family, with alternate leaves and the calyx present.

- a. Spiny in the leaf axils ..... 6. A. spinosus
- aa. Not spiny.
  - b. Flowers in small axillary inflorescences.
    - c. Seed about 1.5 mm wide ..... 4. A. blitoides
    - cc. Smaller, slightly less than 1 mm wide.
      - d. Bracts and bracteoles 2-3 mm long...3. A. albus
      - dd. Shorter, less than 2 mm long ..
        - ..... 5. A. californicus
    - bb. Terminal inflorescences present, larger and conspicuous.
      - e. Spike-like inflorescences lax and moniliform, at least in the lower half ..
        - ..... 7. A. tuberculatus
      - ee. Spike or panicle dense throughout or essentially so.
        - f. Bracts 2-3 mm long, only slightly longer than the calyx ..... 1. A. hybridus
        - ff. Bracts 3-8 mm long, much exceeding the calyx ..... 2. A. retroflexus

1. A. HYBRIDUS L. var. HYBRIDUS (A. cruentus AA.; A. dubius Mart.) -- Pilewort, Pigweed (Brède de Malabar) -- Glomerules in numerous, narrow, elongate spikes, usually less than 1 cm wide. Flowers and bracts small, otherwise similar to the following. Inflorescence green. Late summer. Sometimes cultivated and casually escaped: Winnipeg. -- Q-Man, (US, CA), SA, Eur, (Afr, Oc) -- Var. CRUENTUS (L.) Moq. (var. hypochondriacus (L.) Bailey; A. paniculatus L.) -- Prince's Feather, Love-Lies-Bleeding (Cannes, Cordelière) -- Inflorescence red. Fort Saskatchewan -- Q-O, Alta-(BC, US).

Our only sheet of var. cruentus was reported as var. hypochondriacus by Groh 1949.

2. A. RETROFLEXUS L. var. RETROFLEXUS -- Red Root, Pigweed (Herbe grasse) -- The taproot commonly reddish. A stiffly erect annual with large oval leaves and a dense greenish panicle. Villous, especially above. Calyx lobes obtuse or rounded, commonly erose, often mucronate. Mid summer. Common weed of open soils and cultivation. -- Mack, (Aka, NS-NB)-Q-O-(Man)-S-BC, US, (CA), Eur, (Afr) -- Var. PSEUDORETROFLEXUS (Thell.) Boivin (var. Powellii (Watson) Boivin; A. Powellii Watson) -- Calyx lobes acute to acuminate. Not so densely villous, sometimes nearly glabrous. Inflorescences tending to be less thick and not quite so dense. Native further south, but only a rare weed with us: Melfort, Lethbridge. -- PEI, O, CS-BC, US, (CA, SA, Eur).



Var. pseudoretroflexus (Thell.) stat. n., A. chlorostachys W. var. pseudoretroflexus Thell., Viertelj. Nat. Ges. Zürich 52: 443, 1907.

3. A. albus L. var. albus -- Tumbleweed (Fleur de jalousie) -- A bushy tumbleweed resembling the following, but the leaves gradually decreasing in size from the base up. Branchy with a well defined main axis which is more or less erect. Glabrous or sparsely puberulent. Mid summer to early fall. Sandy soils, sometimes weedy. -- NS-BC, US, Eur.

The more southern var. pubescens (Uline & Bray) Fern. is viscid-puberulent.

4. A. BLITOIDES Watson (A. graecizans AA.) -- Matweed -- A carpet weed with the leaves conspicuously dimegueth. Stem usually indistinct, but the many branches more or less spread out flat on the ground. Leaves obovate, usually retuse, those of the main branches all about the same size, commonly 2-5 cm long including the petiole, those of the secondary branches only half as large. Summer. Common weed, tolerates tramping, prefers bare soils. -- (Aka), swQ-BC, US.

5. A. CALIFORNICUS (Moq.) Watson -- Similar to the preceding, but generally smaller. Leaves only half as large. Seeds small, like those of A. albus. Mid to late summer. Rare roadside weed: Cypress Hills, Calgary, Herronton, Manyberries. -- swS-sAlta, wUS.

6. A. SPINOSUS L. -- Careless Weed (Epinard rouge, Epinaud épineux) -- Most leaf axils bearing a pair of sharp spines about 1 cm long. Erect annual. Leaves ovate. Spikes thin and elongate. Mid to late summer. Rare and evanescent weed, collected once at Fort Garry. -- swO-sMan, US, Eur.

7. A. tuberculatus (Moq.) Sauer -- (A. tamariscinus Nutt.; Acnida tamariscina (Nutt.) Wood) -- Dioecious. Erect annual. Leaves narrowly ovate to lanceolate. Glomerules in numerous, very thin, elongate and moniliform spikes. Mid summer. Sandy shores: Souris River. -- swQ-O-(sMan), US.

#### Order 45. PRIMULALES

Calyx and corolla fused. Stamens opposite the petals. Flower regular. In nearly all other groups the stamens are either more numerous than the corolla lobes or alternate with them.

- a. Style 1 ..... 80. Primulaceae  
aa. Styles 5 ..... 81. Plumbaginaceae

#### 80. PRIMULACEAE (PRIMROSE FAMILY)

Herbs with opposite or verticillate leaves and a dry fruit.

- a. Leaves all basal except sometimes for an involucre subtending the inflorescence.

- b. Flower solitary ..... 2. Douglasia  
bb. Flowers in an umbel.

- c. Corolla lobes elongate, sharply reflexed ..... 4. Dodecatheon



- cc. Lobes ascending to spreading.
  - d. Calyx shorter than the tube of the corolla ..... 1. Primula
  - dd. Calyx as long or longer ..... 3. Androsace
- aa. Stem leafy.
  - e. Upper leaves alternate ..... 9. Centunculus
  - ee. All leaves opposite or verticillate.
    - f. Flowers nearly sessile in the axils ..... 7. Glaux
    - ff. Flowers pedicellate.
      - g. Leaves borne in a single verticil ..... 6. Trientalis
      - gg. Leaves borne at more than one node.
        - h. Corolla yellow ..... 5. Lysimachia
        - hh. Brick-red ..... 8. Anagallis

## 1. PRIMULA L.

PRIMROSE, COWSLIP

Flowers 5-merous in an umbell. Leaves all basal. Stamens borne on the upper third of the cylindrical corolla tube. Corolla lobes bilobed.

- a. Yellowish or whitish farinose on the calyces and lower leaf surfaces ..... 2. P. incana
- aa. Green or only slightly farinose.
  - b. Leaves entire ..... 4. P. egaliksensis
  - bb. Leaves dentate or crenate; flowers larger.
    - c. Pedicels many times longer than the bracts ..... 1. P. mistassinica
    - cc. Not more than twice as long at flowering time ..... 3. P. stricta

1. P. mistassinica Mx. var. mistassinica (P. MacCalliana Wieg.) -- Bird's Eye, Primrose -- Small and usually less than 12 cm high. Leaves denticulate, mostly obovate. Bracts 2-6mm long, flat at base. Pedicels up to 3 cm long. Flowers white to mauve, commonly 1 cm across. Late spring and early summer. Bogs, shores and wet rocks. -- K-Mack-(Y-Aka, L)-NF-(SPM), NS, NB-BC, US, (eEur).

The leaves are green in our variety, but yellowish farinose below in var. intercedens (Fern.) Boivin, a plant similarly small, yellowish farinose on the calices, magnilacustrine in its distribution.

P. borealis Duby, a minor segregate of P. mistassinica, was reported from as far north as Banks Island by Hultén 1948, Anderson 1949 and Simmons, "A Survey of the Phytogeography of the Arctic Archipelago, Lunds Un. Arskr. 19: 1-183. 1913," but this has never been confirmed and may have been based on a specimen of P. stricta, the only Primula species otherwise known to occur in the Franklin District. Hence the restricted range accepted above.

2. P. incana M.E. Jones (P. farinosa AA.) -- Larger and the calyces and lower leaf surfaces densely farinose. Mostly



2-4 dm high. Leaves dentate, oblanceolate. Early summer. Marshy places. -- (Mack-Aka, nwQ), Man-Alta-(BC), wUS.

3. P. stricta Horn. -- Somewhat coarser than P. mistassinica, but the flowers smaller. Mostly 1-3 dm high. Leaves obovate to lanceolate. Bracts saccate at base. Flowers somewhat less than 1 cm across. Early summer. Wet places in arctic and subarctic habitats. -- (G-F)-K-Mack-(Y-Aka, L), Q-Man, (Alta-BC, wUS), Eur.

4. P. egaliksensis Wormsk. -- Resembles P. mistassinica, but the leaves entire and broadly obovate to spatulate. Flowers less than 1 cm across. Early summer. Arctic shores and marshes. -- (G), sK-(Mack-Y)-Aka, (L)-NF, Q-nMan, (Alta)-BC.

## 2. DOUGLASIA Lindley

Flowers as in Primula, but the corolla lobes are entire.

1. D. montana Gray -- Cushion-forming perennial with the general presentation of Silene acaulis. Leaves thick, ciliate. Peduncle stellate-pubescent. Flower pink to white. Early summer. High alpine on rocky ridges and scree slopes: Waterton. -- swAlta, wUS.

Reported by Hitchcock 1959 as "Waterton Lakes, B.C.," an obvious lapsus calami for "Waterton Lakes, Alta". The B.C. report by Taylor 1966 may be based on the above lapsus, as there was no corresponding B.C. specimen at UBC in 1966.

Douglasia nivalis Lindley is known to occur only in the mountains of the state of Washington except that the type collection is supposed to come from the Canadian Rockies, hence the frequent reports from Alberta and B.C. Lindley describes the type locality as follows in Edin. Bot. Reg. 22: 1886. 1836: "Upon his journey across the rocky mountains in April 1827, in latitude 50°N., longitude 118°W., at an estimated elevation of 12,000 feet above the level of the sea, the attention of Mr. Douglas was attracted by a brilliant purple patch amidst the surrounding snow..."

Part of the journal kept by Douglas was published in the Comp. Bot. Mag. vol. 2 of 1836. We learn from it that in the spring of 1827 Douglas went up the Columbia to the junction of Canot-Tourné river. On April 28 he left the Columbia to strike east. On May 1st he climbs Mount Brown (alt. 9156 ft.) to which he assigns an altitude of 16 - 17000 ft. By May 3rd he has crossed the height of land and he is now going down the Athabaska. There is no suggestion of Douglasia among the plants mentioned in his journal for these few days.

Considering that Douglasia nivalis has never been collected again in the Rockies either of Canada or of the U.S.A., and despite the circumstantially detailed report by Lindley, we are of the opinion that as long as Lindley's report remains unconfirmed, we must assume an error of locality and date and that the type of Douglasia must have been collected within the state of Washington where Douglas was collecting in 1826 and where the plant has been collected repeatedly since.



## 3. ANDROSACE L.

Rather similar to Primula, but the corolla tube shorter, constricted at the mouth and more or less dilated by the ovary.

- a. Perennial with the flowers much longer than the calyx ..... 3. A. Chamaejasme
- aa. Annual with small flowers.
  - b. Involucral bracts sessile, lanceolate to linear ..... 1. A. septentrionalis
  - bb. Bracts subpetiolate, spatulate or obovate ..... 2. A. occidentalis

1. A. septentrionalis L. (var. diffusa (Small) Knuth, var. puberulenta (Rydb.) Knuth, var. subumbellata Nelson; A. puberulenta Rydb.) -- Like the following, but the bracts narrower and broadest at the base. Late spring and early summer. Dry places. -- (G-Aka), NF, Q-(O)-Man-BC, (wUS), Eur.

2. A. occidentalis Pursh -- Inconspicuous annual consisting mainly of a very leafy rosette and thin and wiry stems and pedicels. Stems usually many. Involucral bracts broadest above the middle. Pedicels rather long and uneven. Corolla shorter than the calyx. Second half of spring. Light and loose soils, sometimes weedy. -- (wO)-Man-BC, US.

3. A. Chamaejasme Host -- Flowers white with a yellow eye. Stoloniiferous perennial with solitary scapes. Villous. Pedicels rather short, not much longer than the bracts. Late spring to mid summer. Rocky slopes, montane or alpine. -- swF, Mack-Aka, swAlta-(eBC, nwUS, Eur).

## 4. DODECATHEON L.

## AMERICAN COWSLIP

Flower very showy and rather unusual, resembling an arrow-head, with the conspicuous stamens in the point and the long reflexed petals as the ears.

- a. Foliage glandular-pubescent ..... 1. D. conjugens
- aa. Foliage glabrous ..... 2. D. pulchellum

1. D. conjugens Greene var. Beamishii Boivin (var. viscidum AA.; D. cylindrocarpum AA.; D. pubescens Rydb.) -- Flower showy, with a rather unusual arrangement of successive colour rings. The corolla lobes are bluish-purple; while the tube is whitish; the connectives form a yellowish ring and the anthers are bluish black below, paler to whitish above. Leaves oblanceolate. Corolla lobes 10-25 mm long. Fruit 13-22 mm long, circumscissile near the top. Spring and early summer. Montane prairies: Cypress Hills and Rockies. -- swS-seBC, nwUS -- F. lacteum Boivin -- Flowers white. -- swAlta.

Var. Beamishii nom. n., D. pubescens Rydb., Mem. N.Y. Bot. Gard. 1: 306. 1900. Var. Beamishii is glandular-pubescent, but otherwise not different from the more western and glabrous typical variety. Miss K.I. Beamish is a student of Dodecatheon and herbarium curator at the University of British Columbia.



Our variety has also been called var. viscidum but it has been pointed out that the type of the latter name is apparently the hybrid D. conjugens X Cusickii. See Bull. Torr. Bot. Club 82: 361, 1955.

F. lacteum f.n. floribus albis. Type: D.K. Norris 19, Pasque Mtn., 40 miles almost due north of Coleman; open grassy-rocky slope; flowers white, rare, alt. 7500', July 8, 1956 (DAO).

2. D. pulchellum (Raf.) Merr. var. pulchellum (D. Maedia AA.; D. pauciflorum (Durand) Greene; D. radiculatum Greene; D. salinum Nelson) -- Shooting Star -- Similar, but glabrous and the flower generally smaller. Corolla lobes 5-14 mm long. Fruit 8-14 mm long, opening by longitudinal slits. Mid spring to early summer. Wet places on saline soils. -- Mack-Aka, sMan-BC, US, (CA).

Many authors have expressed doubts as to the exact identity of D. pauciflorum and D. radiculatum. Fortunately, as pointed out by Merrill, Journ. Arn. Arb. 29: 212. 1948, an earlier name is available: Eximia pulchella Raf., Aut. Bot. 185. 1840. This is based on an excellent illustration and description by Hooker, Curt. Bot. Mag. 64: 3622. 1837 so that the interpretation of Rafinesque's name presents no difficulty. Four other varieties occur to the west and south of us. These and the typical phase are as follows.

Var. pulchellum -- Normally 1-3-(4) dm high. Herbage glabrous. Leaves oblanceolate and gradually attenuate at base. Filaments yellow.

Var. Watsonii (Tid) stat. n., D. Watsonii Tid., Proc. Biol. Soc. Wash. 36: 183. 1923 -- Smaller than the first and generally 2-10 cm high. Known in Canada only on Mt. Arrowsmith in Vancouver Island. A map of the full range of this and other varieties is given by Thompson 1953.

Var. album (Suksd.) stat. n., D. Cusickii Greene var. album Suksd., Werdenda 1: 30. 1927; D. Cusickii Greene, Erythea 3: 37. 1895 -- Like the first but the herbage glandular-puberulent, especially the inflorescence. Known from south-central B.C. and the northwestern U.S.

Var. alaskanum (Hultén) stat. n., D. macrocarpum (Gray) Knuth var. alaskanum Hultén, Fl. Aka, Yuk. 8: 1289. 1948 -- Leaves broadest towards the base, ovate to ovate-lanceolate, abruptly rounded to a petiole clearly set off from the limb. Occurs along the coast from southern Alaska to northwestern Oregon.

Var. monanthum (Greene) stat. n., D. pauciflorum (Durand) Greene var. monanthum, Pittonia 2: 73. 1890. Differs from var. radiculatum by its purple filaments. This would seem to be widely distributed in Canada according to a map by Thompson 1953, page 117, but on closer inspection it appears that the symbols for D. radiculatum ssp. radiculatum and ssp. monanthum have been interchanged and that the latter entity does not occur in Canada.



5. LYSIMACHIA L.

## LOOSESTRIFE

A middling type with stamens opposite the petals. Flowers yellow. Herbs with opposite or verticillate leaves.

- a. Not flowering, but bulbiferous in the axils ..... 1. L. terrestris
- aa. Floriferous.
  - b. Flowers in racemes.
    - c. Raceme open, terminal ..... 1. L. terrestris
    - cc. Raceme dense, axillary ..... 2. L. thyrsiflora
  - bb. Flowers axillary or in terminal cymules.
    - d. Leaves narrowly linear and sessile ..... 5. L. quadriflora
    - dd. Broader and petiolate.
      - e. Leaves ciliate,  $\pm$  ovate ..... 3. L. ciliata
      - ee. Not ciliate and narrower ..... 4. L. hybrida

1. L. terrestris (L.) BSP. -- Sterile and usually simple stems with reddish axillary bulblets. Much less common than the flowering type, not yet collected from Manitoba. -- L-(NF, NS-PEI)-NB-O, US -- F. florifera Boivin -- Swamp-Candles, Bog-Loosestrife -- Sepals, petals and fruit with dark purple lines or dots. With one or more terminal racemes of long-pedicelled flowers. Summer. Lake shores. -- L-SPM, NS-seMan, US.

Both forms appear to have essentially the same distribution, but the typical bulbiferous phase was not represented from Manitoba among the many specimens examined from loans and during inventories or revisions. Because this sterile phase is much less conspicuous, its lack of representation from our area may be due only to lack of collecting.

2. L. thyrsiflora L. (Naumburgia thyrsiflora (L.) Reich.) -- Tufted Loosestrife (Corneille en bouquet) -- Leaves, stem and flowers abundantly and finely purple-dotted. No terminal raceme, but the simple stem bearing 2-8 axillary racemes on long peduncles. Pedicels shorter than the flowers. Early summer. Freshwater shores. -- Mack-(Y)-Aka, NS-BC, US, Eur.

3. L. ciliata L. (Steironema ciliatum (L.) Raf.) -- A common and conspicuous yellow-flowered herb with a variable floral arrangement, but usually with some flowers solitary in the axil of opposite leaves while others are in terminal cymules of 4-6 flowers subtended by a verticil of 4 leaves. Long stoloniferous and without basal rosettes. Leaves mostly 3-5 cm wide. Peduncle (2)-4-(6) cm long. Mid summer. Light woods and wetter prairie spots. -- NS-BC, US.

Gleason 1952 would extend the range to Yukon, but we found no corresponding specimen at NY in 1965.

4. L. hybrida Mx. (Steironema hybridum (Mx.) Raf.; S. lanceolatum (Walter) Gray var. hybridum (Mx.) Gray) -- Readily confused with the preceeding, but the leaves not ciliate and narrower. Not stoloniferous, but producing basal rosettes. Leaves 0.5-2.0 cm wide,  $\pm$  lanceolate, usually verticillate on the last



2-3 nodes. Flowers all or mostly verticillate. Mid summer. Wet meadows. -- swQ-wAlta, US.

5. L. quadriflora Sims (L. longifolia Pursh; Steironema quadriflorum (Sims) Hitchc.) -- Leaves linear and sessile. Tufted with rosettes, the basal leaves much smaller and obovate to elliptic. Leaf and flower arrangement much as in the last two. Mid summer. Chernozem prairies, rare: Kleefeld. -- swO-seMan, US.

#### 6. TRIENTALIS L. CHICKWEED WINTERGREEN

Flower usually 7-merous.

- a. Leaves rhomboid-lanceolate, acute to sub-acuminate at tip ..... 1. T. borealis
- aa. Leaves oblanceolate to obovate, obtusish to rounded at tip ..... 2. T. europaea

1. T. borealis Raf. (T. americana Pursh) -- Star-Flower-- Leaves all or mostly in a single terminal verticil. Other leaves, if any, very much reduced and alternate. Larger leaves usually over 5 cm long. Flowers white, terminal, usually two. Early summer. Frequent in forests. -- (seK), L-SPM, NS-neBC, neUS.

2. T. europaea L. (var. arctica Fischer) -- Similar, but the leaves broadest near the tip and usually less than 5 cm long. Stem leaves usually present and not so much reduced, nearly as large as the smaller ones of the terminal verticil. -- Mack-(Y)-Aka, nwAlta-BC, (nwUS), Eur.

Quite variable as to leaf size and there is a strong tendency to smaller leaves (var. arctica) in America. But this is only a matter of frequency as the range of variation appears to be essentially the same on both sides of the Pacific. It seems difficult to implement here a distinction that would not be either artificial or based primarily on the locus of collection.

A report of T. latifolia Hooker from Alberta by Hitchcock 1959 and Boivin 1966 may have been due to a lapsus calami as there was no corresponding specimen at WTU in 1967.

#### 7. GLAUX L. SEA MILKWORT

Corolla lacking, the calyx somewhat petaloid.

1. G. maritima L. var. angustifolia Boivin -- Black Saltwort (Herbe au lait) -- Leaves very finely punctate in slightly darker green. Small perennial herb with milky juice. Somewhat fleshy. Leaves mostly around 1 cm long, lanceolate, entire. Calyx, marcescent, the lobes pinkish with white margins. Early summer. Wettish alkaline soils. -- sMack-sY, sMan-sBC, US.

It is primarily by its narrower leaves that our inland variety is distinguished from either the east coast (var. obtusifolia Fern.) or the west coast (var. macrophylla Boivin) vicariants.



## 8. ANAGALLIS L.

PIMPERNEL

Sepals free.

1. *A. ARVENSIS* L. -- Pimpernel, Scarlet Pimpernel (Mouron, Mouron rouge) -- Flower brick-red. Rather similar to *Stellaria media* in general presentation. Foliage obscurely punctate in purple. Leaves ovate, sessile. Peduncle becoming sharply recurved in fruit. Summer. Rare garden weed: Lacombe. -- (G, NF)-SPM, NS-(PEI-NB)-Q-O, Alta-BC, US, Eur.

## 9. CENTUNCULUS L.

CHAFFWEED

Flowers insignificant, 4-merous. Leaves mostly alternate.

1. *C. minimus* L. -- Chaffweed -- Capsule whitish with a brown equatorial line. Small annual with obovate leaves, the lowermost opposite. (Mid summer?). Marshy places in the prairie. Rare or inconspicuous. -- NS, S-BC, US, (CA), Eur.

We have checked specimens (DAO) from Mortlach, Long Lake, Cory and Empress. We also know of a report from Reed Lake (CAN).

## 81. PLUMBAGINACEAE

(LEADWORT FAMILY)

Plants with the stamens opposite the petals and otherwise generally similar to the *Primulaceae* but the styles 5 and the leaves (and branching) alternate or basal.

- a. Flowers in a branched inflorescence ..... 1. *Limonium*  
 aa. In a dense head ..... 2. *Statice*

## 1. LIMONIUM L.

SEA-LAVENDER

Petals free or nearly so. Each flower tightly wrapped in (2)-3 scarious bracts. Calyx petaloid.

1. *L. VULGARE* Miller -- Sea-Lavender (Saladelle) -- Flowers in a corymb of secund spikes. Leaves all basal, broadly oblanceolate, fairly large. Branching somewhat dichotomous, the branches trigonous and winged. Calyx white with 5 thick and green nerves. Corolla pink. Mid summer. Cultivated and rarely spreading around old cemeteries: Big Muddy. -- sO, scS, Eur.

Both collections examined (REG, TRT) belonged to the white-flowered cv. Album.

## 2. ARMERIA W.

Scapose herbs with the flowers in a globose head.

1. *A. maritima* (Miller) W. var. *interior* (Raup) Lawr. (*Statice interior* Raup) -- Thrift, Sea-Pink (Gazon d'Espagne, Herbe à sept têtes) -- Head subtended by numerous membranous bracts, the lowest one being reflexed and tubular. Rosette leaves numerous, marcescent and narrowly linear. Head interspersed by numerous bracts. Early summer. Dunes of lake Athabaska. -- (Mack), nwS.



A variable type to be organized into geographical varieties only with some difficulty. Our present understanding of the Canadian variations may be summarized in the following key:

- a. Calyx glabrous ..... var. interior
- aa. Pubescent at least along the nerves.
  - b. Outer involucre bracts triangular-lanceolate,  $\pm$  acute at tip, and as long or longer than the inner ones -- Vancouver ..... var. californica (Boiss.) Lawr.
  - bb. Broader, rounded at tip and shorter.
    - c. Outer involucre bracts less than half as long as the inner -- Arctic regions -- ..... var. sibirica (Turcz.) Lawr.
    - cc. Not quite so short, hence less strongly imbricated.
      - d. Less than 2 dm high; calyx pubescent on both the nerves and the internerves. -- Arctic-alpine .. ..... var. labradorica (Wallr.) Lawr.
      - dd. Usually taller; calyx pubescent on the main nerves, glabrous on the internerves. -- West Coast .. ..... var. purpurea (Mert. & Koch) Lawr.

#### Order 16. LYTHRALES

Ovary inferior, but the petals free or lacking. Petals borne on the summit of a calyx tube.

- a. Flower without perianth, reduced to a single stamen or ovary or both.
  - b. Fruit an achene; leaves verticillate... Hippuris, p. 140
  - bb. Fruit a diachene; leaves opposite .. ..... 85. Callitrichaceae, p. 146
- aa. Flower normal or much less reduced.
  - c. Petals more than 4, usually 6... 82. Lythraceae, p. 138
  - cc. Petals (3)-4, rarely lacking.
    - d. Fruit an achene. Aquatics .. ..... 83. Halorrhagidaceae, p. 139
    - dd. Fruit a capsule. Terrestrial plants ..... 84. Onagraceae, p. 140

#### 82. LYTHRACEAE (LOOSESTRIFE FAMILY)

Like the Onagraceae, but the floral parts usually more numerous and the hypanthium (or calyx tube) free from the ovary.

##### 1. LYTHRUM L.

Petals usually 6, free and borne on the summit of the elongate hypanthium.

1. L. SALICARIA L. (var. gracilior Turcz., var. tomentosum (Miller) DC.) -- Purple Loosestrife (Salicaire, Roupie de  
 ARMERIA 138



coq d'Inde) -- Showy species of shores and ditches with a terminal inflorescence of magenta flowers. Coarse perennial with opposite lanceolate leaves. Inflorescence a raceme of opposite glomerules. Mainly late summer. Sometimes cultivated and spreading readily to freshwater habitats. -- NF, NS-sMan, swalta-BC, US, Eur.

### 83. HALORRHAGIDACEAE (WATER MILFOIL FAMILY)

Aquatic plants with a rather small or somewhat reduced flower, similar to the Onagraceae, but the fruit indehiscent.

- a. Leaves finely divided ..... 1. Myriophyllum  
 aa. Leaves entire ..... 2. Hippuris

#### 1. MYRIOPHYLLUM L.

#### WATER MILFOIL

Submerged aquatics with verticillate pectinate leaves.

- a. Flowers and bracts all or mostly alternate ..  
 ..... 1. M. alterniflorum  
 aa. Verticillate and the leaves longer.  
 b. Inflorescence bracts closely pectinate to  
 entire, many times shorter than the leaves ..  
 ..... 2. M. spicatum  
 bb. Bracts remotely lobed and at least half as  
 long as the leaves ..... 3. M. pinnatum

1. M. alterniflorum DC. -- Leaves smaller than in the following, (5)-8-10(12) mm long. Fruit deeply 4-lobed, the lobes rounded and smooth on the back. Second half of summer. Shallow waters, becoming sterile in deeper waters. -- G, (Mack, Aka), NF-SPM, NS, NB-nMan-nS, US, Eur, (Afr).

We know of only 3 collections (CAN; DAO, photo) from our area: Cochrane river, Reindeer Lake and lake Axis. The last is not typical, the leaves being part alternate like the inflorescence bracts.

2. M. spicatum L. (M. exalbescens Fern.; M. verticillatum L., var. pectinatum Wallr.) -- Water-Milfoil (Volant d'eau)-- A common submerged aquatic with verticillate and pectinately divided leaves. Leaves (1)-2-(3) cm long. Flowers inconspicuous, verticillate in a moniliform and emersed spike. Fruit shallowly 4-lobed, the lobes rounded and sometimes smooth or more commonly somewhat verrucose. Mid to late summer. Common submerged herb in shallow to deeper water. -- G-(F)-K-Aka, (L-SPM), NS-BC, US, (SA), Eur, Afr.

We are not convinced that the neogean plants are separable from the paleogean ones except on a statistical basis.

3. M. pinnatum (Walter) BSP. -- Usually with some of the leaves or flowers alternate, the others verticillate. Leaves 1-2 cm long, the lobes few and rather short, passing gradually into the not very reduced bracts. Fruit deeply 4-lobed, the lobes squarish, with 2 tuberculate ridges on the back and 3 concave sides. Late summer. Submerged in sloughs, rare:



Wordsworth, Mortlach. -- sS, US, (CA).

We have checked only the Wordsworth collection.

## 2. HIPPURIS L.

## MARE'S TAIL

Palustrine and simple herbs with verticillate and entire leaves. Flowers insignificant. Perianth lacking, the ovary enclosed by the overgrown hypanthium. Stamen only 1 or none.

- a. Leaves verticillate in 4's ..... 2. H. tetraphylla  
 aa. More numerous and narrower ..... 1. H. vulgaris

1. H. vulgaris L. -- Bottle-Brush, Mare's Tail (Queue de cheval, Pesse d'eau) -- Common herb of shallow waters with simple stems and verticillate leaves. Stem fleshy. Leaves in 6's - 10's, entire, 1-3 cm long, acute or acutish, 1-3 mm wide. Early summer. Forming large colonies on muddy shores and shallow waters. -- G-Aka, L-SPM, NS-BC, US, (SA), Eur, (Afr).

In so far as our two species are shore plants, emerged and submerged forms are part of the normal variation of each species and we have made no attempt at distinguishing them, even if the submerged forms can be strikingly different. They have already received names: f. fluviatilis (Coss. & Germ.) Glueck for the first, f. lacunarum Dut. & Lep. for the second.

2. H. tetraphylla L. f. -- Leaves 0.5-1.0-(1.5) cm long, broader, thickish and verticillate in 4's-(6's), oblong-lanceolate and obtuse or rounded at tip. Second half of summer. Maritime shores. -- (F-K)-Mack-(Y)-Aka, (L), Q-nMan, (BC), Eur.

## 84. ONAGRACEAE (EVENING-PRIMROSE FAMILY)

Flower 4-merous, of free parts, but the ovary inferior, being enclosed in a long-tubular hypanthium.

A Manitoba report of Isnardia palustris L. (= Ludwigia palustris (L.) Ell.) is undoubtedly incorrect as pointed out by Scoggan 1957 and the Saskatchewan reports by Hooker 1832 and Macoun 1883 are probably equally unjustified.

- a. Fruit catchy, covered with hooked hairs ..... 6. Circaea  
 aa. Not catchy.

- b. Fruit short, indehiscent ..... 5. Gaura  
 bb. Elongate, a dehiscent capsule.

- c. Seeds with a pappus ..... 1. Epilobium  
 cc. No pappus.

- d. Capsule bilocular, opening by  
 2 valves ..... 4. Gayophytum  
 dd. 4-locular and opening by 4 valves.

- e. Petals entire to merely emarginate ..... 3. Oenothera

- ee. Petals conspicuously bilobed ..  
 ..... 2. Boisduvalia

## 1. EPILOBIUM L.

## WILLOW-HERB

Seed with a pappus of capillary bristles. Otherwise as in Oenothera.

HIPPURIS



- a. Petals large, at least 1 cm long.
  - b. Flowers numerous, subtended by small bracts ..... 1. E. angustifolium
  - bb. Flowers few in a leafy inflorescence... 2. E. latifolium
- aa. Petals smaller.
  - c. Leaves linear.
    - d. Annual; fruit 2-3 cm long ..... 3. E. paniculatum
    - dd. Perennial with longer fruits ..... 4. E. palustre
  - cc. Leaves lanceolate to ovate.
    - e. Low plant with usually ovate to elliptic leaves ..... 6. E. alpinum
    - ee. Taller, the leaves mostly lanceolate ..... 5. E. ciliatum

1. E. angustifolium L. (var. intermedium AA., var. macrophyllum (Hauskn.) Fern., var. platyphyllum (Daniels) Fern.; Chamaenerion spicatum (Lam.) S.F. Gray) -- Fireweed, Pink Tops (Lilas de montagne, Bouquets rouges) -- Showy virgate herb with one large terminal raceme of spreading magenta flowers. Stoliferous, commonly 1 m high. Leaves  $\pm$  lanceolate, thin, paler and somewhat rugose below. Bracts mostly about as long as the pedicels. Flower buds reflexed; flowers spreading; fruits slightly ascending. Mid to late summer. Open places, often very abundant after a fire.--G-(F)-K-Aka, L-SPM, NS-BC, US, Eur -- F. albiflorum (Dum.) Hauskn. -- Flowers white, including the sepals. -- Mack-Aka, L-NF, NS-BC, US, Eur -- F. spectabile (Simmons) Fern. -- Petals white, but the sepals purple. -- Aka, NS, Q, Man-S-(Alta), Eur.

2. E. latifolium L. -- River-Beauty -- Similar to the above but smaller and somewhat fleshy. Only 1-4 dm high. Leaves rhomboid to lanceolate, rather thickish, the lateral nerves inconspicuous. Bracts large and leaf-like, mostly at least as long as the buds. Flowers (and buds) 2-3-(12), erect. Fruit erect. Mid summer. Arctic and alpine habitats, especially wet gravels. -- G-Aka, L-NF, Q-(nO)-nMan, swAlta-BC, US, Eur.

3. E. paniculatum Nutt. (f. adenocladon Hausskn.; var. subulatum (Hausskn.) Fern.; E. adenocladon (Hausskn.) Rydb.) -- The bark usually exfoliating on the lower part of the stem. Annual, usually diffusely branched. Leaves linear, conduplicate, falcate. Fruit attenuate at both ends, mostly falcate. Mid summer. Shores of sloughs and disturbed soils. -- swQ-CB, US.

4. E. palustre L. var. palustre (var. grammadophyllum Hausskn.; var. monticola AA., var. oliganthum (Mx.) Fern.; E. davuricum Fischer; E. densum Raf.; E. leptophyllum Raf.; E. lineare AA.; E. molle Torrey; E. oliganthum Mx.; E. strictum Muhl.; E. wyomingense Nelson) -- Resembling the next, but the leaves narrowly linear and the flowers usually white. Glabrous to grayish pubescent. Leaves less than 5 mm wide. Perennial by thin, fragile stolons. Fruit 3-7 cm long. Mid summer. Swampy ground. -- (G-F)-K-Mack-(Y-Aka), L-SPM, NS-BC, US, Eur.

Somewhat variable and subjected to much splitting. We have accepted the consolidation proposed by Hitchcock 1961 as



it seems realistic. The next two species are also the result of similar consolidation procedures.

On the east coast there is a var. sabulonense (Fern.) Boivin with larger flowers, the petals 8-10 mm long.

5. E. ciliatum Raf. var. ciliatum (E. adenocaulon Hausskn., var. perplexans Trel.; E. americanum Hausskn.; E. Drummondii Hausskn.; E. glandulosum Lehm., var. adenocaulon (Hausskn.) Fern., var. cardiophyllum Fern., var. Macounii (Trel.) C.L. Hitchc., var. occidentale (Trel.) Fern., var. tenue (Trel.) C.L. Hitchc.; E. leptocarpum Hausskn., var. Macounii Trel.; E. saximontanum Hausskn.; E. scalare Fern.; E. Steckerianum Fern.; E. Watsonii Barbey) -- A common middling type, 2-8 dm high. Perennial by fragile stolons. Leaves 0.5-2.0 cm wide, lanceolate, denticulate. Fruits and flowers erect, the latter usually pinkish or mauve. First half of summer. Wet ground. -- (Mack)-Y-(Aka), L-NF-(SPM, NS-PEI)-NB-BC, US, (Eur).

The absence of pappus characterizes an eastern endemic, var. ecomosum (Fassett) Boivin, known only from the estuary of the Saint Lawrence.

Earlier reports by Hooker 1832 and Macoun 1883 of E. coloratum Muhl. were based on specimens which, according to Macoun 1894, were mostly revised by Trelease to E. adenocaulon. Considering the absence of E. coloratum from Western Canada, a simultaneous report by Macoun 1894 of the hybrid E. coloratum X adenocaulon from Little Slave Lake cannot be rated as anything but highly improbable.

6. E. alpinum L. (var. albiflorum (Suksd.) C.L. Hitchc., var. clavatum (Trel.) C.L. Hitchc., var. gracillimum (Trel.) C.L. Hitchc., var. lactiflorum (Hausskn.) C.L. Hitchc., var. nuttans (Horn.) Hooker; E. anagallidifolium Lam.; E. glaberrimum Barbey var. fastigiatum (Nutt.) Trel.; E. Hornemannii Rchb.; E. lactiflorum Hausskn.; E. platyphyllum Rydb.) -- Like the preceding but smaller and perennial by rooting decumbent bases or superficial stolons. Only 1-2-(4) dm high. Leaves ovate to narrowly oblong, rather few and commonly only 3-4 pairs to a stem. Flowers few, usually pinkish or mauve. Mainly mid summer. Cold mountain springs. -- (G-F)-K-(Mack-Y)-Aka, L-(NF, NS), Q, Alta-BC, US, (Eur).

Re E. minutum Lindley reported for northern Alberta by Macoun 1883, see comment about Rosa nutkana p. 69, part I.

## 2. BOISDUVALIA Spach

Petals bilobed, otherwise as in Oenothera.

1. B. glabella (Nutt.) Walpers -- Inconspicuous annual. 1-2 dm high, usually decumbent and ± branched from the base. Herbage more or less hirsute. Leaves narrowly lanceolate below to broadly lanceolate above. Fruit often curved, somewhat shorter than its leaf-like bract. Mid summer. Bare alkaline clays, rare. -- swS-BC, US, (SA).

A collection of B. densiflora (Lindley) Watson labelled M.O. Malte, Alberta, Lethbridge, Aug. 27, 1911 (CAN; DAO, photo)



was mentioned by P. Raven in Brittonia 17: 250. 1965 and was the basis for the Alberta entry in Boivin 1966. The accuracy of the locality on the label was questioned by Raven and his doubts proved to be fully justified. We did not locate Malte's field records for that year, but a checking of other herbarium sheets at DAO showed that in late August 1911 Malte was collecting in British Columbia, not in Alberta. A similar check by Miss H. Harkness at the National Museum neatly confirmed and completed our sampling. The consolidated samplings provide us with the following spot-check on Malte's 1911 itinerary:

Aug. 7-8, 1911	-- Fernie, B.C.
Aug. 11	Nelson, B.C.
Aug. 15	Salmon Arm, B.C.
Aug. 16	Kamloops, B.C.
Aug. 20-21	Vancouver, B.C.
Aug. 24	Victoria, Cedar Hill, B.C.
Aug. 27	New Westminster, B.C.
Aug. 31	Summerland, B.C.
Sept. 3	Banff, Alta.
Sept. 5-6	Calgary, Alta.

In all likelihood the collection labelled Lethbridge came from the vicinity of Victoria, B.C., the only area where B. densiflora is known to occur in Canada.

### 3. OENOTHERA L.

### EVENING-PRIMROSE

A basic type, 4-merous and the perianth of free parts, but the ovary inferior.

A very heterogeneous genus comprising 15 subgenera many of which are rated as distinct genera by various authors. We have found the treatment by P.A. Munz, N. Am. Fl. II, 5: 79-177. 1965 to be the most practical solution, while being intellectually as satisfactory as any other arrangement known to us.

- a. Stemless or the stem rather short, overtopped by the basal leaves.
  - b. Flowers very large, white ..... 8. O. caespitosa
  - bb Smaller and yellow.
    - c. Petals 1-2 cm long ..... 7. O. flava
    - cc. Shorter, 6-10 mm long ..... 9. O. breviflora
- aa. Stem much taller than the rosette leaves.
  - d. Petals white, fading purplish ..... 2. O. Nuttallii
  - dd. Petals yellow.
    - e. Petals 1-3 mm long ..... 6. O. andina
    - ee. Petals 5 mm long or more.
      - f. Ovary and capsule rounded on the angles.
        - g. A low shrub ..... 3. O. serrulata
        - gg. Biennial herb ..... 1. O. biennis
      - ff. Ovary and fruit winged or crested on the angles.



- h. Petals 5-9 mm long ..... 5. O. perennis  
 hh. Larger, 10-25 mm ..... 4. O. fruticosa

1. O. biennis L. var. biennis -- Evening-Primrose, Candlestick (Herbe aux ânes, Mâche rouge) -- Large yellow flowers in the shape of a maltese cross. Biennial herb, green, more or less pubescent. Leaves lanceolate, entire to remotely denticulate. Flower borne at the end of a long thin tube, termed hypanthium, longer than the ovary and enclosing it. Mid to late summer. Pioneer in open soils. -- (NF, NS-NB)-Q-(O-Man)-S-BC, US, (Eur) -- F. muricata (L.) Boivin (O. muricata L.; O. parviflora L.) -- Pubescence partly of stiff hairs with a red and inflated base. -- (NF, NS-NB)-Q-O-(Man-BC, US) -- Var. canescens T. & G. (var. hirsutissima Gray; O. strigosa (Rydb.) Mack. & Bush) -- More pubescent, grayish or whitish hairy, especially in the inflorescence. Muricate hairs none or few. -- (NS-O)-Man-Alta-(BC), US, (CA).

In the east it has been minutisected into umpteen micro-species as the result of genetic studies. Fortunately our local populations have remained completely outside these developments towards the miniaturization of the species concept.

2. O. Nuttallii Sweet (O. pallida AA.; Anogra Nuttallii (Sweet) Nelson) -- Stem bone-white. Tufted perennial. Leaves linear. Flowers large and showy, opening white in late afternoon, fading pink, drying reddish blue. Mid summer. Scattered tufts on sandy soils. -- O-BC, US.

3. O. serrulata Nutt. (Meriolix serrulata (Nutt.) Walp. -- Shrubby in the lower half. Leaves lanceolate to linear, conspicuously serrate, tending to be conduplicate and falcate. Fruit linear. Summer. Prairie on sandy or gravelly soils. -- (C)-Man-Alta, US.

4. O. FRUTICOSA L. -- (var. linearis (Mx.) Watson) -- Sundrops -- Leaves alternate, becoming congested in the inflorescence. Tufted perennial. Fruit ellipsoid, stipitate. Early summer. Rare weed of gravelly soils: Bird's Hill. -- (sMan), eUS.

5. O. perennis L. (O. pumila L.) -- Sundrops -- Fruit conspicuously stipitate. Generally similar to the preceeding, but the flowers smaller and the inflorescence racemose. Early summer. Prairies on gravelly soils, rare: Teulon. -- NF-(SPM), NS-O-(Man, swBC, eUS).

6. O. andina Nutt. var. andina -- Small annual with minute flowers. Around 1 dm high and very branchy. Fruit largest at the base and gradually tapered. Early summer. Light soils, rare: Pend-d'Oreille. -- sAlta-(sBC), wUS.

In var. Hilgardii (Greene) Munz from the state of Washington the petals are about twice longer.

7. O. flava (Nelson) Garrett (Lavauxia flava Nelson) -- Similar to the following but generally smaller and the flower yellow when fresh. Pubescence somewhat shorter and less dense. Petals 1-2 cm long, fading purplish. Anthers 4-8 mm long. Hy-



panthium and sepals finely glandular. Capsule slightly hirsute and finely glandular, the angles not verrucose and not particularly sinuous. Early summer. Steppes and eroded hillsides. -- sS-sAlta, (US, CA).

8. O. caespitosa Nutt. var. caespitosa (var. montana (Nutt.) Durand; Pachylophus caespitosus (Nutt.) Raim.; P. montanus (Nutt.) Nelson) -- Showy perennial with huge white flowers fading pink or red. Stemless with rosette leaves resembling those of a Taraxacum. Petals 2.5-4.5 cm long. Anthers 8-13 mm long. Hypanthium and sepals strigose. Capsule strigose or glabrescent, strongly sinuose-verrucose on the angles. Early summer. Bare clays and badlands, local. -- sS-sAlta, wUS -- Var. psammophila (Nels. & Macbr.) Munz -- Stem present, about 1 dm long. More restricted: Cardston. -- swAlta, nwUS.

Var. montana is apparently only a less common glabrous extreme, sporadic in the range of the typical pubescent phase.

9. O. breviflora T. & G. (O. brevifolia sphalm.; Taraxia breviflora (T. & G.) Nutt.) -- Like the previous 2 but the leaves more deeply divided, lyrate-pinnatifid, and the flowers smaller. Puberulent throughout, including the sepals, hypanthium and capsule, the latter merely rounded on the angles. Petals yellow, 6-10 mm long, fading reddish. Anthers less than 1 mm long. Early summer. Saline clay flats, rare. -- swS-sAlta-sBC, US.

#### 4. GAYOPHYTUM Jussieu

Capsule bilocular and opening by 2 valves. Otherwise as in Oenothera.

1. G. humile Juss. (G. racemosum T. & G.) -- Capsule deeply sulcate on both faces. Inconspicuous and small annual, somewhat puberulent. Leaves linear. Capsules linear. Mid summer. Disturbed sandy ground, rare: Mt. Glendown. -- swAlta, wUS, (SA).

Closely related to, and none to clearly distinct from, the more western G. ramosissimum Nutt.

#### 5. GAURA L.

#### BUTTERFLY WEED

Fruit short and indehiscent. Otherwise as in Oenothera.

1. G. coccinea (Nutt.) Pursh var. coccinea -- Fruit rhomboid. Tufted perennial with decumbent stems and terminal racemes. Herbage pubescent and tending to be grayish, especially in the inflorescence. Flowers pinkish in bud, darkening and fading deep scarlet. Early to mid summer. Common on hillsides, dry prairies, roadsides, etc. -- O-Alta-(BC), US -- Var. glabra (Lehm.) T. & G. (G. glabra Lehm.) -- Glabrous or nearly so. Less frequent and of more restricted distribution. -- S-Alta, US.

#### 6. CIRCAEA L.

#### ENCHANTER'S NIGHTSHADE

Floral parts in 2's. Fruit catchy by hooked hairs.

a. Fruit broadly oblanceolate ..... 1. C. alpina



aa. Broadly obovoid ..... 2. C. quadrisulcata

1. C. alpina L. (C. pacifica Asch. & Magnus) -- A delicate forest species with small catchy fruits in terminal racemes. 1-4 dm high. Leaves broad, ovate, remotely denticulate. Raceme minutely and obscurely bracteolate, the bractlets mostly 0.1-0.3 mm long. Flowers small, white. Petals  $\pm$  1 mm long. Fruit  $\pm$  1 mm wide, not ridged. Early to mid summer. Common in damp forests. -- (Mack), Aka, L-SPM, NS-BC, US, Eur -- Var. pacifica (Asch. & Magnus) M.E. Jones -- Raceme bractless except sometimes the lowermost 1-(3) flowers. Rockies. -- swAlta -BC, wUS.

Specimens of var. pacifica will commonly exhibit a number of other characters such as being taller and having leaves not cordate at base and less saliently toothed. Distinctions based on these additional characters have proved rather unsatisfactory as a certain proportion (about one in ten) of more eastern specimens will also exhibit these same features in a sporadic fashion. We have therefore shifted the emphasis entirely to the presence or absence of bractlets in the inflorescence, a character more clearly restricted in its geography.

2. C. quadrisulcata (Max.) Franch. & Sav. var. canadensis (L.) Hara -- Rachis of the raceme purplish at the base of each pedicel. Like the preceeding, but larger throughout. 3-8 dm high. Petals  $\pm$  2 mm long. Fruit 2-3 mm wide, with 6-10 longitudinal ridges. Summer. Alluvial woods on the Coteau de Prairie. -- (NF), NS, NB-sMan, US.

In our variety the flowers are reputedly less brightly coloured and less pubescent than the typical east-asiatic plant.

## 85. CALLITRICHACEAE (WATER-STARWORT FAMILY)

Flower insignificant, without perianth and reduced to an ovary or a single stamen.

### 1. CALLITRICHE L.

### WATER STARWORT

Submerged aquatics with submerged flowers.

a. Leaves all alike; fruit larger ..... 2. C. hermaphroditica  
aa. Leaves usually dimorphic; fruit smaller..... 1. C. palustris

1. C. palustris L. (C. heterophylla AA.; C. verna L.) -- Submerged aquatic with opposite and entire leaves, the latter usually dimorphic. Submerged leaves filiform, 1-nerved and usually about 2 cm long. Floating leaves smaller,  $\pm$  spatulate, 3-nerved, the nerves reticulate. Fruit longer than broad, 1.0-1.5 mm long, shallowly sulcate, the angles very sharp to narrowly winged. Summer. Common submerged aquatic. -- (G), K-Aka, L-SPM, NS-BC, US, (SA), Eur.

We have examined and revised to C. palustris two (DAO, MT) of the three Manitoba collections listed as C. heterophylla Pursh by Löve 1959. The other collection was not seen.

Macoun 1890 also reports C. heterophylla from the Moose Jaw Creek but there are no Saskatchewan specimens filed under that name to-day at CAN and the original collection has presumably been revised since to some other species, possibly C. palustris.



2. C. hermaphroditica L. (C. anceps AA.; C. autumnalis L.)  
 -- (Etoile d'eau) -- All leaves similar and narrowly linear,  
 mostly around 1 cm long. Fruit 1.2-1.5-(2.0) mm wide, as wide  
 as or slightly wider than long, deeply sulcate nearly to the  
 central axis, being divided into 4 flat lobes. Summer. Slow  
 moving water. -- (G), Mack-(Y)-Aka, (L-NF), NB-BC, US, Eur.

#### Order 47. SAXIFRAGALES

Resembling the Rosales, with free petals and fused sepals,  
 but the carpels more or less united and the flower typically  
 perigynous.

a. Carpels (4)-5; mostly fleshy plants .....86. Crassulaceae  
 aa. Carpels 2 ..... 87. Saxifragaceae

#### 86. CRASSULACEAE

(ORPINE FAMILY)

Differs from the Saxifragaceae by its more numerous car-  
 pels that are only slightly united at base.

a. Flowers showy ..... 1. Sedum  
 aa. Flowers greenish, without petals ..... 2. Penthorum

#### 1. SEDUM L.

STONE-CROP

Fleshy herbs of dry and rocky habitats with showy flowers  
 like those of Saxifraga, but the carpels more numerous.

a. Leaves mostly opposite or verticillate ..... 5. S. Rosea  
 aa. Leaves alternate.  
   b. Leaves very thick and less than 3 mm wide.  
     c. Stem leaves less than 5 mm long ..... 1. S. acre  
     cc. Longer, mostly around 1 cm long.  
       d. Leaves narrowed at base ..... 6. S. lanceolatum  
       dd. Conspicuously larger at base ..  
           ..... 7. S. stenopetalum  
 bb. Leaves flat and at least 5 mm wide.  
   e. Flowers reddish ..... 4. S. Telephium  
 ee. Yellow.  
   f. Leaves spatulate, dentate above  
     the middle only ..... 2. S. hybridum  
 ff. Lanceolate, serrate their whole  
     length ..... 3. S. Aizoön

1. S. ACRE L. -- Mountain-Moss, Love-Entangle (Gazon d'or,  
 Petite joubarbe) -- The whole plant yellowish-green and forming  
 a carpet less than 1 dm high. Leaves small and short, closely  
 imbricated, not falling off in drying. Flowers yellow, few.  
 Early summer. Cultivated and rarely escaped in dry or rocky  
 places: Pointe-du-Bois, Ft. Qu'Appelle, Ma-Me-O. -- (G, NF-SPM),  
 NS-BC, US, Eur.

2. S. HYBRIDUM L. -- Leaves 5-12 mm wide, short-spatulate,  
 dentate only in the upper half. About 2 dm high. Yellow flo-  
 wers in a terminal cyme. Early summer. Cultivated and rarely



escaping to roadsides and rocky places: Pointe-du-Bois, Fort Saskatchewan. -- Q, sMan, cAlta, Eur.

3. *S. AIZOON* L. -- Leaves 3-10 cm long, lanceolate, serrate their whole length. Plant 2-6 dm high. Flowers yellow in a cyme. Early summer. Cultivated and rarely escaped to roadsides: Ma-Me-O. -- cAlta, Eur.

It was also reported for Saskatoon by Russell 1944, and Breitung 1957, but the justifying collection is likely to be only a cultivated specimen as it is labelled R.C. Russell, Saskatoon, "U", garden, June 29, 1932 (SASK; DAO, photo). Further, it was later revised to *S. Telephium*.

4. *S. TELEPHIUM* L. -- Live-Forever, Orpine (Grassette, Chou au lièvre) -- Flowers reddish in a dense terminal corymb. Stem 4-7 dm high. Leaves  $\pm$  elliptic, rather large and very fleshy, coarsely dentate, often densely punctate in purple. Mid summer. Cultivated and rarely escaped to roadsides; reported from The Pas. -- (NF), NS-O-(Man), BC, US, Eur.

5. *S. Rosea* (L.) Scop. var. *integrifolium* (Raf.) Berger (*S. Roseum* sphalm.) -- Aaron's Rod, Midsummer-Men (Millegraine, Racine de Rose) -- Leaves partly alternate, partly opposite or verticillate, entire, ovate to lanceolate. 1-3 dm high. Inflorescence small, purplish-black. Early summer. Rocky alpine habitats. -- Mack-Aka, Alta-BC, US, (Eur).

In the more eastern var. *Rosea* the fruits are paler, pink to red, and the leaves are commonly dentate.

6. *S. lanceolatum* Torrey (*S. stenopetalum* AA.) -- Flowering stems arising from a dense carpet of sterile shoots. Leaves linear, those of the sterile shoots crowded and persisting in the herbarium, the stem leaves not so crowded and falling off in drying. Flowers yellow in a terminal cyme. Early summer. Rolling montane prairies, from the Coteau Boisé westward. -- Y-(Aka), swS-BC, US.

7. *S. stenopetalum* Pursh (*S. Douglasii* Hooker) -- Similar but bulbiferous in the upper half of the stem. Leaves drying whitish and abundantly rusty-spotted. Bulblets axillary, foliaceous. Early summer. Rocky places at mid altitudes: Waterton. -- swAlta-sBC, wUS.

## 2. PENTHORUM L.

DITCH-STONE-CROP

Petals lacking and the plant not fleshy.

1. *P. sedoides* L. -- Perennial herb arising from a creeping base. Leaves lanceolate, serrate. Inflorescence glandular, terminal. Flowers in secund cymes. Filaments 10, persistent in fruit. Calyx lobes small and discrete. Mid summer. Shores and ditches, rare. -- NB-seMan, US.

## 87. SAXIFRAGACEAE

(SAXIFRAGE FAMILY)

Like the Crassulaceae, but the ovary typically reduced to 2 carpels.

SEDUM



- a. Petals lacking ..... 10. Chrysosplenium
- aa. Petals present.
  - b. Stamens alternating with staminodia;
    - carpels 4; leaves entire ..... 11. Parnassia
  - bb. Staminodia lacking; carpels usually 2.
    - c. Petals trifid to pectinate.
      - d. Styles 3; leaves palmatipartite ..
        - ..... 7. Lithophragma
      - dd. Styles 2; leaves shallowly to
        - deeply bilobed ..... 8. Mitella
    - cc. Petals entire.
      - e. Inflorescence a simple raceme... 9. Conimitella
      - ee. More branched and not a raceme.
        - f. Stamens 5.
          - g. Ovary bilocular; inflores-
            - cence cymose ..... 2. Suksdorfia
          - gg. Unilocular; inflorescence
            - spicate to narrowly pani-
              - culate ..... 6. Heuchera
        - ff. Stamens 10.
          - h. Petals filiform, resembling
            - the filaments of the sta-
              - mens ..... 5. Tiarella
          - hh. Petals broader and more obvious.
            - i. Carpels completely fused;
              - styles partly fused....4. Telesonix
            - ii. At least the styles free.
              - j. Carpels mostly
                - completely free..1. Leptarrhena
              - jj. Carpels fused ven-
                - trally for the lower
                  - half or so ..... 3. Saxifraga

#### 1. LEPTARRHENA Br.

As Saxifraga but the carpels nearly free to the base and the calyx barely adnate to the base of the ovary.

1. L. pyrolifolia (D. Don) Br. -- Rather resembling Saxifraga rhomboidea, etc., but the stem typically bearing one large leaf which is  $\pm$  cordate at base. Basal leaves oblong, thickish, serrate, the nerves impressed above. Inflorescence densely glandular in red. Flowers marcescent. Petals white, narrow and inconspicuous,  $\pm$  linear. Early summer. Along creeks and shores. -- Y-Aka, swAlta-BC, US.

#### 2. SUKSDORFIA Gray

Stem arising from a tuft of bulblets. Stamens only 5 and the inflorescence cymose; otherwise as in Saxifraga.

- a. Flowers 1-3-(7) ..... 2. S. violacea
- aa. More numerous ..... 1. S. ranunculifolia



1. S. ranunculifolia (Hooker) Engler (Hemieva ranunculifolia (Hooker) Raf.) -- Stem arising from a cluster of rusty-colored bulblets. 1-3 dm high and glandular-pubescent. Leaves palmatipartite. Flowers white, usually with a deep red center. Late spring and early summer. Wet rocky places in the mountains: Waterton -- (swAlta)-BC, US.

2. S. violacea Gray -- A delicate herb resembling many Saxifraga, but the petals pink to drying violet; they are white or yellow, sometimes red, in Saxifraga, except S. oppositifolia. Stem simple, 1-3 dm high, with few and inconspicuous basal bulblets. Herbage glandular-pubescent. Leaves mostly cauline, alternate and palmatilobed to palmatifid. Flowers few or single. Petals rather showy, oblanceolate, sometimes nearly white. Late spring and early summer. Wet rocky banks and cliffs in the mountains; rare: Carbondale River. -- swAlta-BC, US.

### 3. SAXIFRAGA L.

### SAXIFRAGA

The basic type of the family and a readily recognized genus by its ovary obviously composed of two carpels that are fused ventrally below the middle, but quite free in the upper half, the two styles conspicuously distinct. Stamens 10.

- a. Leaves opposite ..... 16. S. oppositifolia
- aa. Leaves alternate or all basal.
  - b. Stem leafless below the inflorescence ..... Group A
  - bb. Stem leafy ..... Group B

#### Group A

Foliage mainly basal, the stem leafless, but the branches of the inflorescence often subtended by  $\frac{1}{2}$  reduced leaves.

- a. Leaves subcordate to deeply cordate at base.
  - b. Many of the flowers replaced by clusters of bulblets ..... 2. S. Mertensiana
  - bb. Not bulbiferous ..... 1. S. punctata
- aa. Leaves broadly to narrowly cuneate at base.
  - c. Sepals sharply reflexed and pendent.
    - d. Glabrous or slightly puberulent above ..... 3. S. Lyallii
    - dd. Abundantly glandular-pubescent throughout ..... 6. S. ferruginea
  - cc. Sepals ascending to more or less spreading.
    - e. Petals 2-4 mm long ..... 4. S. occidentalis
    - ee. More elongate, 4.0-4.5 mm long... 5. S. virginensis

#### Group B

Stem with few to many leaves below the inflorescence.

- a. Leaves trifid to palmately lobed.
  - b. Bulbiferous in the upper axils ..... 10. S. cernua
  - bb. Not bulbiferous.
    - c. Leaf lobes ligulate ..... 12. S. cespitosa



- cc. Ovate to rounded ..... 11. S. rivularis  
 aa. Leaves 3-toothed to entire.  
   d. Flowers white; petals punctate or not.  
     e. Leaves soft, with a rounded tip....9. S. adscendens  
     ee. Leaves stiff, prickly pointed.  
       f. Leaves entire ..... 13. S. bronchialis  
       ff. 3-toothed at apex ..... 14. S. tricuspidata  
 dd. Yellow-flowered, the petals not punctate.  
   g. Conspicuously long stoloniferous ..  
     ..... 8. S. flagellaris  
 gg. Not stoloniferous.  
   h. Leaves all alike, all sessile...15. S. aizoides  
   hh. Basal leaves petiolate ..... 7. S. Hirculus

1. S. punctata L. var. Porsildiana (Calder & Savile) Boivin (S. aestivalis AA.; S. arguta AA.) -- Leaves deeply reniform and flabellately lobed. Scapose, villous, stoloniferous. Flowers white with a red center. Filaments thin. Early summer. Wet cliffs near timberline: Rockies. -- K-(Mack)-Y, swAlta-BC.

Four other intergrading varieties occur in Canada, of which one may mention var. arguta (D. Don) Engl. & Irmsch. (including ssp. pacifica Hultén), with glabrous and larger leaves, the main ones 2.5-7.5 cm wide, occurring from southern Alaska to north-western B.C. This was also cited for Yukon as ssp. pacifica in Bot. Not. 109: 192. 1956, but the justifying collection, N.J. Freeman, Quill Creek, 1953 (WIN; DAO, photo), has since been revised to var. Porsildiana.

2. S. Mertensiana Bong. -- Cocoa-Nuts -- Flowers partly replaced by clusters of pinky bulblets. Scapose, reddish glandular-pubescent. Leaves orbicular, deeply cordate, palmately lobed, the lobes 3-toothed. Inflorescence very open. Flowers white with conspicuously clavate filaments. Early summer. Dripping cliffs in the mountains: Waterton. -- sAka, swAlta-BC, wUS.

3. S. Lyallii Engler var. Lyallii -- Leaves spatulate, coarsely toothed in the upper half. Scapose and mostly around 1 dm high. Inflorescence ± racemose. Petals white to red tinged. Sepals deep red. Filaments clavate. Early summer. Alpine brooks and late snow patches. Rockies. -- swAlta-sBC, (US) -- Var. Hultenii Calder & Savile -- Taller plant, 1-3 dm high, with larger basal leaves, broadly obovate to flabelliform. Inflorescence paniculate. -- Y-Aka, swAlta-BC, US -- Var. laxa Engler (S. Lyallii X S. odontoloma AA.) -- Also taller, 2-4 dm high and the basal leaves orbicular, broadly cuneate to subtruncate at base. Inflorescence paniculate. Sometimes reputed a hybrid, but one parent is missing over much of the range. -- (swAlta)-sBC, (US).

4. S. occidentalis Watson var. occidentalis (S. nivalis AA.; S. rhomboidea AA.; S. rufidula (Small) Macoun; Micranthes rhomboidea AA.) -- Quite like the following, but the inflorescence more congested and the flowers smaller. Herbage commonly reddish glandular-puberulent. Petals obovate to oblong. First



half of summer. Dry montane prairies on slopes: Cypress and Rockies. -- (seAka), swS-swAlta-sBC, wUS.

Further south there occurs a number of rather weak variations, of which var. idahoensis (Piper) C.L. Hitchc. has strongly clavate filaments and var. latipetiolata C.L. Hitchc. has a short and broadly winged petiole.

S. rhomboidea Greene is a Colorado and Wyoming species with a semi-inferior ovary, while in our S. occidentalis the ovary is almost completely superior. All Canadian specimens met with under S. rhomboidea have been studied and revised to C. occidentalis.

5. S. virginensis Mx. -- Everlasting, Sweet Wilson (Passe-pierre) -- Leaves typically rhomboid-ovate and serrate. Scapose, commonly 1-2 dm high, mostly glandular-villous. Petals oblanceolate. Mid spring. Open sandy or rocky places where it may be quite conspicuous at flowering time. -- NB-seMan, US.

6. S. ferruginea Graham -- Leaves rather large, commonly 3-10 cm long, cuneate-oblanceolate and remotely serrate above the middle only. Inflorescence diffuse. Flowers white. Petals unguiculate, lanceolate. First half of summer. Wet shaded rocks, at the middle altitudes: Waterton. -- (nwMack), sAka, (swAlta)-BC, US -- F. Vreelandii (Small) St. John & Thayer (var. Macounii Engler & Irmscher) -- Flowers partly replaced by green leafy bulblets, their leaves obovate to spatulate. -- (sAka), swAlta-BC, US.

7. S. Hirculus L. -- (Faux-ciste) -- Flower yellow, usually solitary. Rufous-villous above. Stem leaves numerous, sessile, narrowly linear, the basal ones lanceolate, with a petiole about as long as the blade. Petals  $\pm$  1 cm long. Mid summer. Wet arctic tundra. -- G-Aka, nQ-nMan, wUS, Eur.

The many reports, new and old, from Saskatchewan, Alberta and B.C., are not substantiated by any specimen that we could locate and were presumably based on old misidentifications or were speculative additions.

8. S. flagellaris W. var. flagellaris -- Spider-Plant -- Producing  $\pm$  6 conspicuous superficial stolons. Stem leafy, solitary, with 1 to a few yellow flowers. Herbage  $\pm$  glandular-pubescent. Stolons filiform, naked, about 1 dm long, rooting at tip. Mid summer. High alpine on polygons or solifluction soils: Rockies. -- wMack-Aka, swAlta-nBC, US, Eur.

The glandulosity is clear to light brown in ours but the glands are purple black in the arctic var. platysepala Trautv.

9. S. adscendens L. var. oregonensis (Raf.) Breitung -- Leaves mostly 3-toothed or 3-lobed, but soft and not spinescent. Biennial, less than 1 dm high, glandular-puberulent throughout. Flowers white. Mid summer. Talus slopes and permafrost soils at high altitudes. -- sY-seAka, swAlta-BC, wUS.

The typical eurasian phase is generally larger, with larger flowers and larger stem leaves.

10. S. cernua L. -- With clusters of fleshy, deep purple bulblets in the axils of the upper leaves. Glandular-villous. Leaves palmatilobed, the lower ones on very long petioles.



Flower white, typically single and terminal. Mid summer. Wet cliffs and mountain summits. -- (G)-F-Aka, L, Q, swAlta-BC, US, Eur.

11. S. rivularis L. -- Similar to the preceeding, but not bulbiferous and the few flowers usually on very long pedicels, commonly longer than half the height of the plant. Leaves (3)-5-(7) lobed, not bulbiferous. Petals white. Early summer. Crevices of outcrops in arctic regions and in the mountains. -- G-Aka, L-NF, Q, nMan, swAlta-BC, US, (Eur).

12. S. cespitosa L. (var. groenlandica (L.) Pursh; var. minima Blank.) -- Leaves digitately lobed, the lobes ligulate. Glandular-puberulent, forming dense cushions, the stems about 1 dm high. Leaves cut into 3-(5) lobes. Flower white, often single. First half of summer. Alpine shale slopes and arctic gravels. -- G-Aka, L-NF, Q, nMan, swAlta-seBC, US, Eur.

13. S. bronchialis L. var. austromontana (Wiegand) G.N. Jones -- Forming dense cushions of entire, stiff and spinescent leaves. Leaves marcescent, stiffly ciliate. Stem thin, glandular puberulent. Petals 5.0-6.5 mm long, not unguiculate, white, with about 6 deep-red dots. Early to mid summer. Rocky alpine meadows. -- swAlta-BC, US.

Replaced to the northwest by a var. purpureomaculata Hultén with unguiculate and somewhat larger petals, typically 7-8 mm long.

14. S. tricuspidata Rottb. (Leptasea tricuspidata (Rottb.) Haw.) -- Leaves fleshy, 3-toothed at apex, the teeth spiny. Carpet forming perennial, similar to the preceeding. Leaves ligulate, stiffly ciliate. Flowers white, the petals with 10-15 magenta dots. Early summer. Rocky outcrops in northern regions. -- G-Aka, nL, nQ-BC.

15. S. aizoides L. -- Yellow-flowered carpet-making perennial. Stem densely puberulent, 1 dm high or less. Leaves all alike, sessile, narrowly lanceolate, marcescent, slightly fleshy. Mid summer. Alpine and arctic gravels and other loose soils. -- G-Mack-(Y) L-NF, NS, Q-(nO)-nMan, swAlta-eBC, US, Eur.

16. S. oppositifolia L. -- Mayflower -- Leaves opposite; flowers purple. Densely leafy carpet-making perennial. Leaves obovate, long ciliate, marcescent, turning blackish. Flowers solitary at the end of the branches. Early summer. Exposed rocky or gravelly places in arctic or alpine regions. -- G-Aka, L-NF, Q, nMan, swAlta-BC, US, Eur.

Reports of S. Aizoön Jacq. from Saskatchewan by many authors are probably based on the distribution given by Hooker 1832. The latter mention may have been based on collections from the Great Slave Lake or possibly the Great Bear Lake.

#### 4. TELESONIX Raf.

Differs from Saxifraga in the carpels being fused ventrally their whole length and the styles often partly fused.

1. T. Jamesii (Torrey) Raf. var. heucheriformis (Rydb.) Bacigalupi (Boykinia heucheriformis (Rydb.) Ros.) -- With the



general habit of a Heuchera, but the flowers reddish and the pubescence also often reddish, especially near the base of the flower. Glandular-pubescent throughout, 1-7 dm high. Leaves orbicular, lobed and dentate, cordate at base. Calyx ± reddish. Early summer. Rock crevices at the Hot Springs of Roche Miette. -- swAlta-(BC), US.

In ours the petals are obovate to spatulate and mostly 3 mm long. The typical phase, restricted to the Rockies of Colorado, is somewhat larger flowered, the petals 3-5 mm long and somewhat larger, broadly obovate to suborbicular.

5. TIARELLA L.

FALSE MITREWORT

Flower slightly irregular. Upper calyx lobe somewhat longer than the others. Carpels unequal in size the lower one often becoming as much as twice as long as the 1-(2) upper ones in fruit.

- a. Leaves simple ..... 1. T. unifoliata
- aa. Trifoliate ..... 2. T. trifoliata

1. T. unifoliata Hooker (f. trisecta Lakala) -- Petals insignificant, about as narrow as the filaments of the anthers. Glandular-puberulent perennial, the leaves mostly basal, trilobed to tripartite, the lobes irregularly crenate-dentate. Flowers white in a narrow panicle. Early summer. Mountain woods in the Rockies and Swan Hills. -- Aka, Alta-BC, nwUS.

More deeply lobed specimens have been called now a mere form, f. trisecta, now as an interspecific hybrid to T. trifoliata. The last assumption seems rather improbable since the form was originally described from the albertan Rockies, an area where one of the postulated parents is not known to occur.

2. T. trifoliata L. -- Similar, but the leaves trifoliate. Tending to be taller and more abundantly flowered. Early summer. Wetter coniferous forests, rare: Whitecourt. -- sAka, wcAlta-BC, nwUS.

6. HEUCHERA L.

ALUM-ROOT

Stamens only 5 as in Suksdorfia, but the carpels fused into a unilocular ovary. Otherwise as in Saxifraga. Flower often somewhat asymmetrical.

- a. Calyx 2-4 mm long, including the semi-inferior ovary.
- b. Leaf-teeth acute ..... 1. H. glabra
- bb. Leaves broader, their teeth broadly rounded ..... 4. H. parvifolia
- aa. Flowers larger, the calyx 5-12 mm long.
- c. Stamens included in the calyx ..... 2. H. cylindrica
- cc. Stamens exerted; leaves and flowers larger ..... 3. H. Richardsonii

1. H. glabra W. -- Pedicels recurved, mostly longer than the flowers. Leaves sharply dentate, at least one well developed

TIARELLA

154



leaf borne on the stem or subtending the lowest branch. Panicle open, sometimes secund. Mid summer. River cliffs, rare: Mt. Edith Cavell. -- sAka, swAlta-BC, US.

2. H. cylindrica Douglas var. glabella (T. & G.) Wheelock (var. septrionalis R., B. & L.) -- Petals linear, included and inconspicuous, but the calyx lobes yellowish. Scapose perennial 3-6 dm high. Leaves broadly ovate, lobed, the lobes crenate. Inflorescence a narrow racemiform panicle. Late spring to mid summer. Open rocky slopes in the mountains. -- swAlta-sBC, wUS.

Petioles glabrous or somewhat glandular-puberulent, never hirsute. The typical phase occurs west of us and is readily recognized by the dense and mixed pubescence of the petioles, partly long hirsute, partly glandular-puberulent.

3. H. Richardsonii Br. var. Richardsonii (var. hispidior R., B. & L.; H. hispida AA.) -- Alum-Root -- Much like the preceding, but the calyx strongly asymmetrical and the stamens exserted. Calyx barely petaloid. Petals pink, spatulate, about as long as the calyx lobes. Early summer. Common on rolling prairie. -- Mack, O-sMan-neBC, US.

In ours the capsule is included, the stamens barely exserted and the petals are merely papillose. We have submerged var. hispidior as being a mere sporadic extreme of pubescence. Further south one may find var. Grayana R., B. & L. (including var. affinis R., B. & L., a smaller-flowered extreme) with a somewhat exserted capsule, more strongly exserted stamens and petals at once glandular and papillose.

4. H. parvifolia Nutt. var. dissecta M.E. Jones (H. flabellifolia Rydb.) -- Flowers small and the white petals exserted as in H. glabra, but the panicle narrow and racemiform. Generally smaller, the leaves only 1-3 cm wide. Late spring to early summer. Foothill prairies. -- (swS)-swAlta-(seBC), US.

## 7. LITHOPHRAGMA Nutt.

Petals conspicuously and digitately lobed. The gender of this genus was discussed in Taxon 12: 208. 1963.

- a. Bulbiferous in the upper axils ..... 1. L. glabrum  
aa. Not bulbiferous ..... 2. L. parviflorum

1. L. glabrum Nutt. ramulosum (Suksd.) Boivin (L. bulbiferum Rydb.; L. tenellum AA.) -- Lower flowers replaced by clusters of deep-purple fleshy bulblets. Otherwise, quite like the following. Calyx campanulate, elongating up to 5 mm in fruit. Petals somewhat smaller, mostly trifid. Late spring. Prairies near springs: Cypress Hills and Rockies. -- swS-swAlta-BC, US.

The more restricted var. glabrum from the western United States lacks any bulblets.

2. L. parviflorum (Hooker) Nutt. -- Leaves palmatipartite. Flowers few, in a terminal raceme. Calyx more elongate, cuneate at base, elongating to 6-10 mm in fruit and becoming somewhat tubular. Petals white, mostly 5-lobed. Early summer. Moist montane prairies. -- swAlta-BC, US.



## 8. MITELLA L. MITREWORT, BISHOP'S CAP

Petals trifid to pectinately divided into filiform segments. Styles 2.

- a. Petals digitately trifid, white ..... 4. M. trifida
- aa. Petals pectinate.
  - b. Pedicels 1-2 mm long; petioles villous with long rufous hairs ..... 3. M. Breweri
  - bb. Longer; pubescence white.
    - c. Stamens 10; leaves broadly rounded at tip ..... 1. M. nuda
    - cc. Stamens 5; leaves obtuse at tip; larger plant ..... 2. M. pentandra

1. M. nuda L. -- Small delicate forest herb with yellowish-petals pectinately divided. Smaller, 1-(2) dm high. Leaves smaller, 1-3-(5) cm wide, suborbicular, deeply cordate,  $\pm$  crenate. Stamens 10. Seeds black, small, but conspicuous on the cup-like fruit wall. Early summer. Common forest species. -- (K)-Mack-Y-(Aka), L-SPM, NS-BC, US, (Eur).

2. M. pentandra Hooker -- Stamens only 5 and opposite the greenish petals. Leaves broadly cordate, shallowly lobed, the lobes crenate. Summer. Wetter spots in montane and subalpine forests and meadows. -- Y-Aka, wAlta-BC, US.

3. M. Breweri Gray -- Much as in the preceeding, but the leaves broader and reniform and the stamens opposite the calyx lobes. Leaves merely crenate or sometimes weakly lobed. Mid summer. Wetter areas in the upper montane zone in Waterton. -- swAlta-BC, US.

4. M. trifida Graham (M. violacea Rydb.) -- Calyx lobes whitish and the trifid petals white. Stamens 5, opposite the calyx lobes. Leaves more like those of M. pentandra. First half of summer. Mountain springs and wet cliffs. -- (swAlta)-BC, US.

## 9. CONIMITELLA Rydb.

Differs from Mitella by its entire petals and almost completely inferior ovary.

1. C. Williamsii (D.C. Eaton) Rydb. -- Bracts petaloid, white and pink, 1-2 mm long and fimbriate. Herbage densely glandular-puberulent. Leaves reniform, all basal. Scape rather long, bearing only 5-10 subsessile flowers. Petals white, narrowly oblanceolate, 4-5 mm long including a claw nearly as long as the blade. Calyx lobes  $\pm$  1 mm long, petaloid, white and pink. Early summer. Rich montane forests: Crownest Forest. -- swAlta, wUS.

## 10. CHRYSOSPLENIUM L. GOLDEN SAXIFRAGE

Petals lacking. Carpels 2, united into a unilocular ovary, the two styles far removed to opposite sides of the ovary. Stamens marcescent and present even in fruit.



1. C. alternifolium L. var. tetrandrum (Th. Fries) Lund (C. americanum AA.; C. tetrandrum Th. Fries) -- (Cresson doré, Cresson de roche) -- Small erect herb, usually less than 1 dm high, with reniform and crenate leaves. Most leaves and flowers clustered near the top of the plant. Sepals all alike, green, erect. Stamens 4, opposite the sepals. Early summer. Wet shaded places. -- (G)-F-K-(Mack-Y)-Aka, (L), Q-(O)-Man-BC, wUS, (Eur) -- Var. iowense (Rydb.) Boivin (C. iowense Rydb.) -- Sepals of two sizes, the outer ones somewhat wider. Sepals yellowish-green, recurved at tip. Stamens 5 to 8, the additional ones alternating with the sepals. -- swMack, sMan-sAlta, (ncUS, Eur).

Var. iowense is very close to var. sibiricum Ser., the main distinction of the latter being that the stamens are always in 8's.

# 11. PARNASSIA L. GRASS OF PARNASSUS

With 5 clusters of staminodia, each cluster borne on a flabellate base. Carpels 4. Herbs with entire leaves and a single terminal flower. Stem scapose or unifoliate.

- a. Leaves reniform ..... 4. P. fimbriata
- aa. Leaves ovate, longer than broad.
  - b. Petals small, about as large and as long as the sepals ..... 1. P. Kotzebuei
  - bb. Much larger, at least twice broader than the sepals.
    - c. Stem leafless ..... 3. P. glauca
    - cc. Stem unifoliate ..... 2. P. palustris

1. P. Kotzebuei Cham. var. Kotzebuei -- Smaller, usually around 1 dm high. Stem leafless. Flower small, the petals elliptic-lanceolate and about as long as the calyx lobes. Before mid summer. Wetter alpine and arctic meadows. -- (G-F)-K-Aka, L-NF, Q-(nO)-nMan-(nS)-Alta-BC, US, (Eur).

A dwarf var. pumila Hitchc. & Ownbey with much reduced staminodia has been described from a limited area in the Okanagan Valley.

2. P. palustris L. var. tenuis Wahl. (var. neogaea Fern.; P. multiseta (Led.) Fern.) -- Grass of Parnassus, White Buttercups (Fleur du Parnasse) -- Tufted herb, each stem bearing a single smaller, cordate and sessile leaf towards the lower third. Stem usually 2-4 dm high. Leaves ovate, broadly rounded to cordate at base. Petals about  $1\frac{1}{2}$  times as long as the sepals. Staminodia cluster typically with more than 10 segments. Mid to late summer. Wet meadows and marshy places. -- K-(Mack)-Y-Aka, (L-NF), Q-BC, US, (Eur) -- Var. montanensis (Fern. & Rydb.) C.L. Hitchc. (P. montanensis Rydb. & Fern.) -- Somewhat smaller. Petals only slightly longer than the calyx lobes. Staminodia with less than 10 segments. Not always clearly distinct. -- (Y), Alta-(seBC, US) -- Var. parviflora (DC.) Boivin (P. parviflora DC.) -- Still smaller. Typically 1-2 dm high. Stem



and basal leaves usually cuneate or rounded at base. Petals less than 1 cm long. Staminodia with less than 10 segments. -- (Mack-Aka, L)-NF, NS-PEI, Q-nMan-seBC, US.

The inclusion of *P. montanensis* in Saskatchewan lists by Russell 1954 and Breitung 1957 is credited to Raup 1936. However the latter gives only three localities, two of them, Calumet and Shelter Point, being in Alberta while Great Slave Lake is in Mackenzie District. There was no Saskatchewan sheet at GH in 1965.

3. *P. glauca* Raf. (*P. americana* Muhl.; *P. caroliniana* AA.) -- Flowering Plantain -- Leaves all basal, broadly ovate to elliptic, rounded at base. Calyx lobes short, only 3-5 mm long. Petals 10-18 mm long, more than twice as long as the calyx lobes. Staminodia mostly with 3 coarse and reddish segments. Late summer. Wetter prairies. -- NF, NB-cS, US.

Canadian reports of the southern *P. caroliniana* Mx. are generally based on specimens of *P. glauca*, but Gardner's 1946 reports for Churchill and Labrador are undoubtedly based on something else still. The corresponding specimens could not be found at DAO or QFA in 1965 and 1966.

4. *P. fimbriata* König var. *fimbriata* -- Petals coarsely fimbriate on each side in the lower half. Leaves broader than long, reniform and deeply cordate. Stem leaf small, borne towards the middle. Mid summer. Brooksides and springs near timberline. -- (swMack)-Y-Aka, swAlta-BC, US.

The staminodia are short, stubby and not capitate in our variety, but they are longer, thinner and capitate in two other varieties from the western U.S.

#### Order 48. SARRACENIALES

Carnivorous and capturing insects in a variety of ways. A primitive type of flower with the parts mostly in 5's and free, except for the fused carpels.

- a. Inflorescence a raceme ..... 88. Droseraceae  
aa. Flower solitary ..... 89. Sarraceniaceae

#### 88. DROSERACEAE

(SUNDEW FAMILY)

Single genus with us. Styles 3-5. Insects trapped by hair-like processes.

#### 1. DROSERA L.

SUNDEW

Leaves covered with coarse hair-like processes, capitate, glutinous and in which the insects become trapped to be eventually digested. Herbs with the leaves all basal and flowers in a raceme borne on a scape.

- a. Leaves linear, the limb  $\pm$  2 mm wide ..... 2. D. linearis  
aa. Broader.

b. Leaves  $\pm$  obdeltoid, slightly broader

than long ..... 3. D. rotundifolia

bb. Leaves obovate to broadly oblanceolate... 1. D. anglica

PARNASSIA

158



1. D. anglica Hudson (D. intermedia AA.) -- Leaves 1-3 cm long, 2.5-4.0 mm wide, narrowly obovate to narrowly oblanceolate, elongating in age. Mid summer. Northern bogs, usually in wetter and pioneer habitats. -- Mack-Aka, L-NF, Q-BC, US, Eur, (Oc).

Sometimes treated as the hybrid of D. linearis X rotundifolia but the Canadian distribution of D. anglica extends much further north than that of D. linearis and the solution of hybridity does not seem very plausible.

2. D. linearis Goldie -- Leaves 2-4-(6) cm long, 2-(3) mm wide, long linear, erect. Mid summer. Bogs, rare. -- NF, Q-S-(Alta)-BC, US.

3. D. rotundifolia L. var. rotundifolia -- Dewgrass, Eye-bright (Herbe à la goutte, Petit Saint-Sacrement) -- Leaves wider and more spreading, more or less obdeltoid to suborbicular, (5)-8-10-(12) mm wide and usually slightly wider than long. Early to mid summer. Sphagnum hummocks in bogs. -- G, seK-Aka, L-SPM, NS-BC, US, Eur.

#### 89. SARRACENIACEAE PITCHER-PLANT FAMILY

Insects trapped in hollowed out petioles half-filled with digestive liquids. Stamens numerous. Style 1.

##### 1. SARRACENIA L. SIDE-SADDLE FLOWER

Style unusually large, shaped like an umbrella, and wider than the ovary or fruit, which it covers.

1. S. purpurea L. var. purpurea -- Indian Pipe, Frog's Trousers (Sabot, Cochon de pelé) -- A single, large, drooping, deep red flower on a long scape, arising from a rosette of leaves half-buried in Sphagnum. These shaped like "horns of plenty", and half full of water. Sepals 2.5-4.0 cm long. First half of summer. Sphagnum bogs. -- L-SPM, NS-neAlta, US -- Var. ripicola Boivin -- More superficial, the rhizome very short or indistinct, the whole plant not buried in moss. Sepals shorter, 1.5-2.2 cm long. Wet terraces and shores, rare: Nipawin and Prince Albert. -- cO, cS.

The only Alberta collection seen was from Anzac (ALTA; DAO, photo). It is made up of 3 separate leaves only and its varietal determination remains tentative.

#### Order 49. UMBELLALES

Related to the Araliales. Carpels 2, maturing into a dry fruit which splits into a pair of achene-like fruits. Achenes borne on a central structure termed carpophore. Single family.

##### 90. UMBELLIFERAE (PARSLEY FAMILY)

Flowers in umbels and the ovary inferior. Flowers 5-merous, the perianth parts free, but the sepals much reduced. Flowers typically unisexual. Generic characters in this family are often rather obscurely technical.



- a. Flowers in blueish heads; foliage spinescent... 2. Eryngium
- aa. Flowers in umbels.
  - b. Leaves digitately compound ..... 1. Sanicula
  - bb. Not digitate, although sometimes trifoliate.
    - c. Leaves divided progressively into numerous small and rather narrow ultimate segments ..... Group A
    - cc. Leaves simple or divided into fairly well defined leaflets.
      - d. Stem leaves simple to trifoliate ..... Group B
      - dd. Leaflets more numerous ..... Group C

## Group A

Leaves deeply and progressively divided into many and rather narrow segments; leaflets not obvious or poorly defined.

- a. Flowers mostly replaced by bulblets ..... 9. Cicuta
- aa. Not bulbiferous.
  - b. Involucre of large and pectinately dissected bracts ..... 22. Daucus
  - bb. Bracts much smaller and little if at all dissected, or even lacking.
    - c. Umbell simple and few flowered ..... 3. Scandix
    - cc. Compound and the flowers very numerous.
      - d. Leaves all basal, or at least the lower pair opposite.
        - e. Fruit not winged, but finely tuberculate ..... 6. Musineon
        - ee. Fruit winged, not tuberculate.
          - f. Fruit winged along the marginal nerves only ..... 19. Lomatium
          - ff. Conspicuously winged along both the marginal and dorsal nerves ..... 18. Cymopterus
      - dd. Stem leaves all alternate, sometimes opposite in the inflorescence.
        - g. Segments very few (mostly 5), very narrow and very long.. 13. Perideridia
        - gg. Segments much more numerous and shorter.
          - h. Stem with irregularly scattered purple blotches.... 5. Conium
          - hh. Stem not maculate.
            - i. Native perennial; fruit very flat ..... 19. Lomatium
            - ii. Annual or biennial weeds; fruit slightly compressed.
              - j. Flowers white; the shorter pedicels shorter than the fruit ..... 11. Carum



- jj. Yellowish-green; all  
pedicels many times  
as long as the fruit ..  
..... 15. Anethum

## Group B

Leaves simple, entire or merely dentate to lobed or trifoliate, the leaflets rather broad.

- a. Leaves entire ..... 7. Bupleurum  
aa. Serrate to trifoliate.  
b. Leaflets huge, at least 1 dm wide ..... 21. Heracleum  
bb. Much smaller or the leaf simple.  
c. Flowers yellow; primary rays of the  
umbel nearly uniform in length ..... 8. Zizia  
cc. Flowers white; umbel rays very  
uneven ..... 10. Cryptotaenia

## Group C

Leaves compound, the leaflets more than 3 and all or most of them discrete and well defined.

- a. Leaves pinnate.  
b. Leaflets ± linear ..... 14. Sium  
bb. Leaflets ± oblong ..... 20. Pastinaca  
aa. Leaves ternately divided.  
c. Leaflets not serrate, but entire or with  
a few lobes.  
d. Stem tall and leafy ..... 17. Levisticum  
dd. Stem short, the leaves all basal or  
near basal ..... 19. Lomatium  
cc. Finely to deeply serrate.  
e. Fruit strongly flattened dorsally  
and winged ..... 16. Angelica  
ee. Fruit slightly flattened laterally,  
wingless.  
f. Leaves symmetrically divided into  
(3) or 9 leaflets ..... 12. Aegopodium  
ff. Central segment more divided than  
the lateral ones, the leaflets com-  
monly 5 or 15 or 21, etc.  
g. Fruit over 1 cm long, usually  
setose-strigose ..... 4. Osmorhiza  
gg. Fruit glabrous, much shorter.  
h. Flowers yellow, the central  
pistillate one subsessile .... 8. Zizia  
hh. White and all pedicelled .... 9. Cicuta

## 1. SANICULA L.

## SANICLE

Fruit catchy, being covered with numerous hooked prickles.  
Calyx nearly as large as the corolla.



1. *S. marilandica* L. (*S. marylandica* sphalm.) -- Snake-Root, Black Snake-Root -- Common deciduous forest species with digitate leaves. Leaflets 5, obovate to oblanceolate, sessile, serrate, the larger 2 often bifid to bipartite. Stem simple, the branching of the inflorescence tending to be opposite. Early summer. Nearly ubiquitous in deciduous woods. -- NF-SPM, NS-BC, US, (SA).

## 2. ERYNGIUM L.

Flowers in dense heads, much simulating a Composite. Fruit densely covered with membranous scales.

1. *E. PLANUM* L. -- (Herbe aux serpents) -- Stiff herb, bluish above. Foliage spiny-toothed. Leaves alternate, but the main branches of the inflorescence verticillate. Heads with a spinescent involucre. Flowers bluish. Mid summer. Casual escape from cultivation. -- Q-O, S-BC, (US, Eur).

## 3. SCANDIX L.

Body of the fruit prolonged into a much longer cylindrical beak.

1. *S. PECTEN-VENERIS* L. -- Venus' Comb, Lady's Comb (Peigne de Vénus, Aiguille de berger) -- Fruit longest, 4-7 cm long. Annual with the leaves finely dissected into very numerous and narrow segments. Umbels simple, of less than 10 flowers and subtended by an involucre of  $\pm$  connate bracts. Flowers white. Fruit scabrous. Carpophore needle-like. Late spring to mid summer. Rare weed: Golburn. -- O, S, BC, US, (SA), Eur, (Afr, Oc).

## 4. OSMORHIZA Raf.

SWEET CICELY

Except for one atypical species, fruit catchy by appressed and acicular hairs, especially numerous towards the base, the latter prolonged into a sharp and fairly long point.

- a. Flowers yellowish or greenish; fruit glabrous ..... 1. *O. occidentalis*
- aa. Flowers white or pink; fruit coarsely strigose.
  - b. Involucre and involucels lacking ..... 2. *O. chilensis*
  - bb. Involucre and involucels present ..... 3. *O. aristata*

1. *O. occidentalis* (Nutt.) Torrey -- Atypical, the blackish achenes linear, glabrous, and devoid of a sharp basal beak. Main leaves typically with 15 or 21 leaflets, the latter lanceolate to elliptic-lanceolate, puberulent. Involucre and involucels lacking. Fruit 12-18 mm long, longer than its pedicel. Late spring. Open woods and rocky slopes at lower altitudes. -- swAlta-seBC, wUS.

2. *O. chilensis* H. & A. var. *chilensis* (*O. brevipes* (C. & R.) Suksd.; *O. divaricata* (Britton) Suksd.) -- Usually with one



stem leaf below the inflorescence, of 9 leaflets, the latter triangular-lanceolate, serrate above, gradually more deeply cut below. Flowers white. Fruits (1.5)-2.0-(2.5) cm long, all or mostly longer than their pedicel, the latter 0.5-2.0 cm long and widely divergent. Early summer. Woods. -- sAka, NF, NS, NB-O, swS-BC, US, (SA) -- Var. purpurea (C. & R.) Boivin (O. purpurea (C. & R.) Suksd.) -- Flowers pink or at least with a pink center, rarely white. Fruit shorter, (0.8)-1.0-(1.5) cm, stubbier at tip, shorter than its pedicel. -- sAka, swAlta-BC, nwUS -- Var. cupressimontana Boivin (O. depauperata Phil.; O. obtusa (C. & R.) Fern.) -- Flowers white. Fruits not so short,  $\pm$  1.5 cm long, yet all or most of them shorter than their pedicel, the latter (1)-2-3 cm long. Stem usually leafless below the inflorescence, the lower leaf of the latter usually with 9 leaflets. -- seK, sAka, (sL-NF), NS, (NB)-Q-BC, US, (SA).

3. O. aristata (Thunb.) Mak. & Yabe var. brevistylis (DC.) Boivin (O. Claytonii (Mx.) C.B. Clarke) -- Sweet Jarvil -- Commonly with one stem leaf of  $\pm$  27 leaflets, the latter as in O. chilensis. Herbage villous. Flowers white. Pedicels mostly 0.5-1.0 cm in fruit. Fruit  $\pm$  1.5 cm long. Styles 0.5-2.0 mm long. Late spring. Poplar woods at Moon Lake in Riding Mountain -- NF, NS-sMan, US -- Var. longistylis (Torrey) Boivin (O. longistylis (Torrey) DC.). -- Anise-Root, Paregoric-Root -- Stem glabrous, the foliage glabrous to villous. Styles longer, 2.0-3.5 mm long. Oak bluffs and galerie-forests. -- NS, NB-Alta, US.

Reports of var. brevistylis (= O. Claytonii) from western Canada appear to be all based on specimens with the longer styles and lesser pubescence typical of var. longistylis. Except for the Riding Mountain and perhaps also for the Cypress Hill reports. The Macoun collection (QK; DAO, photo) from the Cypress Hills was typical indeed of var. brevistylis, but in the absence of later confirmation, we are inclined to suspect the possibility of mixed labels.

Our two varieties are not sharply disjunct morphologically and consequently a number of intermediate types based on unusual associations of diagnostic characters have been described and named. Specimens with styles of intermediate size are not uncommon and one is then left with pubescence as the only usable distinction. Further the asiatic O. aristata is more or less intermediate between our two types, the herbage being villous (as var. brevistylis) but the beak rather longish (like var. longistylis) or not infrequently intermediate in size. However, var. aristata is best distinguished by its commonly longer pedicels, these being 1-2-(3) cm long in fruit while they are usually about 0.5 cm long in our two american varieties, sometimes longer, but never averaging more than 1 cm on any plant.

The rank of variety seems most appropriate for these intergrading and morphologically overlapping taxa. The varietal rank also reflects most obviously their undeniable and very close affinity.



Var. brevistylis (DC.) stat. n., O. brevistylis DC., Prod. 4: 232. 1830; Urospermum aristatum (Thunb.) Ktze. var. brevistyle (DC) Ktze., Rev. Gen. 1: 270. 1891; Osmorhiza Claytonii (Mx.) C.B. Clarke.

Var. longistylis (Torrey) stat. n., Myrrhis longistylis Torrey, Fl. U.S. 310. 1824; Urospermum aristatum (Thunb.) Ktze. var. longistyle (Torrey) Ktze., Rev. Gen. 1: 270. 1891.

#### 5. CONIUM L.

#### POISON HEMLOCK

Ribs of the fruit proeminent and strongly sinuous. Carpophore not becoming bifid. Stylopodium very broad. Otherwise the fruit resembles Cicuta.

1. C. MACULATUM L. -- Poison Hemlock (Ciguë d'Europe) -- Stem sparsely to densely and irregularly purple-blotched. Leaves divided into very numerous small segments, the main ones alternate, becoming opposite in the inflorescence. Bracts of the involucre (and involucels) broadly margined, tending to be fused and usually reflexed. Early to mid summer. Established along roadsides at Maclean. -- NS, Q-O, S, swBC, US, Eur.

#### 6. MUSINEON Raf.

Rather resembling Lomatium, but the fruits wingless and only slightly compressed laterally.

1. M. divaricatum (Pursh) Nutt. (var. Hookeri T. & G.; M. trachyspermum Nutt.) -- Conspicuous in early spring on dry hillsides, a low herb with an umbel of yellow flowers and at least one pair of opposite leaves. With a deeply buried taproot and much dissected leaves. Puberulent to scabrous, especially the stem and inflorescence. Up to 2 dm high. First half of spring. Hillsides. -- swMan-sAlta, US.

#### 7. BUPLEURUM L.

#### THOROUGH-WAX

Fruit resembling the preceeding but smooth and the stylopodium especially broad.

1. B. americanum C. & R. -- Leaves simple, entire, linear-lanceolate. Involucre and involucels rather large and conspicuous. Flowers pale yellow with the stylopodia forming a conspicuous brown center. Fruits (and ovary) strongly glaucous, rather bluish. Mid summer. Gravelly and rocky prairies: Waterton. -- nwMack-Aka, swAlta-seBC, nwUS.

The inclusion of B.C. in the distribution is based solely on a collection by Dawson at the head of the Kootenay River in 1871 (CAN). This has never been confirmed and we have also come to appreciate that the geographical data on Dawson's labels are accurate only within a rather broad margin of approximation. It could be that Dawson's collection came from the Alberta side.



## 8. ZIZIA W. D. J. Koch

ALEXANDERS

Fruit slightly compressed laterally as in the last few genera, but the stylopodium wanting. Each umbellule of pistillate flowers shows a central flower sessile or nearly so.

- a. Basal and lower leaves simple, the middle and upper trifoliate ..... 1. Z. aptera  
 aa. Basal and stem leaves biternate, with 9-11 leaflets ..... 2. Z. aurea

1. Z. aptera (Gray) Fern. (Z. cordata AA.) -- Alexanders -- A common yellow-flowered herb conspicuous in early summer in ditches and other wet places. Basal and lower leaves cordate, crenately serrate. Leaflets ovate to lanceolate, serrate. Leaves thickish. Early summer. Chernozem prairies and wetter places. -- swY, swQ-BC, US.

The recent extension of range to Yukon by Boivin 1966 was based on L. Fournier, Haines Junction, 25 juillet 1958 (QFA; DAO, photo).

2. Z. aurea (L.) W.D.J. Koch (Thaspium barbinode AA.) -- Golden Alexanders, Meadow-Parsnip -- Similar, the leaves thinner and more divided, mostly with 9 or 11 leaflets. Often taller, 5-10 dm high. Leaflets rhomboid to lanceolate, serrate. Early summer. Galerie-forests, Oak islands and low chernozems. -- NS, NB-sMan, US.

Despite numerous Saskatchewan reports of Z. aurea, all of the 4 or 5 collections found under that name in various herbaria turned out to belong to Z. aptera. All Manitoba specimens under Thaspium barbinode (Mx.) Nutt. at CAN and DAO also proved to be Z. aurea.

## 9. CICUTA L.

WATER-HEMLOCK

A middling type with small, slightly compressed and wingless fruit. Flowers white. Involucre much reduced or absent. Base of stem slightly bulbous and fistulous with numerous cross-plates. Very poisonous plants.

- a. Flowers mostly replaced by clusters of bulblets ..... 1. C. bulbifera  
 aa. Not bulbiferous.  
     b. Fruit depressed globose ..... 2. C. mackenzieana  
     bb. Ovoid; leaflets broader ..... 3. C. maculata

1. C. bulbifera L. -- A rather sparse herb with at least one terminal white umbel and numerous bulblets scattered along the branches. Annual or perennial, 5-12 dm high. Foliage dissected to filiform segments, about 1 mm wide and entire or sometimes very remotely serrate. Fruit infrequent, suborbicular, about 1.5 mm long and about as wide. Second half of summer. Swampy ground or shores. -- sMack, L-NF, NS-BC, US.

2. C. mackenzieana Raup -- Like a narrow-leaved form of the following. Tuberous roots poorly developed or lacking.



Rather thick-stemmed for its sparse foliage and tending to be fastigiate in habit. Leaflets linear-elongate, about 10-15 times as long as broad, usually less than 5 mm wide. Fruit broadly orbicular, 2.0-2.5 mm long, as wide or wider than long. Mid summer. Marshes and bogs northward; mainly subarctic in distribution. -- Mack-Aka, wQ-neBC.

3. C. maculata L. var. angustifolia Hooker (C. Douglasii AA.; C. occidentalis Greene) -- Cowbane, Beaver-Poison (Carotte à Moreau) -- A tall herb with flattish, white umbels, conspicuous around most sloughs just before mid summer. Some of the rootlets tuberous; base of the stem enlarging, becoming fleshy and tuberous towards the end of the season. Commonly about 1 m high. Leaflets narrowly lanceolate, (0.5)-1.0-(1.5) cm wide, about 4-6 times as long as wide, most of the lateral nerves ending at the bottom of the sinuses. Fruit 2.5-3.0 mm wide and somewhat narrower. Mid summer of somewhat earlier. Open marshy places. -- swMack-sY, wQ-neBC, US -- Var. maculata -- Leaflets broader, 1-3 cm wide, ovate to lanceolate, 2-4 times as long as large. Fruit a bit longer, 3-4 mm long. Prairie Coteau at Notre-Dame-de-Lourdes. -- NS-sMan, (eUS).

## 10. CRYPTOTAENIA DC.

HONEWORT

Fruit elongate as in Osmorhiza, but glabrous and not prolonged into a sharp point at base. Involucre lacking.

1. C. canadensis (L.) DC. var. canadensis -- Honewort (Cerfeuil sauvage) -- Leaves trifoliate, the leaflets doubly serrate. Inflorescence vaguely paniculate. Flowers white. Pedicels very conspicuously uneven in length. First half of summer. Rare in alluvial woods: Portage, Morden. -- NB-sMan, US, (Eur).

The Far Eastern var. japonica (Hassk.) Makino has more open umbels subtended by better developed involucre and involucels, each of 2-5 bractlets.

## 11. CARUM L.

CARAWAY

Closely related to the preceeding. Involucre typically of a single bract which is often lobed. Fruit slightly compressed laterally.

1. C. CARVI L. -- Caraway (Anis, Anis bâtard) -- Leaves pinnately dissected into numerous small and linear segments. Annual. Terminal umbel usually overtopped by the lateral ones by fruiting time. Flowers white. First half of summer. Often cultivated and a casual escape to roadsides, shores, shelterbelts, etc. -- G, NF-(SPM), NS-Q-(O)-Man-Alta-(BC), US, Eur -- F. RHODOCHRANTHUM A.H. Moore -- Flowers pink. Infrequent. -- NS, Q, Man-Alta.

## 12. AEGOPODIUM L.

Fruit without oil tubes, merely dark green between the thin nerves.

CRYPTOTAENIA



1. *A. PODOGRARIA* L. -- Goutweed, Ground-Elder (Herbe aux goutteux, Petite Angélique) -- Main leaves with 9 leaflets, the lateral ones strongly asymmetrical. Stoloniferous perennial. Leaflets ovate to oblong, often broadly margined in white. Flowers white. Styles rather long, pendent in fruit. Early summer. Cultivated and sometimes spreading out of control: Morden. -- NF, NS, NB-sMan, BC, neUS, Eur.

### 13. *PERIDERIDIA* Reichenbach

SQUAW-ROOT

A segregate of *Carum*, perhaps mainly based on habit.

1. *P. Gairdneri* (H. & A.) Mathias (*Atenia montana* (Blank.) Rydb.) -- Squaw-Root -- Foliage unusually sparse; main leaves about 1 dm long and divided into a few (mostly 5-7) remote leaflets, these very narrow, 1-(3) mm wide, very long, and usually deciduous by fruiting time. Perennial from a cluster of tuberous roots. Flowers white. Mid summer. Submontane prairies, mainly in draws and around bluffs. -- swS-BC, US.

### 14. *SIUM* L.

WATER-PARSNIP

Leaves pinnate, otherwise much as in *Cicuta*.

1. *S. suave* Walter (*S. cicutifolium* Schrank) -- Leaves pinnate; otherwise quite similar to *Cicuta maculata* with which it often grows. Reputedly perennial. Leaflets linear, 1 cm wide or less, finely dissected when submerged. Involucre of numerous lanceolate and reflexed bracts. Flowers white. All summer. Common around sloughs and on marshy shores. -- sMack, (Aka), NF, NS-BC, (US, Eur).

### 15. *ANETHUM* L.

In this and the following genera the fruit is dorsally compressed, hence each achene is as wide as the whole fruit. Fruit strongly flattened and narrowly winged marginally. Involucre and involucels lacking.

1. *A. GRAVEOLENS* L. -- Dill (Fenouil, Aneth) -- Stem pale, finely striate longitudinally in white and green. Resembles *Carum Carvi*, but the flowers yellow and the pedicels nearly uniform in length. Annual. Leaves finely divided into linear to filiform segments. Inflorescence most often becoming glandular-punctate first in deep green, then in black. Mid to late summer. Waste places. -- Q-Alta, US, Eur.

### 16. *ANGELICA* L.

ANGELICA

Fruit as in *Anethum*; leaflets broad and distinct; flowers usually white. Involucre usually lacking. Involucels small.

a. Flowers yellow; involucral bracts about as long

as the peduncles ..... 3. *A. Dawsonii*

aa. Flowers white to pinkish; involucre lacking.



- b. Leaf rachis straight, its branches ascending ..... 2. A. arguta  
 bb. Leaf rachis geniculate, its branches widely spreading to reflexed ..... 1. A. genuflexa

1. A. genuflexa Nutt. var. genuflexa -- Primary divisions of the leaf rachis about equally spreading from the petiole and more or less radiating from its tip. Coarse perennial often 1 m tall. Involucels of filiform bracts nearly as long as the pedicels. Inflorescence densely puberulent, but the fruit becoming nearly glabrous, with a deep green centre and whitish wings. Mid summer. Low spots in semi-open forest. -- (sAka), cAlta-BC, (wUS).

Stem glabrous and the leaflets eciliate. Involucels shorter than the pedicels. In the Far Eastern vicariant var. multinervis (Koïdz.) Hiroë (including A. refracta F. Schmidt) the stem is puberulent above, the leaflets ciliate and the involucel longer than the pedicels.

2. A. arguta Nutt. (A. Lyallii Watson) -- Resembles the above, but quite glabrous and slightly glaucous, or slightly scabrous. Subterminal leaflets often proximally adnate in the manner of the following. Involucels lacking or much reduced. Mid summer. Mountane forests, rare: Rockies. -- swAlta-seBC, wUS.

3. A. Dawsonii Watson -- Mountain-Parsnip -- Involucre conspicuous, of bracts mostly 2-3 cm long, their margins laciniate and their base  $\pm$  petiolate. Less than 1 m high and glabrous. Leaflets 9-15, the intermediate ones often sessile and cuneate on the distal side, broadly adnate to the rachis on the proximal side. Umbel solitary, on a rather elongate peduncle 2-4 dm long. Late spring. Rare in wettish montane woods: Watterton. -- swAlta-seBC, (nwUS).

#### 17. LEVISTICUM Hill

Fruit as in Anethum; leaflets broad and distinct; flowers yellow. Involucre present.

1. L. OFFICINALE W.D.J. Koch -- Lovage (Herbe à cochons, Céleri bâtard) -- Leaflets lanceolate and entire to rhomboid and few-toothed or few-lobed towards the middle. Coarse perennial about 1 m high. Involucre of broadly membranous bracts. Involucels of broadly membranous and fused bractlets. Early summer. Sometimes planted and long persisting to slowly spreading around abandoned homesteads: Langham. -- NS, Q-O, S, (US), Eur.

#### 18. CYMPTERUS Raf.

Each achene with 4 broad wings, otherwise similar to Lomatium.



1. C. acaulis (Pursh) Raf. (Cymopteris acaulis sphalm.)-- Low herb with habit of Musineon and Lomatium, but the leaves all basal, the inflorescence more congested, the flowers white and the fruits with more wings. Perennial with a deeply buried fleshy taproot connected to the rosette by a thin and fragile pseudoscape. Leaves much dissected into linear lobes. Inflorescence congested,  $\pm$  puberulent. Involucre lacking. Involucels palmatifid, the tips of the lobes overtopping the white to pinkish flowers. Pedicels of the pistillate flowers very short, shorter than the ovary and partly adnate to the involucre. Early to mid spring. Dry hills, mainly along the major coulées. -- swMan-sAlta, US.

Previous reports of Cymopterus montanus (Nutt.) T. & G. were discussed by Scoggan 1957. The only herbarium sheet located was N. Criddle 1033, Aweme, prairie sèche, 24 mai 1909 (MT; DAO, photo) and it turned out to be the rare Lomatium orientale.

#### 19. LOMATIUM Raf.

Rather polymorphic. Typically low herbs with a taproot, the fruit dorsally flattened and winged around the edge. No involucre. Fruit nearly always at least as long as its pedicel.

- a. Leaf divided into well defined leaflets...7. L. triternatum
- aa. Leaf finely divided into numerous small ultimate segments.
  - b. Ovary and fruit densely puberulent.
    - c. Involucre simple and palmately lobed ..
      - ..... 2. L. foeniculaceum
    - cc. Involucre of several free and slender bractlets ..... 5. L. Sandbergii
  - bb. Glabrous.
    - d. Bractlets broadly oblanceolate ..... 1. L. Coûs
    - dd. Narrowly lanceolate, broadest nearer the base.
      - e. Stem glabrous ..... 6. L. dissectum
      - ee. Densely puberulent.
        - f. Stem with at least one pair of opposite leaves near the base ..
          - ..... 4. L. macrocarpum
        - ff. Stem with a single leaf in the lower half, or sometimes the leaves more numerous and alternate, rarely all basal ..... 3. L. orientale

1. L. Coûs (Watson) C. & R. (L. montanum C. & R.) -- Cous (Cahous)-- Taproot with a subglobular enlargement. Commonly glabrous. Leaves usually all basal. Flowers yellow. Primary branches of the inflorescence few and very uneven in fruit. Early spring. Dry hillsides, rare: Cypress Hills. -- swS, nwUS.



2. L. foeniculaceum (Nutt.) C. & R. var. foeniculaceum (L. daucifolium AA.; L. villosum Raf.; Cogswellia villosa (Raf.) Schultes) -- (Racine biscuit) -- Short villous throughout. Leaves all basal very finely divided, about quadripinnatifid into very numerous and narrow ultimate segments. Scape about 1 dm high. Bractlets fused into a strongly asymmetrical involu- cel, the latter peltate, palmatilobed and broadly membranous along the edges. Flowers yellow. Early to mid spring. Dry hills along major coulees. -- swMan-sAlta-(neBC), US.

There are a number of more southern varieties such as var. fimbriatum (Theobald) stat. n., ssp. fimbriatum Theobald, Brit- tonia 18: 15, 1966, with pubescent petals. Also var. inyoense (Math. & Const.) stat. n., L. inyoense Math. & Const., El Aliso 3: 120, 1955 in which the umbels are reduced to a single pedicel.

3. L. orientale C. & R. (Cogswellia orientalis (C. & R.) M.E. Jones) -- Quite similar to the above, the leaves not quite so deeply divided, the herbage puberulent, but the pedicels and fruit glabrous. Stem nearly always bearing one leaf in the low- er half. Flowers white. Early spring. Steppes on the bluffs of the Souris, rare: Minto, Aweme, Bienfait. -- swMan-seS, US.

Peucedanum nudicaule (Pursh) Nutt. as used by older authors and, presumably, by Macoun 1890, usually refers to specimens of Lomatium orientale.

4. L. macrocarpum (H. & A.) C. & R. var. macrocarpum (Cogs- wellia macrocarpa (H. & A.) M.E. Jones) -- The stout stem typi- cally bearing one pair of opposite leaves near the base. Stem 1-3 dm high. Herbage lightly to densely villous tomentose. Bractlets fused near the base. Flowers white. Fruit largest, narrowly oblong, 8-13 mm long. Spring. Steppes and hillsides, mainly along coulees. -- swMan-BC, US.

The more southern var. ellipticum (T. & G.) Jepson has longer peduncles and fruits.

5. L. Sandbergii C. & R. -- Resembles L. foeniculaceum but merely scabrous puberulent and the leaves smaller, the limb 5 cm long or less. Stem more or less clearly leafy near the base, the leaves alternate. Flowers yellow. Bractlets free, few, narrowly elongate, the larger ones often digitate at tip. Mid summer. Shale slides above timberline. Waterton. -- swAlta-seBC, nwUS.

6. L. dissectum (Nutt.) Math. & Const. var. multifidum (Nutt.) Math. & Const. (Leptotaenia multifida Nutt.) -- Tallest, 6-15 dm high and the leaves most divided, tripinnate to quadri- pinnate with the segments pinnatifid to bipinnatifid. Stem leafy, the leaves alternate, puberulent below, much less densely so to glabrous above, the plant otherwise glabrous or nearly so. Involucels strongly reflexed. Flowers yellow or purplish. Fruit elliptic, 1 cm long or less, nearly sessile or at least longer than its pedicel. (Early spring?). Sheltered montane prairies. -- swS-swAlta-sBC, nwUS.

In the more western typical phase the leaf is less finely dissected, the ultimate segments often over 2 mm wide, and the fruit is always subsessile.



7. L. triternatum (Pursh) C. & R. var. triternatum (L. nudicaule AA.; L. simplex AA., var. leptophyllum (Hooker) Mathias) -- With (3)-9-15-(35) distinct leaflets, entire, narrowly lanceolate to long linear. Stem leafless, thickened below the umbel. At least the stem, and usually the whole plant including the fruits, finely puberulent. Flowers yellow. Late spring to early summer. Low ground in regions of steppe. -- sAlta-sBC, nwUS.

The more western var. platycarpum (Torrey) Boivin is known in Canada only from the Okanagan valley. It has a larger fruit, the wings being about as wide as the body, and a less variable leaf, the narrowly linear leaflets being nearly always 9-15 in number.

Despite many Alberta reports of L. nudicaule (Pursh) C. & R., only one collection was found under that name: A.H. Brinkman 3005, near Beaver Creek, June 4, 1928 (NY; DAO, photo). It turned out to be L. triternatum.

## 20. PASTINACA L.

## PARSNIP

Fruit flattened and marginally winged in the manner of Lomatium. Involucre and involucels lacking.

1. P. SATIVA L. -- Parsnip (Panais sauvage) -- Leaves pinnately divided into a few broad leaflets. Strongly scented herb. Stem 1-2 m high, fistulose, polygonal rather than cylindric. Leaflets irregularly serrate, toothed and lobed. Flowers yellow. Mid summer. Cultivated and occasionally escaped, sometimes in great abundance. -- Y-Aka, NF-SPM, NS-BC, US, Eur.

## 21. HERACLEUM L.

## COW-PARSNIP

Peripheral flowers larger; the petals bifid. Fruit similar to Lomatium.

1. H. lanatum Mx. -- Wild Parsnip, Cow-Parsnip (Ciguë) -- Leaves trifoliate, the huge leaflets 1-4 dm wide. A huge herb in many ways, leaves, stem, umbels, etc. Biennial, 1-2 m high, the herbage copiously villous. Flowers white. Early summer. Wetter woods, usually semi-open, and frequently in the peripheral shrubbery. -- seK-Aka, L-SPM, NS-BC, nUS, (eEur).

## 22. DAUCUS L.

## CARROT

Fruit densely covered with bristles borne in rows along the nerves of the achene. Peripheral flowers larger and irregular.

1. D. CAROTA L. -- Wild Carrot, Queen-Anne's Lace (Carotte sauvage) -- Umbel with a conspicuous involucre of bracts about as long as the rays and pectinately dissected. Coarsely hirsute biennial with finely dissected leaves. Umbels strikingly contracted after flowering and until the maturity of the fruits. Flowers white, the central one often pinkish. Mid summer. Wild progenitor of the cultivated carrot, occurring with us only as a rare roadside weed: Brandon, Indian Head. --



L, NS-S, BC, US, Eur.

*Foeniculum vulgare* Miller was mentioned for Colinton, Alberta, by Groh 1947, but there is no corresponding specimen under that name at DAO and in 1950 Groh now mentions the species only for B.C. Presumably the original sheet was in the interval revised to something else.





Boivin, Bernard. 1968. "Flora of the prairie provinces: A handbook to the flora of the provinces of Manitoba, Saskatchewan and Alberta. II. Digitatae, Dimerae, Liberae (Cont.)." *Phytologia* 17, 57–112.

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