

PROVANCHERIA

3

Mémoires de l'Herbier Louis-Marie  
Faculté d'Agriculture, Université Laval

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FLORA  
OF THE  
PRAIRIE PROVINCES

by

BERNARD BOIVIN



Part II

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FLORA  
OF THE  
PRAIRIE PROVINCES

A HANDBOOK  
TO THE FLORA OF THE PROVINCES OF  
MANITOBA, SASKATCHEWAN AND ALBERTA

by

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Part II

Digitatae, Dimerae, Liberae

1968-1969

FLORA  
OF THE PRAIRIE PROVINCES

Bernard Boivin

Part II -- DIGITATAE, DIMERAE, LIBERAE

Sub-class 2. HERBIDAE                      HERBACEOUS DICOTS

Herbs, annual or perennial, the bark poorly if at all developed. Rarely woody and if so the wood formations nearly always of a rather unusual type.

The following key also includes the herbaceous groups from the Lignidae. The very few woody types in the Herbidae will similarly appear in the key to the Lignidae, part I, page 39. And a few unusual types with a corolla of fused petals will appear in the key to the Connatae in part III.

For the beginner, the task of identification can be greatly lightened by first learning to recognize some of the more characteristic and larger families and genera. The following are recommended as a start.

1. Conifers. Nearly all have leaves that remain on the branch during the winter and persist for some 4 to 6 years; these leaves are mostly long, stiff and narrow, somewhat shaped like so many needles. Other genera with similar persistent foliage needles are: Empetrum (leaves mostly subverticillate), Loiseleuria (leaves opposite) and Phyllodoce (leaves alternate); all three have the foliage variously pubescent or glandular. Two other genera, Hudsonia and Cassiope, are vaguely reminiscent of Juniperus horizontalis in the arrangement of their reduced leaves.

WOODY DICOPSIDS

2. Salicaceae. Willows and Poplars. Both the male and female flowers form elongated catkins and the small seeds have a long fluffy pappus. The largest genus, Salix, has the unique character of buds covered by a single scale which is shaped like a hood to cover the whole bud. Other genera with flowers in catkins are: Betula (winged seeds), Ostrya (seed in an inflated bladder), Myrica (fruiting catkins in a naked spike), and Alnus (fruiting catkins in a naked raceme). In two other genera, Corylus and Quercus, the male flowers are in elongated catkins, but the female flowers seem to be in glomerules rather than catkins; both have edible hard-shelled nuts for fruits.

3. Ribes (Grossulariaceae) has palmately lobed and alternate leaves; the fruit is a berry. Two other genera have the leaves palmatilobed and alternate: Rubus (petals rather large) and Physocarpus (calyx stellate-pubescent). In two other genera the leaves are similar, but opposite: Acer (fruit a pair of samaras) and Viburnum (fruit a berry).

4. Ericales. A rather variable group, but in most species the anthers are attenuate at tip into a pair of short-stubby to long-attenuate horns. Hence the old alternate name of Bicornes, now fallen into disuse. The anthers often open by pores located at tip.

#### HERBACEOUS DICOPSID

5. Compositae include many well known flowers such as Dandelions, Sunflowers and Daisies. The flowers are rather small and packed together into a head which presents the rough appearance of a flower and is often popularly so called. Often the corollas are prolonged into radiating ligules. The head is closely surrounded by one or more rings of small bracts termed tegules. This is our largest family. The petals are fused in this family and also in families 14, 15 and 16 below, while all the others have free petals. Other units with flowers in involucre heads are keyed out under Group 4.

6. Umbelliferae have flowers in umbels, that is with their pedicels all originating at the same point at the top of the common peduncle. A few other units with flowers in umbels are eliminated under Group 5.

7. Cruciferae have rather readily recognizable flowers in bractless racemes. The 4 unguiculate petals have the limbs spreading out in the shape of a maltese cross. The sepals are also free and 4 in number, but there are 6 stamens of which the outer 2 are shorter. The fruit (or silique) is also characteristic, being made of 4 united carpels, of which the inner two are sterile and fused face to face to form a central partition (or septum) while the outer two carpels form the outer walls (or valves) of the locules.

8. Leguminosae also have distinctive flowers. The sepals are fused while the 5 petals are free. As for the stamens, one is free and the 9 others are fused by their filaments. The flower is zygomorphic and it is the upper petal (termed standard) which gives the plant its most distinctive feature. This standard is somewhat larger than the other petals which it overlaps and its limb is bent outwardly and spreads out fan-wise. The leaves are alternate and pinnate or trifoliate. The leaflets are entire or merely serrulate. A large and readily recognized family once a few of its members are known, such as: Caragana, Pea, Clover or Bean. A few other families have zygomorphic corollas of free petals; they are keyed out under Group 9a.

9. Rosaceae. A rather heterogeneous family, but most of its herbaceous members have a double calyx with 10 lobes in two series. The inner series of 5 lobes is apparently the main one. The 5 other lobes are attached to the outside of the calyx tube and they alternate with the inner lobes. A double calyx is also found in the Malvaceae, but the latter are readily recognized by their stellate pubescence.

10. Polygonaceae. Its two larger genera are readily spotted by their unique features. In Polygonum there are two shea-

thing structures at each node. The inner and larger one, termed *ocrea*, is tubular and usually membranaceous. The outer structure is the more or less sheathing leaf-base and usually it is mostly adnate to the *ocrea*. An *ocrea* is also present in Rumex. And the latter has free sepals which persist in fruit, the 3 inner ones becoming much enlarged to form a three-winged structure with the seed hidden in the middle. The mid-nerve of some of the sepals is often enlarged into a seed-like "grain".

11. Onagraceae have a superficial resemblance to the Cruciferae because of their 4 free petals, but the ovary is obviously inferior and there are 8 stamens. A few other families have free petals and semi-inferior ovary, but their flowers are normally 5-merous.

12. Caryophyllaceae have opposite leaves and a rather rare type of inflorescence termed dichasium. In this type the stem ends in a single terminal flower and a pair of branches arise from the axils of the upper pair of leaves or bracts. These branches in turn end in a terminal flower and produce a secondary pair of branches from the axils of the upper bracts. And so on.

13. Ranunculaceae. Very heterogeneous, but represents a basic type of Flowering Plants. About half the species are in Ranunculus, a rather good example of primitive floral type. In this genus all the parts are free and the flower is regular; the basic number is 5 but the actual number may vary somewhat. There are commonly 5 sepals, 5 petals, many stamens and a great many achenes. The receptacle is clearly elongate and the leaves are alternate. Other genera in this family are variations of this basic type; thus Anemone has a simple perianth and opposite or verticillate leaves.

14. Labiatae are herbs with square stems, opposite leaves and obviously bilabiate flowers. The ovary is 4-lobed and matures into 4 distinct nutlets; that is, each lobe matures into a distinct nutlet.

15. Boraginaceae have flowers and fruits rather similar to the Labiatae, but the leaves are alternate, the stem is not square and most species are rather coarsely pubescent or bristly-pubescent, the larger hairs being usually inflated at base.

16. Scrophulariaceae. A rather diverse agglomeration, but most of its types resemble Labiatae with their square stems, opposite leaves and tubular, zygomorphic flowers. However, the fruit is a bilocular capsule and is not 4-lobed.

#### MONOPSIDS

17. Gramineae. A highly specialized family, not to be confused with anything else. It contains the Bluegrass from our lawns, the Brome from the roadsides and the Oats and other cereals from our fields. The family has many unique features. The stem is of the Bamboo type, that is round and hollow, with an occluding plate at each node. The leaf arises from the top of a long sheathing base. The flower is reduced to 3 stamens and an ovary. Each flower is enclosed by 2 chaffy bracts termed

lemma and palea. The flowers are gathered in short distichous spikelets. Each spikelet is subtended by a pair of chaffy bracts termed glumes.

18. Cyperaceae have a superficial resemblance to Gramineae: chaffy bracts in the inflorescence and narrow leaves with sheathing bases, but the stem is solid and nearly always triangular while the floral organization is very different. Actually there are many types of floral organization in this family but Carex, the largest genus, is readily recognized by its female flower reduced to a mere ovary and enveloped by a bottle-shaped bract termed utricule. The flowers are unisexual and borne in spikes.

19. Juncaceae is also a family of grass-like plants but here the flower is reduced only in size. It is like the flower of the Liliaceae except that the 6 perianth parts are small and chaffy.

20. Orchidaceae. This is another highly specialized family with many unique features. The ovary is inferior and the flower is strongly zygomorphic with the lower petal (termed labellum) generally larger and produced forward like a small landing stage. The style and the only stamen (2 in Cypripedium) are fused together into a rather unusual structure termed gynostemium.

21. Liliaceae have a basic and quite unspecialized type of flower with 3 free sepals, 3 free petals, 6 free stamens and a 3-locular superior ovary. The flowers are usually showy and the petals and sepals tend to be similar.

22. Potamogetonaceae are common submerged aquatics with entire leaves and spikes of insignificant flowers or achenes protruding above the surface of the water. No other plant matches this behaviour.

The 22 families characterized above comprise better than 85% of our flora and learning to recognize them should reduce the task of identification by more than half.

## GENERAL KEY TO THE HERBACEOUS DICOPSIDS

- a. Plants of unusual behaviour: climbing  
or parasitic on other plants ..... Group 1
- aa. Self-supporting plants.
  - b. Flowers normally lacking or replaced  
by unusual structures such as bulblets,  
tufts of leaves, etc ..... Group 2
  - bb. Flowers normally present.
    - c. Leaves vestigial, or peltate, or  
carnivorous, or submerged and  
finely dissected, thus the plant  
is more readily identified by its  
foliage ..... Group 3
    - cc. Plants more ordinary in their foliage  
and their general presentation and  
more readily identified by their  
flowers.
      - d. Inflorescence highly reduced  
and condensed into an involucreted  
head (or cyathium etc.) which has  
more or less come to function as  
a single flower. The individual  
flowers in the head may be highly  
reduced ..... Group 4
      - dd. Flowers individualized.
        - e. Flowers in umbells ..... Group 5
        - ee. Not in umbells.
          - f. Flowers more or less  
reduced.
            - g. Perianth lacking ..... Group 6
            - gg. Perianth present  
but the flowers  
all unisexual ..... Group 7
          - ff. Perianth present and  
flowers all or mostly  
perfect.
            - h. Perianth simple ..... Group 8
            - hh. Perianth double.
              - i. Petals free ..... Group 9
              - ii. Petals  $\pm$  fused ..... part III

## Group 1

Climbing or parasitic plants. Other climbers, besides those keyed out below, occur in the Lignidae and Monopsida: Smilax (leaves entire and alternate), Lonicera (leaves entire and opposite), Vitis (palmately lobed) and Parthenocissus (digitate). Another root parasite occurs in the Monopsida: Coralorhiza (flowers spicate).

- a. Both parasitic and climbing by its yellow,  
leafless, twining stem ..... Cuscuta, part III

- aa. Either parasitic or climbing.
  - b. Climbing only.
    - c. Climbing by tendrils.
      - d. Leaf simple ..... 33. Cucurbitaceae, part I-149
      - dd. Leaf compound ..... 16. Leguminosae, part I-71
    - cc. Climbing by twining stems or petioles
      - e. Leaves compound.
        - f. Stem twining.
          - g. Leaflets 3 .... Amphicarpa, part I-104
          - gg. Much more numerous .... Adlumia, p. 42
          - ff. Petioles twining ..... Clematis, p. 23
      - ee. Leaves simple, entire to deeply lobed.
        - h. Leaf peltate ... 65. Menispermaceae, p. 39
      - hh. Not peltate.
        - i. Leaves opposite ..
          - ..... 24. Cannabinaceae, part I-133
        - ii. Leaves alternate.
          - j. Leaves triangular to hastate.
            - k. Flowers large, solitary ..
              - ... 94. Convolvulaceae part III
            - kk. Flowers small, in loose racemes ..
              - ..... Polygonum, p. 109
          - jj. Leaves ovate to cordate to trilobed .... Solanum, part III
  - bb. Parasitic only.
    - l. Parasitic on branches ..
      - ..... 46. Loranthaceae, part I-173
    - ll. Parasitic on roots.
      - m. Perianth of free parts ..... 42. Monotropaceae, part I-171
      - mm. Corolla of fused petals ..... 96. Orobanchaceae, part III

## Group 2

Lacking flowers or flowering very rarely. Also normally sterile are two groups in the Monopsida: Lemnaceae (very small, free floating aquatics) and Anacharis (submerged, leaves entire and verticillate or opposite).

- a. Flowers replaced by fleshy bulblets.
  - b. Bulblets in a terminal spike ..... Polygonum, p. 109
  - bb. Bulblets axillary ..... Lysimachia, p. 135
- aa. No bulblets.
  - c. Leaves entire. Shore plants ..... Hippuris, p. 140
  - cc. Leaves serrate to finely divided.
    - d. Leaves opposite or verticillate.
      - Aquatics.



- e. Ultimate segments filiform  
and entire ..... Bidens, part III
- ee. Ultimate segments flattened  
and serrulate ..... 62. Ceratophyllaceae, p. 62
- dd. Leaves alternate.
  - f. Leaves finely dissected;  
terrestrial ..... Artemisia, part III
  - ff. Leaves serrulate; submerged  
aquatic ..... Potamogeton crispus, part IV

## Group 3

Leaf or stem modified in some vary unusual manner. Note also in the Monopsida, the Lemnaceae (very small, free floating aquatics).

- a. Leaves vestigial or lacking. Stem  
thick and fleshy.
  - b. Ferociously spiny ..... 34. Cactaceae, part I-149
  - bb. Spineless ..... Salicornia, p. 127
- aa. Leaves present.
  - c. Leaves peltate.
    - d. Polygonal and marginally  
peltate ..... 65. Menispermaceae, p. 39
  - dd. Elliptic and centrally  
peltate ..... 61. Cabombaceae, p. 36
- cc. Not peltate.
  - e. Carnivorous bog plants. Note  
also Utricularia under ee.
    - f. Leaf hollowed out, shaped  
like a "horn of plenty"  
and half-filled with  
water ..... 89. Sarraceniaceae, p. 159
    - ff. Leaf covered with long,  
capitate processes,  
like very coarse hairs,  
reddish and sticky .... 88. Droseraceae, p. 158
  - ee. Submerged aquatics with the leaves  
dissected into filiform segments.
    - g. Leaves alternate.
      - h. Leaf base narrow .... Utricularia, part III
      - hh. Leaf base dilated  
by the adnate  
stipules ..... Ranunculus, p. 24
    - gg. Leaves opposite or verticillate.
      - i. Pectinately divided... Myriophyllum, p. 139
      - ii. Dichotomously divided.
        - j. Ultimate segments  
filiform and  
entire ..... Bidens, part III
        - jj. Ultimate segments  
flattened and ser-  
rulate ... 62. Ceratophyllaceae, p. 62

## Group 4

Flowers in dense heads and each head surrounded by one or more rings of bracts. In the Monopsida a parallel variation occurs in the Araceae where a very dense spike of florets is subtended by a spathe.

- a. The one ovary per head borne on a long stipe and exerted from the head ..... 37. Euphorbiaceae, part I-154
- aa. Ovaries numerous and hidden among the bases of the florets.
  - b. Florets obviously pedicellate and more or less exerted from the involucre ..... Eriogonum, p. 103
  - bb. Florets sessile or nearly so.
    - c. Flowers strongly bilabiate.
      - d. Involucre of trifoliate leaves ..... Trifolium, part I-79
      - dd. Involucre of simple bracts ..... 106. Labiatae, part III
    - cc. Flowers  $\pm$  actinomorphic or ligulate.
      - e. Head subtended by a reflexed tubular sheath, that is by a sheath attached at the base of the head and directed downwards, with the open end at the lower end .. ..... 81. Plumbaginaceae, p. 137
      - ee. No sheath, reflexed or otherwise.
        - f. Flowers 5-merous, often ligulate... 113. Compositae, part III
        - ff. Flowers 4-merous, never ligulate.
          - g. Leaves alternate, spiny-toothed ..... Eryngium, p. 162
          - gg. Opposite and not spiny.
            - h. Leaves entire .. ..... 109. Plantaginaceae, part III
            - hh. Leaves pinna-tifid... 112. Dipsacaceae, part III

## Group 5

Flowers in umbels.

- a. Ovary inferior.
  - b. Fruit a berry; petioles not sheathing at base ..... 28. Araliaceae, part I-138
  - bb. Fruit a diachene; petioles dilated

- into a  $\pm$  sheathing base ..... 90. Umbelliferae, p. 159
- aa. Ovary superior.
- c. Stem leafless except for the bracts of the involucre.
- d. Flowers 3-merous ..... Eriogonum, p. 103
- dd. Flowers 5-merous ..... 80. Primulaceae, p. 130
- cc. Stem leafy.
- e. Leaves compound.
- f. Leaves trifoliolate ..
- ..... 101. Oxalidaceae, part III
- ff. Leaves pinnate ..... Erodium, part III
- ee. Leaves simple.
- g. Inflorescences arising out of the internodes ..... Solanum, part III
- gg. Umbels terminal or axillary.
- h. Umbels in a terminal leafy corymb ..... 37. Euphorbiaceae, part I-15h
- hh. Umbels solitary, mostly axillary.
- i. Leaves entire ..
- ..... 53. Asclepiadaceae, part I-180
- ii. Leaves serrate ..
- ..... Chimaphila, part I-168

## Group 6

Flowers without perianth.

- a. Leaves opposite ..... 85. Callitrichaceae, p. 146
- aa. Leaves verticillate ..... Hippuris, p. 140

## Group 7

Flowers unisexual. Species with some unisexual flowers mixed with the perfect ones are not included in this key.

- a. Leaves ternately compound ..... 60. Ranunculaceae, p. 14
- aa. Leaves simple to pinnately divided.
- b. Stem-leaves pinnatipartite ..
- ..... 91. Valerianaceae, part III
- bb. Leaves entire to lobed.
- c. Flowers verticillate in terminal spikes; ocrea present ..... Rumex, p. 104
- cc. No ocrea; flowers variously disposed.
- d. Style one ..... 23. Urticaceae, part I-132
- dd. Styles 2-3.
- e. Sepals and bracts herbaceous..
- ..... 78. Chenopodiaceae, p. 118
- ee. Sepals and bracts scarious ..
- ..... 79. Amaranthaceae, p. 129

## Group 8

Flowers perfect, or in large part perfect and mixed with some unisexual flowers. Perianth made up of a single verticil,

often termed tepals; a second verticil is sometimes present, but vestigial or falling off very early and normally lacking in herbarium specimens. The key includes some groups in which both verticils are present, but are so much alike as to seem only one.

- a. Flowers zygomorphic.
  - b. Leaves compound ..... Adlumia, p. 42
  - bb. Leaves simple.
    - c. Leaves deeply divided.
      - d. Leaves palmatifid .... 60. Ranunculaceae, p. 14
      - dd. Leaves pinnatipartite ..
        - ..... 91. Valerianaceae, p. III
    - cc. Leaves merely serrate.
      - e. Perianth petaloid and conspicuous ..... 102. Balsaminaceae, part III
      - ee. Perianth reduced to a green bract ..... Besseya, part III
  - aa. Flowers regular.
    - f. Ovary superior ..... Group 8A
    - ff. Ovary inferior.
      - g. Stemless creeping herb with 2 leaves and a single flower ..... 66. Aristolochiaceae, p. 40
      - gg. Stem present; leaves and flowers more numerous.
        - h. Leaves verticillate ..... Galium, part I-185
        - hh. Alternate or opposite.
          - i. Alternate ..... 47. Santalaceae, part I-173
          - ii. Opposite ..... Chrysosplenium, p. 156

## Group 8A

Group 8 with a regular flower and a superior ovary.

- a. Calyx segments fused below; leaves opposite.
  - b. Leaves obtuse or rounded at tip ..... Glaux, p. 136
  - bb. Leaves sharply acuminate ..... 77. Illecebraceae, p. 117
- aa. Perianth of free parts.
  - c. Carpels numerous and free .... 60. Ranunculaceae, p. 14
  - cc. Carpels more or less fused.
    - d. Carpels 5, fused below the middle, obviously free above ..... Penthorum, p. 148
    - dd. Carpels completely fused into a single compound ovary.
      - e. Flowers large and showy, the petals at least 1 cm long ..
        - ..... 67. Papaveraceae, p. 40
      - ee. Much smaller.
        - f. Flower 3-merous; ocrea mostly present .... 76. Polygonaceae, p. 102
        - ff. 4-5 merous, no ocrea.
          - g. Leaves opposite ..
            - ..... 74. Caryophyllaceae, p. 81

gg. All or mostly alternate,  
rarely vestigial.

h. Floral parts in 4's ..

..... Lepidium, p. 49

hh. In 5's...78. Chenopodiaceae, p. 118

Group 9

Sepals and petals present, the latter free.

- a. Flower zygomorphic ..... Group 9A
- aa. Flower regular.
  - b. Sepals usually fused; ovary inferior or  
semi-inferior, or superior ..... Group 9B
  - bb. Sepals free; ovary superior.
    - c. Sepals 2.
      - d. Leaves entire .....75. Portulacaceae, p. 100
      - dd. Serrate to deeply divided ..  
..... 67. Papaveraceae, p. 40
    - cc. Sepals 3 or more.
      - e. Carpels numerous and free.
        - f. Leaves peltate .... 61. Cabombaceae, p. 36
        - ff. Not peltate ..... 60. Ranunculaceae, p. 14
      - ee. Carpels fused into a single  
compound ovary ..... Group 9C

Group 9A

Flowers zygomorphic.

- a. Flowers spurred.
  - b. Sepals petaloid.
    - c. Leaves remotely serrulate ..  
..... 102. Balsaminaceae, part III
    - cc. Leaves deeply and palmately divided ..  
..... Delphinium, p. 17
  - bb. Sepals green ..... 31. Violaceae, part I-142
- aa. Not spurred.
  - d. Petals deeply and palmately lobed ..  
..... 72. Resedaceae, p. 80
  - dd. Entire or nearly so.
    - e. Sepals fused into a campanulate  
to tubular calyx ..... 16. Leguminosae, part I-71
    - ee. Sepals free or practically so.
      - f. Sepals petaloid ..... Aconitum, p. 19
      - ff. Sepals green ..... 70. Capparidaceae, p. 44

Group 9B

Flower regular; sepals usually fused.

- a. Carpels more than 2 and obviously free or nearly so.
  - b. Foliage very fleshy; calyx not double .... Sedum, p. 147
  - bb. Not fleshy; calyx often double ..  
..... 15. Rosaceae, part I-45

- aa. Carpels only 2 or fused.
- c. Carpels clearly 2, (rarely 3), more or less fused ventrally, but the tip and the styles always free ..... 87. Saxifragaceae, p. 148
  - cc. Carpels completely fused into a single compound ovary.
    - d. Calyx-lobes 2 ..... 75. Portulacaceae, p. 100
    - dd. More than 2, usually 4 or 5.
      - e. Ovary inferior.
        - f. Leaves compound ..... Agrimonia, part I-67
        - ff. Leaves simple.
          - g. Petals 10 ..... 69. Loasaceae, p. 43
          - gg. Petals 4-6.
            - h. Petals 4... 84. Onagraceae, p. 140
            - hh. Petals 6... 82. Lythraceae, p. 138
    - ee. Ovary superior.
      - i. Stem leafy, the leaves alternate ..... 36. Malvaceae, part I-151
      - ii. Leaves opposite, or verticillate, or mostly basal.
        - j. Leaves verticillate .. ..... Chimaphila, part I-168
      - jj. Leaves opposite or mostly basal.
        - k. Leaves and bracts opposite.
          - l. Inflorescence a dense spike of opposite glomerules .. ..... 82. Lythraceae, p. 138
        - ll. Inflorescence not spiciform .. .. 74. Caryophyllaceae, p. 81
      - kk. Leaves all or mostly basal; bracts alternate.
        - m. Inflorescence branched .... Limonium, p. 137
      - mm. Simple, a raceme or a single flower.
        - n. Stamens 5; staminodes 5 or more; flower solitary .. ..... Parnassia, p. 157
        - nn. Stamens 10; no staminodes; flowers usually numerous .. ... 41. Pyrolaceae, part I

## Group 9C

Sepals and petals free; sepals more than 2; single ovary.

An unusual Monopsid with a single verticil of 3 entire leaves, Trillium part IV, may key out here.

- a. Flowers in bractless racemes, rarely with one or a few bracts at the base of the raceme ..... 71. Cruciferae, p. 45
- aa. Flowers basal, or axillary, or in bracted inflorescences.
  - b. Leaves simple and entire.
    - c. Aquatic plant with large floating leaves and flowers ..... 63. Nymphaeaceae, p. 37
    - cc. Terrestrial or shore plants with a well defined stem.
      - d. Leaves alternate ..... 99. Linaceae, part III
      - dd. Leaves opposite.
        - e. Flowers axillary... 73. Elatinaceae, p. 80
        - ee. Flowers terminal or in terminal inflorescences.
          - f. Foliage dotted with black or clear dots; flowers mostly yellow .. ..... 38. Hypericaceae, part I-156
          - ff. Foliage not dotted; flowers not yellow .. ..... 74. Caryophyllaceae, p. 81
    - bb. Leaves lobed to compound.
      - g. Leaves pinnate or merely lobed .. ..... 100. Geraniaceae, part III
      - gg. Leaves ternately compound or digitate.
        - h. Leaves trifoliate or digitate.
          - i. Flowers racemose .. ..... 70. Capparidaceae, p. 44
          - ii. Flowers in axillary pairs or in cymes .... 101. Oxalidaceae, part III
        - hh. Ternately divided into numerous leaflets.
          - j. Flowers in a raceme ..... Actaea, p. 16
          - jj. Flowers in a few-flowered panicle ..... Caulophyllum, p. 38

#### Order 34. RANALES

Receptacle elongate, often cylindric or even long linear, with the floral parts spirally arranged rather than verticillate. Flower typically regular, with all parts free, mostly in 5's, but often of a different mery, or variable in number, or very numerous.

- a. Submerged aquatics with verticillate leaves ..... 62. Ceratophyllaceae, p. 62
- aa. Leaves alternate or opposite.

- b. Terrestrial or aquatics without floating leaves or with variously dissected floating leaves ..... 60. Ranunculaceae, p. 14
- bb. Aquatics with entire floating leaves.
  - c. Carpels free ..... 61. Cabombaceae, p. 36
  - cc. Carpels fused ..... 63. Nymphaeaceae, p. 37

## 60. RANUNCULACEAE (CROWFOOT FAMILY)

The typical family of the order, more or less fitting the description of the latter.

- a. Climbers with opposite leaves ..... 10. Clematis
- aa. Non-climbers.
  - b. Flower spurred.
    - c. Only 1 spur ..... 6. Delphinium
    - cc. Spurs 5.
      - d. Small herb with entire leaves ..
        - ..... 11. Myosurus
      - dd. Taller and the leaves compound ..
        - ..... 5. Aquilegia
  - bb. Not spurred.
    - e. Flower very irregular ..... 7. Aconitum
    - ee. Flower quite regular.
      - f. Perianth simple, closely subtended by a calyx-like involucre of 3 verticillate bracts ..... 9. Hepatica
      - ff. No such involucre.
        - g. Stem-leaves opposite or verticillate ..... 8. Anemone
        - gg. Leaves alternate or all basal.
          - h. Carpel solitary, maturing into a berry ..... 4. Actaea
          - hh. Carpels 2 or more; fruit not fleshy.
            - i. Perianth double, of distinct sepals and petals ..... 12. Ranunculus
            - ii. Perianth simple, of more or less petaloid sepals.
              - j. Leaf simple.
                - k. Leaf entire to toothed ..... 1. Caltha
                - kk. Leaf palmately lobed ..... 2. Trollius
              - jj. Leaf compound.
                - l. Trifoliolate ..... 3. Coptis
                - ll. Leaflets more numerous..... 13. Thalictrum



1. CALTHA L. MARSH MARIGOLD

Perianth simple, of 5-10 petaloid sepals. Fruit a group of follicles.

- a. Plant bearing only 1-(2) flowers and only one stem leaf or none ..... 1. C. leptosepala  
 aa. Flowers and stem leaves more numerous.  
 b. Sepals 1-2 cm long, follicles 13-16 mm long ..... 2. C. palustris  
 bb. Sepals and follicles much smaller ..... 3. C. natans

1. C. leptosepala DC. var. leptosepala -- Elkslip -- Large flower usually with 7-8 oblong-lanceolate tepals, yellowish-white ventrally, yellowish to bluish dorsally. Stem or scape erect, 1.0-2.5 dm high. Leaves broadly ovate, deeply cordate, crenate. Late spring to mid summer. Wet places above timberline. -- Y-Aka, Alta-BC.

Further south, in Idaho, there is a local var. sulfurea C.L. Hitchc. in which the sepals are of a straight yellow colour.

2. C. palustris L. var. palustris -- Cowslip, King-Cup (Souci d'eau) -- A coarse herb with a few large leaves, very conspicuous in the spring with its large yellow flowers. Leaves deltoid-reniform, dentate. Tepals 1-2 cm long, elliptic. Carpels 4-8. Late spring. Wet or boggy places. -- seK-Mack, NF, NS-Alta, US, Eur.

To the west and northwest of us our variety grades into a poorly defined var. asarifolia (DC.) Huth in which the inflorescence leaves are more coarsely and less abundantly dentate than the basal ones. Also, the stem is often arching and may become rooting in the inflorescence. All Alaska reports presumably belong to var. asarifolia.

3. C. natans Pallas -- More or less creeping on mud or in shallow water. Generally smaller and often more leafy. Flowers cream, 6-12 mm across. Carpels numerous, 4-5 mm long. Summer. Muddy shores and shallow waters. -- swK-Aka, wO-eBC, US, (Eur).

2. TROLLIUS L. GLOBE-FLOWER

Much as in Caltha, but the leaves palmately divided and the flower with a ring of staminodia between the stamens and the tepals. Staminodia often large and petaloid.

1. T. laxus Sal. (T. albiflorus (Gray) Rydb.) -- Globe-flower -- Showy herb with large cream-coloured flowers. Stem with 2-3 leaves, these subsessile and palmatipartite. Tepals 1-2 cm long. Flower solitary at the end of the stem. Early to mid-summer. Moister places in alpine and subalpine meadows. -- Alta-BC, US.

3. COPTIS Sal. GOLDTHREAD

Like Trollius, but the follicles stipitate and the leaf compound.

1. C. trifolia (L.) Sal. (C. groenlandica (Oeder) Fern.) -- Goldenthread (Savoyane) -- Ovaries and follicles long stipitate, the stipe often as long as the body of the fruit. Long stoloniferous with a thin yellow rhizome. Leaves all basal, trifoliate, crenate, often trilobed. Flower white, with (4)-5-(6) tepals less than 1 cm long. Late spring. Coniferous forests. --G-(F)-K, Aka, L-SPM, NS-BC, US, (Eur).

Plants from our area and eastward are usually distinguished as C. groenlandica. The distinction is a very easy one to implement since there appears to be a distributional gap in the region of the Rockies. But like Hultén 1944, we have been unable to give a morphological basis to this distinction.

## 4. ACTAEA L.

## BANE BERRY

Flowers with a single carpel which matures into a berry. Both sepals and petals present, petaloid and caducous. Leaf much compound.

1. A. rubra (Aiton) W. var. rubra -- Poisonberry, Snakeberry (Poison de couleuvre, Pain de couleuvre) -- Stem simple, bearing 2-3 large leaves, 2-4 times ternate. Flowers white, small, all gathered in a terminal raceme. Raceme ovoid or oblong. Peduncle about 2-4 times as long as the fruiting raceme. Fruit red. Early summer. Rich woods, mostly along water-courses. -- (K)-Mack-Y-Aka, L-NF, NS-BC, US -- F. neglecta (Gillman) Rob. (A. alba AA.) -- Fruits white. Quite common. -- Mack, L-NF, NS-Alta, US -- Var. arguta (Nutt.) Lawson -- Inflorescence elongate, often with one flower borne well down the peduncle or with a flower or reduced raceme in the axil of the upper leaf. Peduncle 1-2 times as long as the fruiting raceme. Berry red. - Y-Aka, sAlta-BC, US -- F. gburnea (Rydb.) Boivin. -- Berries white, otherwise as var. arguta. Rather common. -- swAlta-BC, US.

## 5. AQUILEGIA L.

## COLUMBINE

All 5 petals long-spurred. Sepals 5, petaloid. Inner stamens reduced to staminodes. Fruit a group of follicles. Leaves ternately compound.

- a. Scape leafless and 1-flowered ..... 2. A. Jonesii  
 aa. Taller and many-flowered.  
 b. Flowers blue ..... 1. A. brevistyla  
 bb. Flowers red or yellow.  
 c. Flowers yellow, the sepals sometimes tinged red ..... 5. A. flavescens  
 cc. Flowers red.  
 d. Sepal erect, shorter than the spur ..... 3. A. canadensis  
 dd. Spreading, longer than the spur ..... 4. A. formosa

1. A. brevistyla Hooker -- A forest species with blue flowers bearing 5 spurs. Basal leaves twice ternate, the stem-leaves smaller. Flower with a yellow center. Spurs short, 6-7 mm long, strongly recurved. Styles short, 3-4 mm long. Late spring and early summer. Wooded shores. -- Mack-Aka, wO-BC, (US).
2. A. Jonesii Parry -- Low and very small, 1 dm high or less. Scape leafless and 1-flowered. Leaves strongly glaucous. Leaflets small, 1 cm wide or less, crowded. Flowers blue to somewhat purplish. Spurs straightish, 8-15 mm long. Staminodia lacking. Follicles glabrous and glaucous. Styles about 12 mm long. (Early summer?). High alpine, in rocky places: Waterton. -- Alta, (US).
3. A. canadensis L. var. eminens (Greene) Boivin (var. hybrida AA.) -- Wild Columbine, Meetinghouse (Glands, Gants de Notre-Dame) -- Flowers purple-red, with erect sepals, Stem 5-10 dm high. Flower center yellow. Spurs 12-20 mm long. Styles 9-13 mm long. Late spring and early summer. Galerie-forests. -- wO-ecS, US.

In the more eastern var. canadensis the spurs are longer, 20-25 mm long.

Our variety has been usually called var. hybrida Hooker, but the type of the latter comes from much farther west in the Rocky Mountains. This prompted us to examine it in 1950 and, for sure, it proved to be a specimen typical of A. brevistyla.

4. A. formosa Fischer var. formosa -- Wild Columbine -- Like the preceding, but showier, the sepals being widely spreading. Flower red. Sepals 12-28 mm long. Petals with a red spur, 10-20 mm long, and a very short yellow blade, 2-4-(6) mm long. Styles 10-15 mm long. First half of summer. Mountain woods. -- (Y)-Aka, swAlta-BC, US.

In the more southern var. truncata (Fisch. & Mey.) Jones the blades of the petals are even shorter, only 1-2 mm long. Two other varieties are also known from California.

5. A. flavescens Watson var. flavescens -- Yellow Columbine -- Quite similar to A. formosa, but the flower entirely yellow. Blade of the petal longer, 6-10 mm long. Styles a bit shorter, 8-10 mm long. Early summer. Open mountain woods. -- swAlta-BC, US -- Var. miniana Macbr. & Pays. -- Seemingly intermediate to A. formosa, the sepals being pink-tinged to salmon. But the petals yellow, with a long blade, as in var. flavescens. -- swAlta-BC, US.

Var. miniana has also been regarded as in interspecific hybrid of A. flavescens X formosa.

#### 6. DELPHINIUM L.

#### LARKSPUR

One sepal long-spurred. Sepals 5, petaloid; petals 4; the flower strongly irregular. Fruit a group of follicles. Leaves palmately divided.

- a. Middle and upper leaves sessile or nearly so ..... 3. D. Ajacis  
 aa. Stem leaves long-petioled.  
 b. Low, with only 1-(3) stem leaves ..... 1. D. bicolor  
 bb. Tall and very leafy ..... 2. D. Brownii

1. D. bicolor Nutt. (D. depauperatum Nutt.; D. Nuttallianum Pritzel) -- Prairie Larkspur -- Stem 1-6 dm high, more or less puberulent to villous above and into the inflorescence. Leaf palmatipartite into narrow segments. Inflorescence usually simple and few-flowered. Flowers blue, but the upper two petals whitish with conspicuous purple nerves. Late spring to mid summer. Montane prairies and open woods in the Rockies and the Coteau Boisé. -- swS-BC, US -- F. DeVriesii Boivin -- Flowers white. Cypress Hills. -- seAlta-sBC.

Rather variable as to pubescence, development of tuberous roots, size of tepals and depth of colouring, etc. Accordingly it is often subdivided into a series of microspecies.

2. D. Brownii Rydb. (D. glaucum AA., D. scopulorum AA.) -- Larkspur, (Pied d'alouette) -- Taller, the stem 0.5-2.0 m., glabrous throughout, even usually the inflorescence. Leaves numerous, palmatifid, the segments rhomboid-lanceolate and coarsely lobed. Inflorescence a long, narrow panicle of racemes. Flowers blue, the upper two petals yellow-white along the upper edge. Mid summer. Wetish, open woods; commonly cultivated and sometimes escaping. -- Q-BC, (US) -- F. pallidiflorum Boivin -- Flowers nearly white. Has been collected near Banff. -- Alta.

Native in light woods and openings from about the center of Saskatchewan westward. Commonly cultivated and escaping fairly readily. The known Manitoba collections are LePas 1955 and 1957, Clear Lake 1958 and Fort de Pierre in 1959. All at DAO.

D. elatum L., with the habit of the above and 4 blackish petals long-bearded in yellow, is sometimes cultivated. A collection from a coniferous forest in the Cypress Hills (UAC: DAO, photo) probably represents a planting in the wild.

3. D. AJACIS L. -- Larkspur (Bec d'oiseau, Pied d'alouette) -- Annual. Leaves numerous, ternately and pinnately divided into numerous filiform segments about 1 mm wide. Inflorescence a raceme or panicle of racemes. Flower colour variable. Petals only 2, fused. Carpel solitary, pubescent. Summer. Dumps and roadsides. -- (NS), Q-Man, BC, US, Eur.

Near D. Consolida L. and often confused with it. The latter has a glabrous ovary and a vaguely corymbose inflorescence.

A species common on the Coteau de Prairie not too far south of our borders, D. virescens Nutt., has also been reported from 3 localities in Manitoba: Lake Winnipeg Valley, Winnipeg and Netly, but we are yet unconvinced. Lake Winnipeg Valley on a Bourgeau collection is a pretty broad geographical term that covers much of Manitoba plus adjacent parts of Ontario

and of the U.S.A. There is also a Houghton collection labelled Winnipeg (HUH; DAO, photo) and it is correctly identified, but to our knowledge Houghton never came to collect in Canada; an error of labels seems likely here. We have not yet traced the Netly collection and remain sceptical in the meantime.

## 7. ACONITUM L.

MONKSHOOD

Flower very irregular. Sepals 5, petaloid, the upper one much larger and strongly concave (hooded). Petals poorly developed, usually 8, of which 2 are larger than the others. Fruit a group of follicles.

1. A. delphinifolium DC. var. delphinifolium -- Much like Delphinium in foliage and general presentation, but the flower is not spurred. Instead, the upper sepal is larger than the others and covers them like a hood. Flower purple, drying deep blue. Mid summer. Mountain meadows. -- Mack-Aka, Alta-BC, US.

Two other varieties occur in Alaska, of which var. Chamissonis (Rchb.) Boivin is a taller plant with broader leaf segments, while var. paradoxum Rchb. is also taller and its larger flowers are few or commonly only one.

## 8. ANEMONE L.

Leaves opposite or verticillate. Perianth simple, usually petaloid. Fruit a group of achenes. Receptacle often very much elongated. The upper pair of leaves is sometimes treated as a remote involucre.

- a. Flowers large, the tepals 2-4 cm long; style elongating to 2-5 cm in fruit.
  - b. Stem-leaves sessile and ± palmately divided ..... 10. A. patens
  - bb. Stem-leaves short-petioled and pinnately divided, with an elongated leaf-rachis ..  
..... 9. A. occidentalis
- aa. Flower smaller; style not elongating.
  - c. Stem leaves with a long and wingless petiole.
  - d. Stoloniferous and 1-2 dm high ..... 8. A. nemorosa
  - dd. Tufted and much taller.
    - e. Leaf-lobes serrate on one side for at least half their length ..... 6. A. virginiana
    - ee. Merely coarsely toothed towards the tip ..... 5. A. cylindrica
  - cc. Stem-leaves sessile or with a winged petiole.
    - f. Stem-leaves with a winged petiole and divided into numerous narrow and entire segments.

- g. 2 dm high or less and one-flowered ..... 4. A. Drummondii  
 gg. Much taller and usually many flowered ..... 3. A. multifida  
 ff. Sessile or nearly so, the segments mostly broader and more or less toothed.  
 h. Main stem-leaves 4-10 cm long ..  
 ..... 7. A. canadensis  
 hh. Stem-leaves smaller.  
 i. Carpels heavily lanate; tepals white, more or less bluish dorsally ..... 1. A. parviflora  
 ii. Carpels glabrous; tepals yellow ..... 2. A. Richardsonii

1. A. parviflora Mx. -- Stem bearing only 3 verticillate leaves, the latter sessile and deeply palmately lobed, the lobes ± oblanceolate. Tufted, the basal leaves trifoliate or nearly so. Tepals white to creamy, more or less bluish dorsally when young. Achenes heavily long-lanate. Style erect, about 1 mm long. Late spring and early summer. River flats and open woods. -- F-Aka, L-NF, NB-Q-(O)-Man-BC, US, Eur.

2. A. Richardsonii Hooker -- Similar to the preceding. Stoloniferous. Basal leaves trilobed, the lobes broadly obovate. Stem leaves similar, subsessile. Flowers yellow. Achenes glabrous. Style elongating in fruit, becoming about 5 mm long, more or less reflexed, hooked or curled at tip. Late spring to mid-summer. Wet bogs. -- (G-K)-Mack-Aka, Q, Man-BC.

3. A. multifida Poiret -- Leaves divided into numerous narrow segments mostly 2-3 mm wide. Petiole of the stem-leaves about 1 cm long, narrowly winged. Flowers very variable in size and colour. Style about 1 mm long. Fruit a globose to ovoid head of long-lanate achenes. Early summer. Open woods and wet prairies. When in flower, the following variations may be distinguished: var. hudsoniana DC. (f. galactiflora Boivin, f. leucantha Fern) -- Flowers white to yellowish. -- Mack-Y-(Aka), NF, (NB)-Q-BC, US -- F. sanguinea (Pursh) Fern. (var. Richardsiana Fern., var. Sansonii Boivin; A. globosa Nutt.) -- Flowers pink to deep purple. More frequent than the preceding. -- K-Y, NF, Q-BC, US -- Var. saxicola Boivin -- Flowers yellow inside, bluish outside. Similar to A. lithophila and often confused with it but taller and the styles shorter, as in var. hudsoniana. -- Mack, swAlta-BC, US.

Some Churchill collections are varietally intermediate and could have been referred to var. saxicola.

A hybrid with the following species has been created experimentally and reported by Heimburger, Can. Journ. Bot. 39: 488 - 501. 1961. We admit that if such a hybrid turned up naturally, we might have difficulty in recognizing it from var. saxicola.

4. A. Drummondii Watson (A. lithophila Rydb.) -- Similar to the preceding, but generally smaller. Mostly about 1 dm high. Flowers yellow inside, blue outside. Styles about 2 mm, elongating to 3-4 mm in fruit. First half of summer. Rocky alpine tundras. -- Mack-(Y)-Aka, Alta-BC, US.

A. lithophila is commonly distinguished on the basis of shorter styles and broader leaf segments. Fruiting heads tend to show longer styles than flowers from the same tuft, from which we would deduce that the length of the style is more related to age than taxonomy. Types with broader and narrower leaf segments grade smoothly into one another and appear to be of sporadic occurrence in the range; their taxonomic significance is not obvious.

5. A. cylindrica Gray -- Thimbleweed -- Leaves generally gathered in a single verticil of (3)-5-7 leaves. Petiole wingless, about as long as the limb. Leaf trifoliolate. Leaflets sessile, 3-lobed, the lobes coarsely few-toothed. Achenes whitish-lanate. First half of summer. Moist places in semi-open areas. -- Q-BC, US.

6. A. virginiana L. var. virginiana (A. riparia AA.) -- Thimbleweed -- Much like the preceding but the verticil made up of only 3 leaves. Other leaves, when present, are opposite and borne on the peduncles. Leaves much as in the preceding species, but somewhat larger and the lobes serrate along the outer edge. Tepals greenish and about 1 cm long. Achenes tawny-lanate. First half of summer. Moist spots, especially in woods. -- NF, NS, NB-BC, US.

Eastward the widespread var. virginiana grades into a var. riparia (Fern.) Boivin with whitish and larger tepals, 1-2 cm long.

7. A. canadensis L. -- Stem bearing a single verticil of (2)-3 large, sessile and trifid leaves. A pair of opposite leaves is also borne on each supplementary peduncle when the latter are present. Basal leaves palmatifid. Flower large, 2-4 cm across, white. Achenes large, pilose, forming a round head, the style about as long as the body. Early summer. Open, wet places. -- K-Mack, NS-BC, US -- F. Dicksonii Boivin -- Flower double. Lacombe. -- Alta.

8. A. nemorosa L. var. bifolia (Farwell) Boivin (A. quinquefolia L. var. interior Fern.) -- Stoloniferous and producing numerous 5-foliolate sterile leaves. Stem 1-2 dm high, bearing a single terminal flower and a single verticil of 3 leaves. Leaves long-petioled, trifoliolate. Flower about 1 cm across, white or pinkish. Achene hirsute. Style short and hooked. Second half of spring. Sandy woods. -- WQ-Alta, US.

Var. bifolia, stat. n., A. quinquefolia L. var. bifolia Farwell, Papers Mich. Ac. Sc. Arts Lett. 1: 94. 1923, an earlier name for our variety, was originally based on a two-leaved extreme of this normally three-leaved species. Thus it was rejected by Fernald, Rhodora 37: 260. 1935 as the "name would be quite misleading and unjustified". However the Code is quite

emphatic on this point and clearly states that a "name must not be rejected because it is inappropriate or because it has lost its original meaning". We have accordingly restored the older name.

Although our plant is usually treated as specifically distinct from the eurasian *A. nemorosa*, the latter is barely separable by its darker rhizomes, becoming black in drying, and its flowers that are often somewhat larger. The more western var. *Lyallii* (Britton) Ulbr. tends to be smaller, its sterile leaves are trifoliate and its slightly smaller flower is nearly always white.

9. *A. occidentalis* Watson -- Towhead-Baby -- Quite like the following, but the flower whitish and the leaves more divided into shorter segments. Basal leaves  $\pm$  bipinnate, the segments  $\pm$  lobed, the lobes  $\pm$  lanceolate. Stem leaves a bit smaller and nearly sessile. First half of summer. Late snow patches and wetter alpine meadows. -- swAlta-BC, US.

10. *A. patens* L. var. *Wolfgangiana* (Besser) Koch (var. *Nuttalliana* Gray; *Pulsatilla ludoviciana* (Nutt.) Heller) -- Crocus, Prairie-Crocus (Crocus) -- The whole plant very showy and in many ways: first by its abundant and very long villosity, then by its large bluish flowers, later by its large head of elongating and plumose styles. Basal leaves ternate, the leaflets 3-partite, the segments lobed, the lobes long linear. Stem leaves 3, similar but smaller, sessile and palmately divided into only 5-9 lobes. Very conspicuous in very early spring. Prairies. -- (F), Mack-Aka, Man-BC, US, (Eur) -- F. Stevensonis Boivin -- Tepals white. Brandon. -- Man.

*F. Stevensonis* f. n., floribus albis. Type: Stevenson 2025, Brandon, prairie, flowers white, four plants observed in several acres of bloom, May 9, 1960 (DAO).

A generalized distributional map by Löve 1954, extends the range of our variety to western Ontario and southern Keewatin, but we know of no justifying specimens.

The eurasian var. *patens* has the leaves divided into somewhat broader segments, 5-10 mm wide.

*A. narcissiflora* L. var. *interior* (Hultén) Boivin was reported from N.W. Alberta by Hultén 1944, repeated by some later authors. We know of no justifying specimens.

#### 9. HEPATICA Miller

Technically similar to *Anemone*, but the similarity not obvious because the 3 verticillate stem leaves are very small and located so close to the flower as to appear like a calyx of 3 sepals.

1. *H. nobilis* Schreber var. *obtusa* (Pursh) Steyermark (*H. americana* (DC.) Ker; *H. triloba* AA.) -- Liverleaf, Mouse-Ears (Trinitaire, Herbe de la Trinité) -- Leaves all basal, rather broad, reniform and trilobed, persisting till the following spring and present at flowering. Flower colour variable. Fruit



a group of hirsute achenes subtended by the persistent involucre of 3 ovate bracts. Flowering in early spring before the new leaves. Rocky deciduous woods. Prairie Coteau at Notre-Dame-de-Lourdes. -- (NS), NB-sMan, US.

An earlier mention for Manitoba was based on a collection from Cartwright's Point near Kingston, Ontario.

In our variety the lobes are broadly rounded and the terminal one is a bit shorter than wide. In the more eastern var. acuta (Pursh) Steyermark the deltoid leaf has acute lobes and the terminal one is  $1\frac{1}{2}$  times as long as wide.

## 10. CLEMATIS L.

## VIRGIN'S BOWER

Climbing by means of the twining petioles and petiolules. Shrubs with opposite leaves. Flowers much as in Anemone, the styles often very long in fruit.

- a. Leaves all trifoliolate.
  - b. Flower solitary ..... 3. C. verticillaris
  - bb. Flowers in panicles or corymbs ..... 1. C. virginiana
- aa. Leaflets more numerous.
  - c. Flower solitary ..... 4. C. tangutica
  - cc. Flowers in panicles or corymbs.... 2. C. ligusticifolia

1. C. virginiana L. -- Virgin's Bower, Devil's Darning-Needle (Herbe aux yeux) -- Flowers yellowish to greenish, the tepals only about 1 cm long. Leaflets 3, ovate, coarsely toothed to  $\frac{1}{2}$  trilobed. Mid summer. Galerie - forest of the Roseau River. -- (NS-PEI)-NB-O-(Man, US).

2. C. ligusticifolia Nutt. -- Virgin's Bower -- Similar to the preceding, but the flowers whitish and the leaves with 5-(7) leaflets. Mid summer. Shores and river valleys. -- Man-BC, US.

Reaches its eastern limit as a native at the Elbow of the South Saskatchewan. It is sometimes cultivated and has been picked up four times as an escape in Manitoba, at Brandon 1921, 1922, at the Fort de Pierre in 1959 and at Carman in 1960. All at DAO.

3. C. verticillaris DC. var. columbiana (Nutt.) Gray (C. columbiana (Nutt.) T. & G.; Atragene columbiana Nutt.) -- Mountain-Clematis -- Flowers blue, very large and showy. Leaflets 3, ovate, entire to coarsely toothed. Tepals 3.5-6.0 cm long. First half of summer. Dry woods. -- swS-BC, (US).

In our variety the tepals are acuminate or acuminate - caudate. In the more eastern var. verticillaris the smaller tepals are 2.0-4.5 mm long, merely acute to obtuse at summit.

In the Lake Superior area one will find another and yet undescribed type: var. grandiflora var. n., floribus majoribus, tepalis ellipticis vel elliptico-lanceolatis, 4.5-6.0 cm long, 1.5-2.5 cm lat, rotundatis et mucronatis ad summam, vel interdum subacutis. Type: Dore & Lindsay 10 723, 5 miles south of Fort William, lower talus slope of basaltic mountain, June 15,

1950 (DAO). Paratypes: Dore & Lindsay 10 759, Port Arthur (DAO); Hutchinson 44, Inter-City (DAO); Pritchard, Lake Nipigon (TRT); A.M. Anderson Kashabowie (TRT); Taylor, Hosie & Bannan 874, Thunder Cape (TRT); C. Goessl, Neillsville, Wisc. (TRT).

4. *C. TANGUTICA* (Max.) Korsh. (*C. orientalis* AA.) -- Flowers yellow, large and showy. Leaflets 5 or more, lanceolate, serrate, often trilobed. Tepals 2.5-5.0 cm long. Mid to late summer. Cultivated and sometimes escaping to roadsides, railway embankments, etc. -- S-BC, (US, Eur).

George Bugnet of Légal, Alta., claims the responsibility of having introduced this in cultivation in our region around 1912. His seeds came from India. Today it is fairly often met with in cultivation; it is rather decorative, quite hardy and requires little attention. It does also tend to spread at times and is known as an escape at Edmonton 1941 and Saskatoon 1945. In 1951 we noticed that it was behaving as a weed in the experimental plots at the Indian Head Forest Experiment Station.

## 11. MYOSURUS L.

## MOUSETAIL

Receptacle very long, often representing about half the height of the plant. Otherwise much as in Ranunculus, but the sepals spurred.

1. *M. minimus* L. var. minimus -- (var. interior Boivin, var. lepturus (Gray) Macoun; M. lepturus (Gray) Howell) -- Mouse-Tail (Queue de souris) -- Small annual herb, rather inconspicuous and rarely collected. Leaves all basal, filiform, the limb indistinct from the petiole. Flowers small and insignificant. Spike of achenes 1.5-4.0 cm long. Style 0.2-0.5 mm long, nearly erect. Late spring and early summer. Wet depressions and arroyos. -- O-BC, US, Eur -- Var. aristatus (Bentham) Boivin (ssp. montanus C.R. Campbell; M. apetalus AA.; M. aristatus Bentham, ssp. montanus (C.R. Campbell) Stone) -- Style longer and more or less divergent, 0.5-1.5 mm long. Spike sometimes elongate, but more often with fewer achenes and less than 1.5 cm long. -- sS-scBC, wUS.

Individuals with a shorter spike (ssp. montanus) are infrequent but widespread in the range of var. aristatus and would seem to represent only a sporadic extreme of variation.

## 12. RANUNCULUS

## CROWFOOT, BUTTERCUP

A basic type for the family. All parts free, regular and spirally arranged on an elongated receptacle. Sepals green, about 5, often caducous. Petals about 5, white or yellow. Stamens about 5 or about a multiple of 5. Carpels numerous, maturing into so many achenes.

a. Submerged aquatics with the leaves finely dissected into numerous filiform segments.

b. Flowers white, axillary ..... 23. R. aquatilis

- bb. Flowers yellow, terminal or in a loose terminal cyme ..... 21. R. Gmelinii
- aa. Leaf entire or the segments much broader.
  - c. Leaves elongate, elliptic to linear, entire or sometimes trilobed.
  - d. Flowers white; leaves with a thick petiole often as wide as the limb .. ..... 24. R. Pallasii
  - dd. Flowers yellow.
    - e. Leaves elliptic to lanceolate; stem-leaves alternate ..... 17. R. glaberrimus
    - ee. Leaves narrowly lanceolate to filiform, mostly geminate, opposite or in fascicles ..... 18. R. Flammula
  - cc. Leaves broader, ovate to reniform, crenate to compound.
    - f. Carpels pubescent.
      - g. Leaves deeply trifid ..... 4. R. uncinatus
      - gg. Leaves merely crenate or sometimes pedately lobed.
        - h. Basal leaves more or less truncate at base; herbage villous ..... 14. R. cardiophyllus
        - hh. Leaves cuneate at base; herbage puberulent ..... 12. R. inamoenus
    - ff. Carpels glabrous.
      - i. Basal leaves merely crenate, or sometimes pedately trilobed with the central lobe linguiform.
        - j. Low and long creeping ... 22. R. Cymbalaria
        - jj. Taller, erect and tufted or solitary.
          - k. Leaves deltoid-ovate .. ..... 13. R. rhomboideus
      - kk. Leaves reniform, flowers very small ..... 16. R. abortivus
    - ii. Leaves more deeply divided ..... Group A

## Group A

- a. Stem-leaves and inflorescence-leaves all or mostly sessile or on much reduced petioles.
  - b. Plant small, even in fruit not exceeding 1 dm; sepals 2.0-3.5 mm long, the petals as long or shorter ..... 11. R. pygmaeus
- bb. Usually taller, at least in fruit; sepals at least 4 mm long, the petals as long or longer.
  - c. Stem leaves divided into narrowly linear segments, 1-3 mm wide ..... 15. R. pedatifidus
- cc. Leaf segments broader,  $\pm$  lanceolate, commonly 5 mm wide ..... 9. R. nivalis

- aa. Petioles well developed.
- d. Small creeping plant, about 5 cm high; leaves usually trilobed and otherwise entire ..... 19. R. hyperboreus
- dd. Much larger and usually erect.
- e. Leaves compound ..... Group B
- ee. Leaves simple.
- f. Stem bearing a single leaf and a single flower ..... 25. R. lapponicus
- ff. Leaves and flowers more numerous.
- g. Sepals abruptly reflexed near the middle or the base, the tip pendant.
- h. Petals usually less than 5 mm long, about as long as the sepals ..... 4. R. uncinatus
- hh. Petals much longer and much exceeding the sepals ..... 3. R. occidentalis
- gg. Sepals more or less incurved, commonly spreading.
- i. Villous or hirsute, especially along the petioles ..... 2. R. acris
- ii. Glabrous or nearly so.
- j. Achene beak insignificant, about 0.1 mm long ..  
..... 20. R. sceleratus
- jj. Beak longer, 0.5-1.0 mm long ..... 21. R. Gmelinii
- Group B
- a. Flowers small, the petals only 2.5-3.0 mm long and shorter than the sepals ..... 5. R. pensylvanicus
- aa. Flowers larger, the petals longer than the sepals.
- b. Up to 2 dm high and the leaves usually divided into numerous narrow segments.
- c. Nearly glabrous; petals about 5 mm long, nearly as wide ..... 10. R. gelidus
- cc. Appressed pubescent; flowers much larger, the petals about twice as long as wide ..... 8. R. fascicularis
- bb. Usually much taller and the leaves merely trifoliate.
- d. Petals 4-7 mm long; sepals 3.5-5.0 mm long and abruptly reflexed from near the base ..... 6. R. Macounii
- dd. Petals and sepals longer, the latter  $\pm$  spreading and somewhat incurved at tip.
- e. Style  $\pm$  straight, about 2 mm long, the stigma restricted to near the tip ..... 7. R. septentrionalis

ee. Recurved and only  $\pm$  1 mm long;  
 stigma extending on the ventral  
 side for most of the length of  
 the style ..... l. R. repens

1. R. REPENS L. -- Buttercup (Bassinnet, Pied de poule) -- Creeping herb with trifoliolate leaves, large yellow flowers and spreading sepals. Becoming ascending or erect in taller and denser grass. Main leaves sometimes biternate. Sepals 5-8 mm long. Petals about half longer, 7-13 mm long, obovate to obdeltoid. Style about 1 mm long. Late spring to mid summer. Rare weed, mainly in lawns: Banff, Miette. -- G, Aka, L-SPM, NS-O, swAlta-BC, US, CA, Eur -- Cv. PLENIFLORUS -- Flowers double. Leaflets commonly broader. Naturalized in roadside ditches at Hillspring. -- O, swAlta-BC.

Two collections have also been cited for Manitoba by Scoggan 1957. Dudley, Sandilands, 1930 (WIN; DAO, photo) has been revised to R. septentrionalis. The other collection has not been located yet.

2. R. ACRIS L. var. ACRIS -- Buttercup (Bouton d'or) -- About 3-6 dm and almost skeletal, the elongate stem and branches usually bearing only one fully developed leaf. The latter palmatifid, the segments more or less lanceolate and coarsely lobed and toothed. Petals 7-13 mm long, at least twice as long as the sepals. Achenes glabrous in a round head. Mid spring to mid summer. Roadsides, ditches and wettish prairies. -- G, Aka, L-SPM, NS-BC, US, Eur -- Var. LATISECTUS G. Beck (var. Stevenii AA.) -- Leaf segments broader, rhomboid to obovate. Mid summer to early fall. -- NS-(PEI), Q-Man, Alta-BC, US, Eur.

The taxonomic value of var. latisectus was discussed by Boivin 1951.

3. R. occidentalis Nutt. var. brevistylis Greene -- Rather like the following but the flowers and achenes larger. Glabrous or merely soft pubescent. Petals 7-15 mm long, commonly oblong and about twice as long as the abruptly reflexed sepals. Achenes 2-3 mm long. Style about half as long, straight to recurved. Early summer. Mountain prairies. -- (Y-Aka), wAlta-(BC).

The typical and more coastal phase is hirsute. In 1951 we did identify and distribute as R. occidentalis a number of Mackenzie collections. These have since been revised to R. Macounii.

4. R. uncinatus D. Don (var. parviflorus (Torrey) Benson) -- Sepals abruptly reflexed at or below the middle and the leaves deeply trifid. Petals oblong to obovate, commonly about 3 mm long and about as long as the sepals. Carpel about 2 mm long. Style 1.5-2.0 mm long and strongly recurved at tip. Late spring and early summer. Moist mountain woods. -- Mack, Aka, Alta-BC, US, (CA).

Often subdivided in two varieties, with var. parviflorus designating the phase with the achenes and foliage hirsute, while the typical phase is glabrous. Both variations have about

the same distribution and seem to be equally frequent in Canada. We have examined specimens with glabrous achenes ranging from Vancouver Island to northern Alberta.

5. R. pensylvanicus L. f. -- Leaves trifoliate and the flowers small with abruptly reflexed sepals. Strongly hirsute throughout. Petals 2.5-3.0 mm long, slightly shorter than the sepals. Fruiting head elongate-oblong. Style short. All summer. Wet woods near water. -- Mack, Aka, L-NF, (NS-PEI)-NB-BC, US, (Eur).

6. R. Macounii Britton var. Macounii -- Rather coarse species with trifoliate leaves, the sepals abruptly reflexed from near the base. Coarsely hirsute. Sepals 3.5-5.0 mm long. Petals 4-7 mm long, obovate. Carpels 2-3 mm long, the style about 1 mm long. Early summer. Wet open places. -- K-Y-Aka, NF), Q-BC.

West of us it grades into a var. oreganus (Gray) K.C. Davis, glabrous or nearly so and often smaller, commonly about 3 dm high.

7. R. septentrionalis Poiret -- Tufted, the main stem erect, the others tending to be decumbent and rooting at the nodes. Otherwise much as the preceding but the flowers and fruit larger, the sepals spreading and longer. Petals 8-15 mm long. Carpel body 3-4 mm long, the style about 2 mm long. Early summer. Wet ground, often in woods. -- (PEI)-NB-Man, US.

Pubescence is variable and the type with the petioles and lower part of stem hispid-retrorse has been distinguished as var. caricetorum (Greene) Fern., a type perhaps more frequent around the Great Lakes, but it is also sporadic from New Brunswick to Manitoba and does not appear to be geographically restricted.

8. R. fascicularis Muhl. var. fascicularis -- Buttercup, Early Buttercup -- Small and tufted, with numerous fleshy and more or less tuberous roots. Leaf at least trifoliate, more commonly divided into numerous  $\pm$  lanceolate segments. Petals oblong, about 1 cm long. Mid spring. Dry, grassy hillsides: Falcon Lake. -- sO-seMan, US.

An earlier report for Manitoba was based on a collection from Cartwright Point near Kingston, Ont.

Saskatchewan reports are frequent and they all go back to a justifying sheet labelled "Dr. Richardson 1080, New York and Cumberland House" (CAN; DAO, photo). Considering the alternate locations, it would seem more sensible to credit this Richardson collection to New York State where the species is common rather than to Saskatchewan where it would represent a disjunction of some 500 miles from the rest of the range.

In our typical variety the leaflets tend to be cut into oblong to linear lobes, while towards the southwest it grades into a var. apricus (Greene) Fern. in which the segments tend to be entire or few-toothed and elliptic to oblanceolate.

9. R. nivalis L. var. nivalis -- The back of the sepals and the top of the peduncle densely hirsute with dark brown to blackish hairs. Stiffly erect and 1-3 dm high, usually with a

single flower and 1-3 stem leaves. Leaves tripartite to palmatipartite, the stem ones subsessile. Flower large and showy. Fruiting head elongate. Summer. Wet tundra, especially late snow patches: Churchill. -- G-K-(Mack)-Y-Aka, L, nQ, nMan, nBC, Eur -- Var. Eschscholtzii (Schlecht.) Watson (R. Eschscholtzii Schlecht., var. Suksdorfii (Gray) Benson; R. verecundus Rob.) -- Pubescence of pale yellow hairs on the sepals and peduncle. Alpine prairies, especially around snow fields. -- Y-Aka, Alta-BC, US.

10. R. gelidus Kar. & Kir. -- Inconspicuous and half buried in loose shale, the stem about 5 cm high and bearing only 1-3 leaves. Glabrous or nearly so. Leaves small, at least trifoliate and divided into numerous  $\pm$  lanceolate segments. Flowers 1-(3) on long peduncles. Early spring. Alpine scree slopes. -- (Mack, Aka), Alta-(BC), US, (Eur).

The range is extended to Yukon by Hultén 1944 but this may be only a lapsus calami as no specimen is cited and no corresponding dot appears on the map of the species.

11. R. pygmaeus Wahl. -- Much like R. nivalis, but generally smaller, as small as R. hyperboreus, the latter with a creeping stem bearing many leaves on long petioles. Glabrous to lightly pubescent, the pubescence pale. Stem about 5 cm high at flowering, elongating up to 1 dm in fruit, bearing a single leaf on a short, winged petiole. Petals 1.5-3.5 mm long, usually shorter than the sepals. All summer. Wet rocky slopes, especially around late snow patches. -- G-K-(Mack-Y)-Aka, L, Q, swAlta-BC, US, Eur.

12. R. inamoenus Greene var. inamoenus (var. elatior Boivin) Carpels densely pubescent and the crenate basal leaves rounded to cuneate at base. More or less appressed-pubescent and 2-6 dm high. Leaves variable, the basal ones sometimes lobed, the others always lobed. Petals 3-6 mm long. Fruiting head cylindrical, 8-20 cm long. Late spring and early summer. Shaded, moist places. -- swS-BC, US.

The more western var. alpeophilus (Nelson) Benson in which the foliage and achenes are glabrous has been collected at Yoho.

13. R. rhomboides Goldie (R. ovalis Raf.) -- Similar to the preceding but smaller, the flowers larger and the glabrous achenes forming a globose head. Up to 2 dm high and  $\pm$  pilose. Basal leaves rhomboid-ovate, usually merely crenate. Petals 5-9 mm long, rather oblong. All spring. Wetter prairies. -- sMack, O-BC, US.

14. R. cardiophyllus Hooker var. cardiophyllus (R. pedatifidus Sm. var. cardiophyllus (Hooker) Britton) -- Carpels densely pubescent like R. inamoenus, but the basal leaves hastate and the flowers very large. Uniformly long villous throughout and 2-4 dm high. Basal leaves crenate to palmatilobed, cordate to truncate at base. Petals shiny, 10-13 mm long. Fruiting head 10-15 mm long. Early summer. Wetter prairie spots. -- S-BC, US -- F. apetalus (Farr) Boivin (R. apetalus Farr) -- Petals (and sometimes sepals) lacking. -- swS-Alta, (US).

In the southwestern U.S.A. there occurs a var. subsagittatus (Gray) Benson, smaller and bearing a smaller head of achenes, usually only 5-6 mm long.

15. R. pedatifidus Sm. var. leiocarpus (Trautv.) Fern. (var. affinis (Br.) Benson; R. affinis Br.) -- Resembling the more dissected phase of R. cardiophyllus, but the segments narrower and the plant nearly glabrous throughout, yet the sepals long-villous and the peduncle short-pubescent. 1-3 dm high. Leaves pedatipartite into entire and narrowly linear segments. Petals 8-10 mm long. Fruiting head ovoid. Early summer. Rocky tundra. -- G-Aka, L-(NF), Q-(O)-nMan, swAlta, (US, Eur).

The range has been extended to B.C. by many authors, but all specimens met with in various herbaria were eventually revised to R. inamoenus var. inamoenus.

9 collections have been cited for Saskatchewan. We have examined 4 of them and all proved to belong to R. cardiophyllus, being more pubescent, with less deeply cut basal leaves, more elongate head of fruits, etc.

The typical variety has puberulent achenes. It occurs primarily in the Altai and other mountain ranges of central Asia, with a limited American range. In the more northern parts of Asia and over most of its North American range it is replaced by the glabrous-fruited var. leiocarpus. The latter name has priority at the varietal rank as will be seen by the following synonymy:

Var. leiocarpus (Trautv.) Fern., Rhodora 19: 138. 1917; R. affinis Br., Bot. App. Pary's Voy. 265. 1823; R. affinis Br. var. leiocarpus Trautv., Midd. Reise 1: 62, 1847; R. pedatifidus Sm. var. affinis (Br.) Benson, Am. Midl. Nat. 52: 355. 1954.

Var. leiocarpus has recently, Am. Midl. Nat. 52: 354-5, 1954, been rejected for our plant as of uncertain application. However the type of var. leiocarpus comes from the Talmir Peninsula, an area where only the glabrous-fruited (as its name states) phase occurs and we see no reason to question the applicability of var. leiocarpus to our plant.

16. R. abortivus L. var. abortivus (var. acrolasius Fern.) -- Thin-leaved forest species with reniform and crenate basal leaves. Inflorescence and stem leaves pedately divided. Flowers very small. Petals 1.2-2.8 mm long, slightly shorter than the abruptly reflexed sepals. Achenes glabrous and small, the beak minute. Late spring and early summer. Rich woods near water-courses. -- sMack-Aka, L-SPM, NS-BC, US.

Varies sporadically from glabrous to finely puberulent above. The latter phenotype is var. acrolasius, but such puberulent specimens have often been identified and reported upon as var. micranthus (or R. micranthus). All Canadian reports of the latter proved to be incorrect. This more southern var. micranthus (Nutt.) Gray is more or less villous throughout with hairs 1 mm long.

17. R. glaberrimus Hooker var. Buddii Boivin (R. Buddii Boivin) -- Basal leaves elliptic to lanceolate, entire. The



whole plant glabrous, except the carpels. About 1 dm high. Achenes very numerous, in a globose head. First half of spring. Wet prairies and creek valleys. -- S-BC, US -- *F. monochlamydeus* Boivin -- Petals lacking or only 1-2 per flower. -- S-Var. *ellipticus* Greene -- Carpels glabrous: Mortlach. -- S-(Alta)-BC, US.

18. *R. Flammula* L. var. *ovalis* (Big.) Benson (*R. reptans* L. var. *ovalis* (Big.) T. & G.) -- Low and long-creeping, with narrow leaves mostly in 2's or in rosettes. Puberulent. Stem at first about 2 dm high, soon decumbent and rooting at the nodes. Leaves narrowly lanceolate, about 5 mm wide. Flower most often terminal and single, about 1 cm across. Mid summer. Wet prairies. -- Mack, (Aka, NS), O, S-BC, US -- Var. *filiformis* (Mx.) Hooker (*R. reptans* L.) -- More creeping, nearly glabrous and the leaves narrower, more or less filiform and 1-(3) mm wide. Flower 6-10 mm wide. Shores, fresh or saline. -- (G), K-(Mack-Y)-Aka, L-SPM, NS, NB-S-(Alta-BC), US, Eur.

There is some disagreement about the taxonomic treatment of our varieties and as a result var. *ovalis* has often been used in the sense of var. *filiformis*. Hence a fair amount of confusion in the botanical literature. Accordingly our statement of the distribution of var. *ovalis* is largely restricted to such regions as we have been to confirm through the examination of specimens.

19. *R. hyperboreus* Rottb. var. *hyperboreus* -- Small creeping plant with the leaves typically trilobed, the lobes entire. Only about 5 cm high or less. Glabrous throughout. Leaves about 5 mm wide, cuneate to rounded at base. Petals only 2-3 mm long. All summer. Shores and very wet places. -- G-K-(Mack)-Y-Aka, L-(NF), Q-Man, NWBC, US, Eur -- Var. *intertextus* (Greene) Boivin (*R. natans* C.A. Meyer var. *intertextus* (Greene) Benson) -- Generally larger. Leaves rather reniform, about 1 cm wide and commonly  $\pm$  cordate at base and palmately 5-lobed. Flowers a little larger, the petals 3-4 mm long. Rockies--Y, Alta, US.

Reports of var. *hyperboreus* by Benson 1948, Moss 1959, Hitchcock 1964 and Boivin 1966 from Raup Lake in northern Alberta were based on a sheet (CAN) since revised by A.E. Porsild and W.J. Cody to *R. abortivus*.

20. *R. sceleratus* L. (var. *multifidus* Nutt.) -- (Mort aux vaches, Herbe de feu) -- Achene beak minute like *R. abortivus* and all leaves trifid, the segments  $\pm$  trilobed, the lobes  $\pm$  3-toothed, like the terrestrial form of the following. Erect and nearly glabrous. Stem thick, with a large central cavity. Petals 3.5-5.0 mm long. Achenes  $\pm$  1 mm long, very numerous. Style  $\pm$  0.1 mm long. First half of summer. Very wet places. -- Mack-Aka, NF-SPM, (NS, NB)-Q-BC, US, Eur.

21. *R. Gmelinii* DC. (var. *Hookeri* (D. Don) Benson, var. *limosus* (Nutt.) Hara; *R. Purshii* Rich.) -- Submerged aquatic with finely dissected leaves and yellow flowers. Often terrestrial and creeping, the leaves then trifid to palmatifid, the segments  $\pm$  trilobed, the lobes  $\pm$  3-toothed. Achene beak 0.5-1.0 mm.

First half of summer. Shallow waters and muddy shores. -- F-Aka, NF, NS-BC, US, (Eur).

Exceptional collections are transitional to R. flabellaris Raf., the latter not otherwise present in our area.

Previous western reports of R. flabellaris are however quite numerous: 5 or 6 localities in Manitoba, reputedly common in Saskatchewan, one locality (Red Deer) in Alberta, and 4 or 5 localities in B.C. In an effort to ascertain the presence or absence of R. flabellaris west of Ontario, we have borrowed for study all the specimens so identified or cited from all the major relevant herbaria.

The two species may be contrasted as follows.

R. Gmelinii: leaves 1.5-2.5-(9.0) cm wide, palmatipartite to bipalmatipartite, sepals 2.5-6.0 mm long; petals 4-7 mm long; anthers 0.5-1.0 mm long; achene without corky ridge, the body 1.0-1.5 mm long, the beak 0.5-1.0 mm long.

R. flabellaris: leaves 2-12 cm across, triternatipartite to quadraternatipartite; flowers often more numerous; sepals 5-8 mm long; petals 7-15 mm long; anthers 1.0-1.5 mm long; achene with a marginal corky ridge along one side, the body  $\pm$  2 mm long, the beak  $\pm$  1.5 mm long.

Most western specimens proved to belong to R. Gmelinii and were so revised. Only one western specimen (from B.C.) clearly belonged to R. flabellaris, namely: J.A. Munro, Kootenay Flats, May 18, 1949 (V; DAO, photo). Another B.C. specimen, Eastham 10980 from Werner (UBC; DAO, photo), while being intermediate, was clearly closer to R. flabellaris.

No other specimen from west of Ontario could be clearly referred to R. flabellaris, but quite a few were intermediate in one way or another. Mostly these intermediates had submerged leaves large enough and dissected enough to be referred to R. flabellaris, but their floral characters were less than convincing. These intermediates were as follows.

MANITOBA: Scoggan 10961, Boissevain (CAN, MT, WIN): petals 5-6 mm; anthers 0.8-1.0 mm; achenes small and without corky crest; body of the achene 1.5-1.8 mm; beak 0.5 mm. -- Scoggan 10684, Portage La Prairie (CAN, WIN, MT; DAO, photo): petals 5-9 mm; anthers 1.2-1.5 mm; achenes small and without corky crest; body of the achene 1.2 mm; beak 0.5 mm.

SASKATCHEWAN: none.

ALBERTA: H.H. Gaetz, Red Deer (CAN, DAO, photo): petals 8-9 mm; anthers 1.2-1.5 mm; no ripe achenes, but the immature ones are rather small; submerged and emerged leaves more like those of R. Gmelinii. This was cited as R. flabellaris in Am. Midl. Nat. 40: 212. 1948. -- Moss 8863, Mackenzie Highway (DAO); petals 5.0-5.5 mm; anthers 0.5-0.6 mm; but the leaves very large and much dissected.

B.C.: Eastham 10980, East of Werner (UBC; DAO, photo): petals 7 mm; anthers 0.8 mm; achenes rather small, with a weak corky ridge, the body 1.5 mm; beak 0.7-1.2 mm; leaves wide and much dissected. -- Eastham 10980a, West of Werner (UBC, V).

RANUNCULUS

The sheet at V is practically identical to 10980, but the one at UBC is not: petals 5.0-5.5 mm; anthers 0.3-1.0 mm; achenes rather small and variable, some without corky ridge, others with a weak ridge; leaves large and much dissected. -- R.T. Ogilvie, Copper Mountain (UBC) petals 5-6 mm; anthers 1.2 mm; leaves varying from typical of the one species to typical of the other -- Calder & alii 13418, Houston (DAO): petals 8 mm; anthers 1.2 mm; otherwise similar to R. Gmelinii.

Considering that typical R. flabellaris is completely lacking from the Prairie Provinces, we are of the opinion that the intermediate specimens detailed above from Manitoba and Alberta are to be considered as extremes of variation of R. Gmelinii.

In view of the many intermediates in our area and in the rest of the range of the two taxa discussed, it would seem more realistic to revert to the older treatments of G. Don and Regel and present them as varieties of the same species. Hence the following transfer. R. Gmelinii DC. var. multifidus (Pursh) stat. n., R. multifidus Pursh, Fl. Am. Sept. 2: 736.1814 (nec Forsk. 1875); R. Purshii Rich. var. multifidus (Pursh) D. Don ex G. Don, Gen. Syst. Gard. 1: 33.1831; R. radicans C.A. Meyer var. multifidus (Pursh) Regel, Bull. Soc. Imp. Nat. Moscou 34, 2: 45.1861; R. flabellaris Raf.; R. delphinifolius Torrey. The sheet reported by Löve 1959 from Otterburne (MT; DAO, photo) as R. flabellaris f. riparius Fern, has been revised to R. Gmelinii.

22. R. Cymbalaria Pursh (var. saximontanus Fern.; Halespertes Cymbalaria (Pursh) Greene) -- Small creeping herb with ovate and crenate leaves. Erect shoots leafless, merely bracteolate and bearing 1-3 flowers. Leaves in tufts of 2 or more. Late spring to mid-summer. Shores and ditches, wherever the water is ± alkaline. -- G-(F)-K-Y-(Aka), L-SPM, NS-BC, US, (SA), Eur.

23. R. aquatilis L. var. capillaceus (Thuill.) DC. (R. trichophyllum Chaix; Batrachium trichophyllum (Chaix) Bosch) -- (Herbe aux écrevisses) -- Submerged aquatic with white flowers and finely dissected leaves. Leaves flaccid, usually deep green. Petiole commonly around 1 cm long with adnate stipules, the free part of the petiole clearly longer than the adnate part. Achene beak short. Early summer. Quiet and shallow waters. -- K-(Mack-Y)-Aka, (L)-NF, NS-BC, US, (CA, SA), Eur -- Var. radicatus Laest. -- Generally smaller, the stem only 0.4-1.0 mm thick. Cold waters. -- G-Mack-(Y)-Aka, L-NF), NS, Q-(O)-Man, Alta, (US), Eur -- Var. subrigidus (W.B. Drew) Breitung (R. circinatus Sibth. var. subrigidus (W.B. Drew) Benson; R. subrigidus W.B. Drew) -- Leaves stiffer and often grayish. Petiole shorter, often reduced to its stipular base or nearly so. Beak of the achene (0.1)-0.2-(0.5) mm long. Early to mid-summer. Marshes and ditches, especially abundant in prairie sloughs. -- F, Mack, (NF), Q-BC, US, (CA) -- Var. longirostris (Godron) Lawson (R. longirostris Godron; Batrachium longirostre (Godron) F. Schultz) -- Much as in var. subrigidus, but the beak of the achene (0.5)-1.0-(1.5) mm long. Mid summer. Quiet

shallow waters. -- Q-0, swS-Alta, US.

Highly variable and much divided species. We have finally rallied to the treatment of Benson 1948 in which all the segregates are reduced to varietal rank; it seems to be a realistic and practical treatment. The following key will summarize our current view of this species as it occurs in Canada.

- a. Floating leaves present and merely trilobed--  
(Mack, Aka), BC ..... var. hispidulus E.R. Drew
- aa. All leaves submerged and finely dissected.
  - b. Foliage pubescent -- F-neK ..... var. Codyanus Boivin
  - bb. Glabrous.
    - c. Beak of the achene (0.5)-1.0-(1.5)  
mm long ..... var. longirostris
    - cc. Shorter, (0.1)-0.2-(0.5) mm long.
      - d. Achenes 2.0-2.5 mm long --  
seQ ..... var. Lalondei Benson
      - dd. Achenes clearly smaller.
        - e. Leaves stiff and mostly grayish;  
petiole mostly reduced to its  
dilated (stipular) base ... var. subrigidus
        - ee. Leaves flaccid; petiole commonly  
rather long, usually many times  
longer than the stipular base.
        - f. Stem thin, 0.4-1.0 mm thick,  
commonly a much reduced  
plant ..... var. eradicatus
        - ff. Thicker.
          - g. Receptacle hirsute,  
the hairs in tufts ..  
..... var. capillaceus
          - gg. Glabrous to lightly  
pubescent -- (NF), NS,  
(NB)-Q-(O, US) .....  
..var. calvescens (W.B.Drew) Benson

Var. Codyanus (Boivin) stat. n., R. Codyanus Boivin, Can. Field-Nat. 65: 3-4. 1951. All our other varieties are already available at varietal rank.

The typical phase is eurasian. It has floating leaves like those of var. hispidulus and somewhat larger flowers, the petals 9-14 mm long.

A report of R. trichophyllus from Baffin Island by Hultén 1944 is undoubtedly to be interpreted in the sense of var. eradicatus. Similarly, all the Greenland specimens under R. trichophyllus that we have examined have been revised to other varieties, usually var. eradicatus.

24. R. Pallasii Schlecht. -- Soft plant with large petioles, nearly as large and much longer than the limb. A short plant, stoloniferous and bearing only a few leaves and flowers.

Leaves narrowly lanceolate, entire to coarsely 3-lobed. Flower white, large. Carpels numerous, large. Mid summer. Very wet places and shallow waters among mooses. -- F-Aka, (L), Q-Man, Eur.

25. R. lapponicus L. (Coptidium lapponicum (L.) Gaud.) -- Half-burried in bog mosses and the achenes longest. Long stoloniferous. Leaves few, alternate on the rhizome, solitary on the stem. Petioles long. Limb trifid, the segments crenate to lobed. Sepals only 3. Achenes few, about 5 mm long, with a hooked beak. Early summer. Spruce bogs. -- G-Aka, L, Q-Alta-(BC), US, Eur.

## 13. THALICTRUM L.

## MEADOW-RUE

Like Ranunculus, but the perianth of a single verticil and the achene wall more or less inflated, not closely enveloping the seed. Leaves ternately divided into numerous leaflets.

- a. Flowers perfect, axillary ..... 1. T. sparsiflorum
- aa. Flowers commonly dioecious, borne in bracteolate terminal panicles.
  - b. Filaments white; leaflets oblong and pubescent below ..... 4. T. dasycarpum
  - bb. Filaments purplish; leaflets  $\pm$  flabelliform, glabrous to finely glandular below.
    - c. Peduncles widely spreading and of nearly equal length; achene slightly compressed and reflexed .. ..... 2. T. occidentale
    - cc. Peduncles ascending and of widely varying lengths; carpels neither flattened nor reflexed ..... 3. T. venulosum

1. T. sparsiflorum Turcz. var. Richardsonii (Gray) Boivin -- Each flower subtended by a reduced, yet compound, leaf. Finely glandular-puberulent. Flowers white, perfect. Filaments white, thickened. Peduncle strongly recurved below the fruiting head. Achene strongly flattened, semi-orbicular. Late spring. Forest creeks. -- Mack-Aka, nO-BC, US.

In our variety all the flowers are borne in the axil of a reduced but compound leaf and the stipe of the fruit is 1.2-3.0 mm long. The typical and asiatic phase has longer stamens and somewhat narrower achenes, while two western U.S. vicariants, var. nevadense Boivin and var. saximontanum Boivin, have some of the flowers usually borne in the axil of mere bracts and their achenes have a shorter stipe, 1 mm long or less.

2. T. occidentale Gray var. palousense St. John -- Achenes  $\pm$  sigmoid and reflexed. Leaflets mostly flabellately trilobed; the lobes 3-toothed. Inflorescence often nearly reduced to a single terminal raceme. Filaments 5-10 mm long, purplish. Stigma 3.0-4.5 mm. Early summer. Woods. -- (seAka), swS-BC, US.

The more western var. Macounii Boivin is a taller plant with a more ample and more leafy inflorescence, commonly 2-4 dm long, a longer stigma, 5-6 mm long and the achenes merely spreading at maturity.

3. T. venulosum Trel. var. venulosum -- Commonly 3-4 dm high. Stiffly erect with a large terminal panicle. Glabrous or minutely glandular-puberulent. Leaflets as in the preceding. Peduncles varying greatly in size, the longest at least twice as long as the shortest but averaging less than 2 cm in length and mostly 2 per node. Filament purplish, 3-4 mm long. Stigma 1.0-2.5 mm. Achene not compressed, ascending, straight or incurved, its body 3-4 mm long. Early summer. Prairies. -- K-Mack, wQ-BC, US -- Var. Turneri Boivin (T. Turnerii Boivin) -- Larger. Mostly 6-9 dm high. Peduncles mostly 3-5 per node and averaging 2-3 cm long. Filaments 4-5 mm long. Stigma about 2 mm long. Body of the fruit 4.0-4.5 mm long. Aspen groves. -- Mack-Y, Man-BC, US -- Var. Lunellii (Greene) Boivin (T. confine AA.; T. Lunellii Greene) -- Still larger, 1-2 m high and usually half supported by the adjacent vegetation in which it often gets entangled. Stigma 3.0-4.5 mm long. Body of the fruit 5.0-6.5 mm long. Mainly at the inner edge of galerie-forests along the Red River and tributaries. -- scMan, ncUS.

An old collection by Bell at York Factory (QK; DAO, photo) was once reported as T. Cornuti L. and more recently as T. dasycarpum. It belongs to var. venulosum.

Eastward these varieties grade into var. confine (Fern.) Boivin. Reports of the latter from Manitoba were based on a sheet of var. Lunellii. Reports of T. dioicum L. from our area were based mainly on var. Turneri.

4. T. dasycarpum Fisch. & Lall. var. dasycarpum -- Middle and upper stem-leaves sessile or nearly so. Not glandular, but pubescent, at least on the lower surface of the leaflets. Leaflets coriaceous, mostly trilobed. Peduncles about 1 cm long. Filaments white. Anthers 1.8-2.2 mm long. Stigma 2-3 mm long. Carpels and achenes nearly always pubescent. Early summer. Woods and wet meadows. -- wQ-BC, US -- Var. hypoglaucum (Rydb.) Boivin -- Larger. Leaflets thin, usually glaucous below, often glabrous and mostly larger. Anthers 2.3-3.2 mm long. Stigma 2.5-5.0 mm long. -- swAlta-BC, US.

#### 61. CABOMBACEAE (FANWORT FAMILY)

Placentation parietal. Flower 3-merous.

##### 1. BRASENIA Schreber WATER-SHIELD

Carpels numerous. Leaves peltate.

1. B. Schreberi Gmelin -- Water-Shield, Purple Wen-Dock -- Aquatic with peltate floating leaves, the limb elliptic and entire. All submerged parts very slippery, being covered by a thick, clear and gelatinous substance. Second half of summer. Muddy lakes; Lily Pond. -- Aka, NS-(PEI)-NB-Man, BC, US, (CA), Eur. (Afr, Oc).

THALICTRUM

A single collection from our area: Boivin & Champagne 14187, Réserve Forestière Whiteshell, Lily Pond, l'extrémité de chaque rameau dressé porte un groupe de bourgeons qui se détache très facilement, 25 septembre 1960 (DAO).

## 62. CERATOPHYLLACEAE (HORNWORT FAMILY)

Single genus.

## 1. CERATOPHYLLUM L. HORNWORT

Submerged aquatics with reduced flowers. Perianth simple. Flowers monoecious. Female flower with a single carpel maturing into an achene.

1. C. demersum L. -- Coontail -- Submerged aquatic, with very inconspicuous flowers. Leaves verticillate, dichotomously divided into filiform segments, the latter remotely serrulate. Flowers axillary, short pedicelled. Early summer. Forming large masses in quiet waters. -- NS-BC, US, CA, Eur.

## 63. NYMPHAEACEAE (WATER-LILY FAMILY)

Carpels united or buried into the receptacle. Otherwise much like the Ranunculaceae. Aquatics with large floating leaves and flowers.

a. Petals large, very numerous, white ..... 1. Nymphaea  
aa. Petals very small, the flower conspicuous  
mainly by its 5 yellow sepals ..... 2. Nuphar

## 1. NYMPHAEA L. WATER-LILY

Large and very showy floating flowers white, with numerous petals. Leaves also floating. Sepals 4.

a. Sepals 4-7 cm long; leaves large ..... 1. N. odorata  
aa. Sepals 1.5-3.0 cm long; leaves small ..... 2. N. tetragona

1. N. odorata Aiton var. odorata (Castalia odorata (Aiton) Woodv. & Wood) -- Water-Lily, Pond-Lily (Nénuphar blanc, Lis d'eau) -- Large roundish floating leaves mostly 1-2 dm across. Peduncle inserted at or below the middle of the blade. Limb entire, the basal sinus not reaching beyond the middle of the leaf. Flower 8-15 cm across, floating. Mid to late summer. Muddy lakes. -- NF, NS-seMan, US.

The more eastern var. maxima (Conard) Boivin has somewhat larger flowers, the leaves twice larger, and the petioles striped longitudinally in purplish, the herbage not otherwise purplish.

2. N. tetragona Georgi var. Leibergii (Morong) Boivin (N. Leibergii Morong) -- Quite similar to the preceding, but generally much smaller. Leaves 3-8 cm wide, slightly obovate, with a deep sinus, reaching at least to the middle, and usually more open. Flowers 3-6 cm wide. Nearly all summer. Usually in acid and boggy lakes, often in very deep water, hence rarely collect-

ed. -- (Mack)-Aka, Q-BC, US, Eur, (Oc).

Typical var. tetragona has somewhat larger leaves with a not so deep and less open sinus.

2. NUPHAR Sm.

Sepals and petals 5, the former yellow, the latter very small. Otherwise as the preceding.

- a. Disk of ovary red; leaves small ..... 1. N. microphyllum  
 aa. Disk yellowish-green; leaves large ..... 2. N. variegatum

1. N. microphyllum (Pers.) Fern. (Nymphaea microphylla Pers.) -- (Petit nenuphar jaune) -- Like the following, but generally smaller. Floating leaves elliptic-ovate, less than 1 dm long. Sepals 1.5-2.0 cm long. Summer. Ponds and muddy lakes. -- (NF), NS, NB-Man, US.

2. N. variegatum Eng. (Nymphaea advena AA.) -- Beaver-Root, Bobber, Pond-Poppy (Grand Nénuphar jaune, Pied d'original) -- Aquatic with large floating leaves and large yellow flowers usually borne just above water-level. Leaves elliptic, 1-3 dm long. Sepals 2.0-3.5 cm long, often reddish towards the base. First half of summer. Quiet waters. -- (Mack-Y), L-(NF-SPM, NS-NB)-Q-(O)-Man-Alta-(BC), US.

Order 35. BERBERIDALES

Similar to the Ranales but the floral parts in 3's or 6's and the carpels often reduced to a single one. Stem often secondarily woody. Stamens opposite the petals.

- a. Carpel 1. .... 64. Berberidaceae  
 aa. Carpels 3-6 ..... 65. Menispermaceae

64. BERBERIDACEAE (BARBERRY FAMILY)

Shrubs or semi-shrubby herbs. Petals 6, in two series. Stamens also 6 and opposite the petals.

- a. Herb with ternately compound leaves ..... 1. Caulophyllum  
 aa. Shrub with simple or pinate leaves ..... 2. Berberis

1. CAULOPHYLLUM Mx. BLUE COHOSH

Petals reduced to minute appendages opposite the sepals. Ovary soon ruptured by the fast growing seed. The mature fruit a stipitate drupe.

1. C. thalictroides (L.) Mx. var. thalictroides -- Papoose Root, Blue Cohosh (Graines à chapelet) -- Only two leaves; the lower one 3 times ternate and, being sessile, looks like a verticil of 3 leaves, each twice ternate; upper leaf much smaller. A coarse herb, dark green and glaucous. Inflorescence small. Fruits dark blue. Early spring. Deciduous woods; probably an Indian introduction: Portage, East Selkirk. -- NS, NB-Man, (US, Eur).



Our plant is green, with sepals 4-5 mm long, petals  $\pm$  1.5 mm wide, anthers  $\pm$  0.7 mm long, and the style 0.2-0.6 mm long. The more eastern and more restricted var. giganteum Farw. is more or less purplish and has larger floral parts, sepals 6-8 mm long, petals  $\pm$  2 mm wide, anthers 1.2 mm long and the style 1.0-1.7 mm long.

## 2 BERBERIS L.

## BARBERRY

The typical genus of the family. Sepals 6, subtended by 3 bracts. Petals 6, opposite the sepals. Stamens 6, opposite the petals. Carpel solitary. Shrubs.

Commonly subdivided into two genera with Berberis for the simple-leaved species and Mahonia for the others. This single character is not linked to any of the more fundamental variations in inflorescence and floral structures. Quite the contrary, the variations of the latter tend to form parallel series in Berberis and Mahonia. We are not therefore accepting this subdivision because it appears to be too artificial in its nature.

- a. Leaves simple ..... 1. B. vulgaris  
 aa. Leaves compound ..... 2. B. Aquifolium

1. B. VULGARIS L. -- Barberry (Epine-vinette) -- Spiny shrub with the leaves in clusters. Spines often trifurcate, subtending the leaf-clusters. Leaves obovate to oblanceolate, spinulose-serrate. Flowers yellow, in pendulous racemes. Fruit red. Late spring. Planted and tending to reseed itself in nearby bush, but now systematically eradicated and nearly eliminated because it is host to a very noxious wheat-rust. -- NS-(PEI)-NB-Man, BC, US, Eur.

2. B. Aquifolium Pursh (Mahonia Aquifolium (Pursh) Nutt.) -- Holly, Mahonia (Houx) -- Leaflets thick and spiny-dentate. Shrub about 1 m high. Leaves alternate, pinnate, with 5-7 sessile leaflets. Flowers golden yellow in showy clusters of erect racemes. Fruit blue. Late spring and early summer. Lightly wooded slopes. -- swAlta-BC, US -- F. repens (Lindley) Boivin (Mahonia repens (Lindley) G. Don) -- Stems and branches more or less decumbent and rooting, their erect tips up to 4 dm high. Leaflets often not shiny. -- swAlta-BC, US.

The more common f. repens is usually treated as a species, but it seems to behave rather like an ecological form of drier and more open habitats.

## 65. MENISPERMACEAE

## (MOONSEED FAMILY)

Similar to Berberis, but the carpels commonly 3.

## 1. MENISPERMUM L.

## MOONSEED

Atypical in this that the floral parts are in 4's. Sepals 4 or 8; petals 4 or 8; stamens 12-24; carpels 2 or 4.

1. M. canadense L. -- Moonseed, Yellow Parilla (Raisin de coulevre) -- Climber with lightly wooded twining stems and

large leaves peltate near the margin. Leaves rather polygonal, with mostly 5-7 shallow lobes, but sometimes entire. Inflorescences nearly, but not quite, axillary. Flowers small. Fruit a dark blue drupe. Early summer. Galerie-forests. -- Q-sMan, US.

Order 36. ARISTOLOCHIALES

Floral parts in 3's as in the Berberidales, but the sepals more or less fused, the petals lacking and the ovary more or less inferior.

66. ARISTOLOCHIACEAE (BIRTHWORT FAMILY)

Not parasitic and the flowers perfect. Calyx petaloid.

1. ASARUM L.

WILD GINGER

Flower with 12 stamens and a semi-inferior ovary.

1. ~~A. canadense~~ L. var. acuminatum Ashe (var. reflexum AA.) -- Wild Ginger, Colicroot (Gingembre sauvage) -- A forest floor species with 2 large velvety leaves and a hidden purple flower. Leaves reniform, entire. Flower solitary, more or less hidden under the dead leaves. Calyx-lobes long acuminate. Late spring. Deciduous forests. -- swQ-sMan, US.

In the more eastern var. canadense the calyx lobes have an ovate to elliptic blade abruptly contracted to a linear appendage 0.5-1.5 cm long. In our variety the limb is narrower, ± lanceolate, and more gradually attenuate to an appendage less than 2 cm long. The two phenotypes intergrade quite a lot and are not always readily distinguishable, but var. acuminatum is the normal phase west of Lake Superior, becoming rather sporadic further east.

Order 37. RHOEDALES

Floral parts in 2's, free (except the carpels) and more or less clearly opposite. However the leaves usually alternate. This is the general pattern for the next few orders. The Rhoedales have only 2 sepals.

a. Flowers regular ..... 67. Papaveraceae  
aa. Flowers zygomorphic or bilateral.....68. Fumariaceae p. 42

67. PAPAVERACEAE

(POPPY FAMILY)

Flowers regular with the 2 sepals quickly caducous. Stamens numerous.

a. Leaf broadly reniform and palmately lobed ..... 2. Sanguinaria  
aa. Leaf serrate to ternately or pinnately divided.  
b. Receptacle expanded into a conspicuous collar at the base of the flower and fruit ..... 1. Eschscholzia

ASARUM

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- bb. Receptacle more run-of-the-mill and  
in no way expanded ..... 3. Papaver

1. ESCHSCHOLZIA Cham.

Sepals fused together into a peaked hood and falling off as a unit before the flower opens. Receptacle enlarged into an infundibuliform structure with a spreading flange. Petals 4.

1. E. CALIFORNICA Cham. -- California-Poppy, Cup-of-Flame (Globe du soleil) -- Pod grooved, with 10 dark green lines, much in the same manner as the striated stem. Glabrous and more or less glaucous. Leaves finely tripinnatifid, the segments about 1 mm wide. Flower large and showy, yellow to orange. First half of summer. Often seeded as an ornamental and casually reseeding itself on roadsides and waste places: Dauphin. -- PEI, Man, BC, US.

2. SANGUINARIA L.

BLOOD-ROOT

Petals numerous, at least 8.

1. S. canadensis L. var. canadensis -- Bloodroot (Sang-dragon, Sanguinaire) -- Exudes an abundant brilliant-red juice from the slightest wound. Very showy spring flower with a single large reniform leaf cradling a single white flower. Stemless. Very early spring. Deciduous and rocky woods. -- NS, NB-sMan, US.

Reported from 5 or 6 localities in southern Manitoba, but we have seen no other specimen than from Sprague (CAN).

3. PAPAVER L.

POPPY

Ovary topped by a stellate crown, with 4-20 rays. Fruit opening by pores just below the crown. Petals 4.

a. Annuals and the stem leafy.

b. Sepals and stem glabrous except near

the top ..... 1. P. somniferum

bb. Hirsute throughout ..... 2. P. Rhoëas

aa. Perennial and stemless ..... 3. P. nudicaule

1. P. SOMNIFERUM L. -- Poppy, Opium-Poppy (Pavot) -- Stiffly erect and somewhat glaucous annual with very large and very thin petals. Leaves more or less oblong, irregularly dentate, deeply cordate and amplexicaul. The long peduncle usually coarsely hirsute. Fruit large and nearly globular. All summer. Cultivated ornamental, casually reseeding itself in open ground: Sandy Lake, Westerham and Fort Vermilion. -- NF, NS, NB-Q-(Man)-S-Alta-(BC, US), Eur.

2. P. RHOËAS L. -- Corn-Poppy (Coquelicot, Pavot) -- Much as the preceding, but coarsely hirsute throughout. Leaves lobed, often deeply so, attenuate at base. Fruit smaller. First half of summer. Cultivated and rarely reseeding itself; not weedy with us. -- (Aka), NS, (NB)-Q-S, (BC), US, Eur, (Afr).

3. *P. NUDICAULE* L. -- Arctic Poppy (Pavot safrané) -- Perennial, the leaves all basal. Hirsute, especially on the scape. Leaves long-petioled, pinnatifid, 5-15 cm long including the petiole. Scape 2-4 dm high. Flower large, variable in colour, most commonly salmon. Summer. Casual garden escape. --Y-Aka, Man, Alta, Eur-- Var. *coloradense* Fedde (*P. pygmaeum* Rydb.) Leaves 1-5 cm long including the petiole. Petals 5-15 mm long, yellow to salmon. First half of summer. Talus slopes above timberline. -- Alta-BC, (US).

The only Canadian reports of *Argemone intermedia* Sweet are by Russell 1954 and (doubtfully) by Breitung 1957, on the basis of a collection from Prince, Sask., supposedly preserved at SASK. The only collection we have located in any Saskatchewan herbarium came from Nebraska and the Canadian report remains both unsubstantiated and questionable as being possibly based on cultivated material. Recently this species was alternately called *A. polyanthemos* (Fedde) G.B. Ownbey. See Mem. Torr. Bot. Club 21: 131. 1958. The argument for the change runs as follows: *A. intermedia* was described in 1828 on cultivated plants from seeds originating in Mexico; but *A. intermedia* is not known to occur to-day in Mexico, hence the current interpretation of this name must be mistaken. This argument overlooks that much of the U.S.A. of to-day were formerly part of Mexico. Texas, where *A. intermedia* is largely distributed, was a Mexican state in 1828 and did not become part of the U.S.A. until 1845, hence the seeds of *A. intermedia* could very well have originated in Mexico. Even if a type of *A. intermedia* has yet to be located, we see no obvious reason to drop this name in favour of the more recent *A. polyanthemos*.

68. FUMARIACEAE (FUMITORY FAMILY)

Flowers bilateral or zygomorphic. Sepals only 2 as in the *Papaveraceae*, stamens 6 as in the *Cruciferae* and the flower with 1 or 2 spurs, these sometimes weakly developed.

- a. Corolla bilateral; plant climbing ..... 1. *Adlumia*
- aa. Corolla zygomorphic, with only 1 spur.
  - b. Flower more than 1 cm long; fruit an elongated pod ..... 2. *Corydalis*
  - bb. Flower smaller; fruit subglobose ..... 3. *Fumaria*

1. ADLUMIA Raf. CLIMBING FUMITORY

Flower almost unique in our flora in its bilateral symmetry.

1. *A. fungosa* (Aiton) Greene -- Canary-Vine, Fairy Creeper -- A climber by twining and entangling. Leaves 2-4 times ternately or somewhat pinnately compound. Upper part of the stem leafless, all the leaves being borne on the branches. Inflorescences extra-axillary. Flowers pearly-pink. Summer and fall. Rocky deciduous woods. -- (NS), Q-Man, BC, US.

We have seen specimens from Winnipeg and West Hawk Lake.

It has also been reported from Victoria Beach.

## 2. CORYDALIS Med.

Fruit an elongated pod similar to those of the Cruciferae, but without a central partition, or seemingly with a partition reduced to its marginal nerve. Flower zygomorphic, spurred on the upper side.

- a. Flowers pink and yellow, in a short few-flowered raceme ..... 1. C. sempervirens  
 aa. Flowers pale yellow, in an elongate raceme ..... 2. C. aurea

1. C. sempervirens (L.) Pers. -- Rock-Harlequin -- A delicate and glaucous herb with spurred, pink and yellow flowers. Stem leaves mostly with 3-5 leaflets, the latter ternatipartite to palmatifid. Basal leaves more divided. Pod slightly torulose. Late spring to mid summer. Usually on granitic outcrops. -- K-Aka, L-NF, NS-BC, US -- F. candida Lakela -- Flowers white. Local. -- nS, US.

2. C. aurea W. var. aurea -- Similar, but the flowers yellow and in distinct terminal racemes. Leaves bipinnate, the leaflets smaller with much narrower lobes. Pod falcate and strongly torulose. Mid spring to early summer. Loose sandy soils. -- Mack-Aka, Q-BC, US.

In our plant the pods are  $\pm$  descending and the inflorescences are  $\pm$  immersed in the foliage. The more southern var. occidentalis Eng. has more elongate inflorescences decidedly overtopping the foliage and the pods are ascending to erect.

## 3. FUMARIA L.

FUMITORY

Like Corydalis, but its subglobose fruit indehiscent.

1. F. OFFICINALIS L. -- Earth-Smoke, Fumitory (Fumeterre, Bec d'alouette) -- A delicate annual weed with flowers like those of Corydalis sempervirens, but purplish and darker at tip. Leaves ternately dissected into numerous narrow segments. Flowers 8 mm long, in terminal racemes. Pod 2 mm long. First half of summer. Infrequent weed of cultivated land. -- NF-SPM, NS-Alta-(BC), US, SA, Eur.

Known from a number of localities in Manitoba and also further west at Lewvan, Gravelbourg and Beaverlodge. The Gravelbourg collection was made in the summer of 1964 and by the time it reached us by ordinary mail it was not fit for herbarium preservation.

## Order 38. LOASALES

Possibly not very closely related to the neighbouring orders. Flower 5-merous. Petals free. Stamens numerous.

## 69. LOASACEAE

(LOASA FAMILY)

Ovary inferior.

## 1. MENTZELIA L.

Stamens numerous, all fertile except sometimes the outer 5.

1. M. decapetala (Pursh) Urb. & Gilg. (Nuttallia decapetala (Pursh) Greene) -- Gumbo-Lily, Evening Star -- A coarse and very rough herb with very large white flowers of 10 petaloid appendages. Stout, erect biennial. Leaves pinnatifid. Petals 5, lanceolate, 3-5 cm long. Staminodia 5, about as large and quite similar to the petals. Flowers opening at sunset. Summer. Bare, eroded badlands. -- sMan-sS-sAlta, US, (CA).

Sporadic from the Cypress Hills westward, rather rare further east; Forks of the Red Deer, Roche-Percée and Boissevain.

## Order 39. CAPPARIDALES

Like the Rhoedales, but the sepals 4. Ovary unilocular.

## 70. CAPPARIDACEAE

(CAPER FAMILY)

Leaves trifoliate or digitate. Rather resembling the Cruciferae, but the flower slightly zygomorphous and the capsule devoid of a central partition, often stipitate.

- a. Stamens 8 or more; fruit sessile or short stipitate ..... 1. Polanisia  
 aa. Stamens 6; fruit very long stipitate ..... 2. Cleome

## 1. POLANISIA Raf.

Petals retuse, equal or nearly so, but tending to be deflected toward the upper side of the flower.

1. P. dodecandra (L.) DC. var. dodecandra (P. graveolens Raf.) -- Clammy weed -- A very glutinous herb with trifoliate leaves and stiffly erect pods. Annual. Flowers in bracted racemes, the lower bracts trifoliate, the upper simple. Petals generally less than 8 mm long and the stamens slightly longer, generally less than 10 mm long. Pedicels widely divergent. Mid to late summer. Open sand, sometimes weedy. -- swQ-sS, US -- Var. trachysperma (T. & G.) Iltis -- Flowers larger, the petals at least 6 mm long, the stamens much longer, commonly 10-15 mm long. -- Man-BC, US.

Our two varieties are very weak morphologically and they grade readily one into the other. But geographically they are more sharply segregated than the above distributions would seem to indicate. Only var. dodecandra occurs in the East while in our area all specimens examined, including a Criddle collection at Aweme, belonged to the more western var. trachysperma, except a Marshall collection east of Brandon (DAO) and a Groh collection at Swift Current (DAO).

## 2. CLEOME L.

Petals entire and somewhat uneven in size. Stamens 6, all of the same size.

MENTZELIA

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1. G. serrulata Pursh (Peritoma serrulatum (Pursh) DC.) -- Stinking-Clover, Spider-Flower -- Capsule very long-stipitate. Generally similar to Polanisia, but not glandular, merely glabrous or puberulent. Flowers pink. Fruit widely spreading to drooping. Early to mid-summer. Sandy soils. -- swQ-BC, US --  
F. albiflora Cock. -- Flowers white. -- S, (US).

Native with us, a rare adventive further east.

#### Order 40. CRUCIFERALES

A single family with a number of unique features. Distinguished from the related orders by the presence of a central partition in the silique.

#### 71. CRUCIFERAE (CRESS FAMILY)

Flower dimerous with 4 opposite sepals, 4 opposite petals, 6 stamens of which 2 are shorter than the other 4, and 4 fused carpels. The inner 2 carpels are sterile and fused face to face to form the central partition of the fruit. The outer 2 carpels (or valves) are fertile and fused to the central partition (or septum).

- a. Silicle with a narrow septum, narrower than the width of the pod ..... Group A
- aa. Silique not compressed or compressed parallel to the septum, the latter thus as wide as the fruit.
  - b. Fruit a silicle, that is a small silique, usually less than 3 times as long as wide ..... Group B
  - bb. Fruit a silique, usually at least 4 times as long as wide
    - c. Silique with an indehiscent beak ..... Group C
    - cc. Silique dehiscent to the base of the style.
      - d. Flowers white or pink to purple.
        - e. Leaves deeply dissected ..... Group D
        - ee. Entire to merely toothed ..... Group E
      - dd. Flowers yellow ..... Group F

#### Group A

Fruit a silicle compressed perpendicular to the partition, the septum thus narrower than the width of the fruit.

- a. Leaves all basal, usually submerged.....1. Subularia p. 48
- aa. Stem leafy; terrestrial plants.
  - b. Silicle strongly flattened, more than twice as large as thick.
    - c. Silicle obdeltoid ..... 22. Capsella p. 64
  - cc. Silicle orbicular to short-ovate.
    - d. Silicle very large, with 2 seeds in each locule ..... 4. Thlaspi p. 52

- dd. Much smaller, the locules mostly one-seeded ..... 2. Lepidium p. 49
- bb. Much less flattened.
  - e. Stigma quite sessile ..... 21. Hutchinsia p. 64
  - ee. Style short to very long.
    - f. Petals yellow; pod very much inflated ..... 19. Physaria p. 63
    - ff. Petals white; pod small.
      - g. Silicle indehiscent..... 3. Cardaria p. 52
      - gg. Silicle dehiscent..... 5. Cochlearia p. 53

## Group B

Fruit a silicle, either not compressed, or compressed parallel to the septum, thus the latter is as large as the width of the fruit.

- a. Flowers white.
  - b. Basal leaves very large, 4-8 dm long; silicle subglobose ..... 17. Armoracia p. 61
  - bb. Much smaller; silicle much flattened.
    - c. Basal rosette present and well developed ..... 25. Draba p. 66
    - cc. Annuals without basal rosette.
      - d. Petals entire; valves of the fruit convex ..... 30. Alyssum p. 76
      - dd. Petals deeply cleft; valves flat ..... 31. Bertorea p. 76
  - aa. Flowers yellow.
    - e. Pod indehiscent or breaking off transversally at maturity.
      - f. Pod globose and indehiscent ..... 24. Neslia p. 65
      - ff. Pod elongate, breaking in two at the median constriction ..... 14. Rapistrum p. 58
    - ee. Dehiscent longitudinally.
      - g. Pod strongly flattened, at least twice as wide as thick ..... 25. Draba p. 66
      - gg. Much less flattened.
        - h. Stem leaves much divided, bipinnatifid to bipinnate .... 8. Descurainia p. 54
      - hh. Leaves entire to pinnatifid.
        - i. Glabrous or with simple hairs ..... 16. Rorippa p. 59
        - ii. Stellate-pubescent.
          - j. Stem-leaves sessile, with a sagittate base ...23. Camelina p. 64
          - jj. Stem-leaves cuneate at base ..... 20. Lesquerella p. 63

## Group C

Siliqua with a tapered indehiscent beak.

- a. Siliqua coarse and indehiscent, but monoliform



- and breaking up into a series of articles  
at maturity ..... 13. Raphanus p. 58
- aa. Silique smaller and dehiscent.  
b. Leaves entire ..... 36. Conringia p. 79
- bb. At least dentate.  
c. Beak very flat while the body  
of the silique is nearly terete... 9. Eruca p. 55
- cc. Beak not more flattened than the  
body of the silique.  
d. Raceme leafy at base; at least  
the lowest flower subtended by  
a pinnatifid leaf..... 11. Erucastrum p. 56
- dd. Raceme leafless.  
e. Seeds in two rows in each  
locule; beak short, mostly  
2-3 mm long ..... 10. Diploxaxis p. 56
- ee. Seeds in one row; beak  
usually much longer....12. Brassica p. 56

## Group D

Silique dehiscent to the base of the style. Flowers white  
or pink to purple. Leaves deeply dissected.

- a. Silique very flat ..... 28. Arabis p. 72
- aa. Cylindric or quadrangular to barely flattened.  
b. Foliage grayish-pubescent ..... 26. Smelowskia p. 71
- bb. Foliage green, glabrous to lightly  
pubescent.  
c. Silique straight.....18. Cardamine p. 61
- cc. Silique falcate .....16. Rorippa p. 59

## Group E

As group D with the leaves entire or merely dentate.

- a. Flowers and fruits sessile ..... 35. Matthiola p. 78
- aa. Pedicels obvious and elongate.  
b. Flowers large, 2.0-2.5 cm long..... 34. Hesperis p. 78
- bb. Much smaller.  
c. Septum with a large window ..... 6. Eutrema p. 53
- cc. Septum not perforated.  
d. Lowest flower of the raceme  
borne opposite a leaf.....33. Malcolmia p. 78
- dd. Lowest flower borne well above  
the uppermost leaf.  
e. Glabrous or with simple hairs.  
f. Stem leaves sagittate-  
amplexicaul at base.  
g. Silique  $\pm$  1.5 cm  
long ..... 27. Thellungiella p. 71
- gg. Much longer, about  
1 dm long..... 36. Conringia p. 79

- ff. Stem leaves cuneate at base to petiolate ..  
..... 18. Cardamine p. 61
- ee. Pubescence mostly or entirely of branched hairs.
  - h. Silique strongly flattened ..... 28. Arabis p. 72
  - hh. Silique terete or nearly so.
    - i. Petals purple, 1-2 cm long ..... 29. Erysimum p. 75
    - ii. Much smaller.
      - j. Silique torulose ..  
..... 32. Braya p. 77
      - jj. Silique of even width... 37. Halimolobos p. 79

## Group F

Silicle dehiscent to the base of the style. Flowers yellow.

- a. Stem leaves entire to dentate.
  - b. Pubescence malpighiaceus ..... 29. Erysimum p. 75
  - bb. Glabrous or nearly glabrous with some simple and forked hairs at base of stem.
    - c. Leaves narrowly linear; long attenuate at base ..... 7. Sisymbrium p. 53
    - cc. Stem-leaves much broader and auriculate at base.
      - d. Glabrous; silique quadrangular ..  
..... 36. Conringia p. 79
      - dd. Stem pilose toward the base; silique terete ..... 28. Arabis p. 72
  - aa. Leaves deeply lyrate to tripinnate.
    - e. Leaves bipinnate to tripinnate....8. Descurainia p. 54
    - ee. Lyrate to pinnatifid.
      - f. Silique short, about as long as, to much shorter than, its pedicel....16. Rorippa p. 59
      - ff. Silique many times longer than its pedicel.
        - g. Stem-leaves sessile and more or less amplexicaul ..... 15. Barbarea p. 58
        - gg. Narrowed into a petiole....7. Sisymbrium p. 53

## 1. SUBULARIA L.

Silicle only slightly compressed and with many seeds in each locule. Flowers white.

- 1. S. aquatica L. var. americana (Mull. & Cald.) Boivin--  
Awlwort (Alène d'eau) -- Submerged aquatic, small and inconspicuous. Leaves all basal, narrowly linear, Resembling a small Isoetes. Flowers few. Silicle obovate. Mid to late summer.

Shallows of fresh-water lakes and streams. -- G, K-Mack-(Y)-Aks, L-NF, NS, Q-S, BC, US, Eur.

Sepals  $\pm$  persistent in fruit. In typical var. *aquatica* from Eurasia and Alaska the sepals are deciduous, the fruit is generally somewhat narrower and the pedicels are frequently more divergent.

## 2. LEPIDIUM L.

## PEPPERGRASS

A main type, with a very flat and short silicle. Each locule with only one seed. Silicle compressed perpendicular to the septum, the latter very narrow. Stamens often only 4 or 2. Petals white, sometimes lacking.

- a. Upper leaves deeply cordate-clasping and seemingly perfoliate ..... 1. L. perfoliatum
- aa. Leaves sessile or petiolate.
  - b. Silicle 5-6 mm long.
    - c. Silicles on spreading pedicels..... 2. L. campestre
    - cc. Pedicels stiffly erect to appressed ..... 3. L. sativum
  - bb. Silicle much smaller, 2.0-3.5 mm long.
    - d. Silicle entire at tip ..... 4. L. latifolium
    - dd. Silicle deeply retuse at summit.
      - e. Silicle nearly orbicular..... 6. L. densiflorum
      - ee. Silicle longer, short-elliptic, about  $1\frac{1}{2}$  times as long as wide.
        - f. Silicle puberulent or at least short ciliate..... 8. L. ramosissimum
    - ff. Glabrous.
      - g. Main stem-leaves serrately lobed ..... 7. L. Bourgesuanum
    - gg. Remotely pectinately partite ..... 5. L. ruderales

1. L. PERFOLIATUM L. -- Upper leaves seemingly suborbicular and perfoliate, but actually deeply cordate and the basal lobes overlapping. Lower leaves bipinnatifid to tripinnatifid, the segments narrow. Herbage somewhat glaucous. Branching tending to dichotomy. Silicle about 4 mm long. Late spring to early summer. A rare weed of roadsides and railway sidings. -- sO, swS-swAlta-BC, US, Eur.

2. L. CAMPESTRE (L.) Br. -- Cow-Cress, Field-Cress (*Cresson des champs*, *Passerage sauvage*) -- The large silicle somewhat spoon-shaped, that is somewhat concave above and quite convex below. Soft puberulent throughout. Leaves finely toothed. Pedicels spreading horizontally, the finely vesiculose silicles ascending. Late spring to late summer. Uncommon weed of disturbed soils, mostly along roads and railways. -- NF, NS-O, swAlta-BC, US, Eur.

We know it in our area only from Frank and Macleod (both at DAO).

3. L. SATIVUM L. -- Garden-Cress (*Cresson alénois*, *Cresson*)

son des jardins) -- Like the preceding with a large and somewhat spoon-shaped silicle, but borne on a nearly erect pedicel. The whole plant glabrous and slightly glaucous. Leaves pinna-tipartite to tripinnatipartite. Late spring to late summer. Sometimes cultivated and readily reseeding itself in loose soils. -- (G), Mack-(Y), NS-Alta-(BC, US), Eur.

The only Manitoba location is Winnipeg from where it was reported by Bourgeau in 1863, by Macoun in 1883 and where we found it again in 1959.

4. L. LATIFOLIUM L. -- (Grande passage, Herbe au poivre) Tall stoloniferous perennial. About 1 m high and glabrous except the pilose silicles. Leaves thickish, ovate to lanceolate, serrate. Silicle not retuse at tip. Mid summer. Locally naturalized around a slough: Lethbridge. -- Q-O, Alta, US, (CA), Eur.

5. L. RUDERALE L. -- Peppergrass (Puette, Cresson plant)-- Petals lacking and lower leaves much divided. Basal leaves bipinnatipartite to tripinnatipartite; stem-leaves pinnatipartite to bipinnatipartite; inflorescence-leaves quite entire, narrowly linear-ligulate, slightly wider above the middle, rounded and perhaps thickish at tip. Racemes all or nearly all elongate. Silicle 2.0-2.5 mm long, glabrous, short-elliptic, with acutish shoulders and a septum 0.5 mm longer than the width of the silicle. Late spring and early summer. Infrequent weed of sidewalks and laneways in towns and cities. -- NS-S, (US), Eur.

Known from a few towns and cities in southern Manitoba, but yet only from Regina in Saskatchewan (REG; DAO, photo).

6. L. densiflorum Schrader var. densiflorum (var. Bourgeauanum AA., var. macrocarpum Mulligan; L. apetalum AA.) -- Peppergrass -- Silicles small and nearly round, the septum as long as the width of the fruit. Lower leaves ± lobed; stem-leaves toothed; inflorescence leaves remotely serrate to entire. Racemes all or mostly elongate. Petals small and inconspicuous. Silicle glabrous, about 2.5 mm long, the shoulders rounded or obtuse. Early to mid-summer. Light soils, especially if disturbed, in open or semi-open places, often weedy. -- Mack-Aka, L-NF, NS-BC, US, Eur -- Var. elongatum (Rydb.) Thell. -- Silicle minutely ciliate. Val-Marie, Craigmyle. -- Y-Aka, S-BC, (US).

7. L. Bourgeauanum Thell. -- Usually with many elongate terminal racemes and more numerous, short, axillary ones. Leaves varying from deeply lobed at base to remotely serrate or entire in the inflorescence. Main branches numerous or many, and mostly of about the same length. Petals short and inconspicuous. Silicle glabrous, 2.5-3.5 mm long, short-elliptic, the shoulders acutish, the septum obviously longer than the width of the fruit. Disturbed or sandy soils. Early to mid summer. -- Mack-Aka, NF, NB-BC, US, Eur.

Native with us, a weed further east.

Quite closely related to the eurasian L. apetalum to which it might perhaps be realistically attached as a variety based primarily on type of pubescence.

The trio Bourgeauanum-densiflorum-ramosissimum is made of rather similar plants and the distinctiveness of one of them, L. Bourgeauanum, was recently questioned by one of the specialists of the group. We find the three to be reasonably distinct and they may be further contrasted as follows on their general appearance in typically full grown plants.

L. densiflorum -- Racemes few (or single) or, if more numerous, tending to form a corymb. Branches borne in the upper part of the plant only, strongly ascending and simple or some of the primary branches ramified and bearing 2-3 terminal and subterminal racemes. (In the other two, the branching is more elaborate and is not confined to the upper part of the plant). Racemes all or nearly all elongated, the longest commonly twice as long as the shortest. (More unequal in the other two, the main racemes being 2-6 times longer than the many short ones). Raceme at the end of the stem developing earlier and becoming longer than all or most other racemes. Pedicels elongating slowly in such a way that each raceme will be of a uniform width below, but will be gradually narrower in the last 3-5 cm. (More quickly elongating in the other two, so that the raceme is narrowed only in the last centimeter or so).

L. Bourgeauanum -- Branches numerous and  $\pm$  isomeguth, bearing many and strongly dimeguth racemes. Branching, tending to form a leafy, elongated and compound raceme of racemes. Each primary branch bearing a terminal raceme and a few lateral and short ones, so that the short racemes are more numerous than the long ones. Branches shorter than in the next, the terminal raceme usually longer than the rest of its branch. Terminal racemes developing simultaneously and the central one not especially longer than the rameal ones.

L. ramosissimum -- More branchy and the leaves more deeply cut. Rosette leaves (and lower stem leaves) pinnatipartite (pinnatifid in the other two species), the stem leaves pinnatifid (serrate to lobed in the other two), and the inflorescence leaves at least in part remotely lobed (entire to serrate in the other two). Generally branched to the base and the lower branches successively longer, the lowermost becoming about as long as the stem. Racemes very numerous and less strongly contrasted in length; each primary branch bears an elongated terminal raceme and a number of lateral ones, some of which elongate, others dont, so that in fully grown plants the elongated racemes tend to be more numerous than the short ones.

These characters give to each member of the trio a distinctive habit in the field, over and above the finer points of floral and fruit morphology. As is often the case with annuals, there is however much variation in response to drought, tramping, browsing and other factors. The type and a probable isotype of L. Bourgeauanum were examined a few years ago; both belong quite clearly with this name as interpreted here and by G.A. Mulligan in Madroño 16: 89. 1961.

8. L. ramosissimum Nelson (L. divergens Osterh.) -- Sili-  
cle finely puberulent at least along the edges, otherwise simi-

lar to that of *L. ruderale* but a bit longer, 2.5-3.0 mm long. Generally very branchy and branched from the base with the lower branches nearly as long as the stem. Main leaves deeply lobed; inflorescence-leaves at least in part remotely lobed. Racemes numerous, variable in size, mostly elongate. Petals  $\frac{1}{2}$  to  $\frac{3}{4}$  as long as the sepals. All summer. Open or disturbed ground, often weedy. -- Mack, Q-BC, US.

Known east of us only as an adventive.

### 3. CARDARIA Desv.

### HOARY CRESS

Differs from *Lepidium* by its indehiscent silicle, not so much flattened.

a. Silicle glabrous ..... 1. *C. Draba*  
 aa. Pubescent ..... 2. *C. pubescens*

1. *C. DRABA* (L.) Desv. var. *DRABA* (*Lepidium Draba* L.) -- Hoary Cress -- Silicle broadly cordate. Nearly glabrous perennial. Leaves thickish, serrulate, the upper amplexicaul. Inflorescence a corymb of racemes. Sepals 1.5-2.0 mm long. Silicle 2.5-3.5 mm long, clearly flattened. Locules one-seeded. Early summer. Infrequent weed of roadsides and cultivated fields. -- (NS, Q)-O-BC, US, Eur -- Var. *REPENS* (Schrenk) O.E. Schulz (*C. chalepensis* (L.) Mazz.) -- Sepals 2.0-2.5 mm long. Silicle 2.5-8.0 mm long, variable in shape, rounded to truncate at base. Locules mostly two-seeded. -- O-BC, US, Eur.

The value of var. *repens* is not obvious: the variation is continuous, the habitat is the same and the distribution differs little. However specimens with small and reniform pods have  $2n = 64$  chromosomes while those with larger pods have  $2n = 80$ . This implies a certain genetic individuality for each of these minor phenotypes. Presumably this should lead to the development of an individualized distribution for each variety, at least in their country of origin.

There occurs near Lethbridge (DAO) some colonies of more or less intermediate morphology, partial sterility and variable chromosome number:  $2n = 66, 67, 68, 69, 70$  and  $72$ . Likely, these may be inter-varietal hybrids.

2. *C. PUBESCENS* (C.A. Meyer) Jarm. (var. *elongata* Rollins) -- Quite like the preceding, but pubescent throughout. Silicle short ovoid, barely compressed. Summer. Roadsides and cultivated fields. -- Man-BC, US, Eur.

### 4. THLASPI L.

### PENNY-CRESS

Like *Lepidium*, but each locule with 2 seeds.

1. *T. ARVENSE* L. -- Frenchweed, Stinkweed (Cennes, Herbe aux écus) -- Silicle largest, 8-12 mm wide. Upper leaves clasping, the margin sinuate. Silicle ovate, very flat, with a wide peripheral wing and a deep terminal notch, becoming yellowish and very conspicuous at maturity, borne erect on widely divergent pedicels. Late spring to late fall. Common weed of dis-

turbed soils and crop fields. -- G, Mack-Aka, L-SPM, NS-BC, US, Eur.

## 5. COCHLEARIA L.

## SCURVY GRASS

Similar to Cardaria and Lepidium but the silicle only slightly compressed and each locule containing many seeds.

1. C. officinalis L. (var. groenlandica (L.) Gelert) -- Scurvy-Grass (Cuillerée, Herbe aux cuillers) -- Fleshy and very variable, 1-40 cm high, etc. Usually with many branches from near the base. Glabrous. Leaves entire, the lower long-petioled and cordate to reniform. Silicle 3-8 mm long, subglobose to lanceolate. First half of summer. Sea-shores; more rarely weedy or some distance inland. -- G-Aka, L-SPM, Q-nMan, BC, (US), Eur.

Rather variable as to height, branching, size of flowers, shape and size of fruits, etc. These variations have been made the basis for a number of varieties and species, but the taxonomic treatment often varies from flora to flora and we are yet unconvinced that any one such classification is more satisfactory than the others.

## 6. EUTREMA Br.

Like Draba or Cardamine, but the septum with a large window, the latter sometimes so large that the septum is almost reduced to its marginal nerve.

7. E. Edwardsii Br. -- Glabrous and slightly fleshy perennial, resembling a Draba, but the pod narrower, and only slightly compressed. Erect and simple, 1-2 dm high. Leaves entire, the lower long-petioled, the upper sessile and \* lanceolate. Pedicels divergent and arching. Siliques 1.0-1.5 cm long, stiffly erect and parallel to the rachis, narrowly lanceolate, barely compressed, almost quadrangular because of the strong mid-nerve of the valves. Early summer. Springy spots in the tundra. -- (G), F-Mack-(Y-Aka), Q, nMan, swAlta-BC, Eur.

## 7. SISYMERIUM L.

## HEDGE MUSTARD

Flowers yellow; fruit a silique; hairs simple or lacking. Leaves usually deeply divided.

- a. Pedicels and siliques closely appressed....1. S. officinale  
 aa. Divergent at 45° or more.  
 b. Leaves all or mostly entire ..... 4. S. linifolium  
 bb. All pinnatifid.  
 c. Siliques 5-10 cm long ..... 2. S. altissimum  
 cc. Shorter, 1-4 cm long..... 3. S. Loeselii

1. S. OFFICINALE (L.) Scop. (var. leiocarpum DC.) -- Hedge-Mustard (Herbe au chantre, Tortelle) -- Branches few, elongate and spreading at 90°. Herbage at least slightly hirsute below. Leaves pinnatifid, the terminal lobe larger and often hastate. Pedicels very short, 1-7 mm long, and appressed. Si-

liques about 13 mm long, tapered from the middle. Style up to 1 mm long. Summer. Disturbed soils, especially in towns and cities. -- (G, Aka, NF)-SPM, NS-Man, (Alta)-BC, US, (CA), Eur, (Afr, Oc).

Easily confused with Brassica nigra, the latter has been erroneously reported from our area.

2. S. ALTISSIMUM L. -- Tumbling Mustard (Moutarde roulante) -- Inflorescence leaves reduced to filiform segments. Very branchy and diffuse, spreading-pilose below. Leaves pinnatifid to pinnate, the segments entire to lobed. Siliques about 8 cm long, stiffly divergent at a 45° angle. Summer. Common in disturbed soil and cultivated fields. -- (G), Mack-(Y)-Aka, NF, NS-BC, US, Eur.

3. S. LOESELII L. -- Siliques 1-4 cm long, widely divergent on thin pedicels. Reflexed-pubescent below. Leaves pinnatifid with the terminal lobe usually hastate. Silique often slightly incurved. Summer. Weed of roadsides and fields, more common in the drier parts. -- Q-BC, US, Eur.

4. S. LINIFOLIUM Nutt. (Schoenocrambe linifolia (Nutt.) Greene) -- Very branchy perennial, the very narrow leaves mostly entire. Quite glabrous throughout. Siliques divergent, 3-6 cm long. Early summer. Dry pasture land; Fort Saskatchewan. -- Alta-BC, US.

Introduced from further west.

Often placed in a segregate genus because of the position of the stigmas and because it is perennial. In our specimens the stigmatic lobes are clearly placed above the placentas, same as Sisymbrium, and we are not impressed that perennity alone is in itself such a strong character as to justify generic segregation.

#### 8. DESCURAINIA Webb & Berth. TANSY-MUSTARD

Like Sisymbrium, but the leaves more divided, pinnate to tripinnate and the hairs branched to stellate or glandular.

- a. Silique oblanceolate, rather short and not more than twice as long as its pedicel.
- b. Not glandular; pedicels 2-6 mm long ..  
..... 2. D. Richardsonii
- bb. Nearly always glandular; pedicels  
6-15 mm long ..... 3. D. pinnata
- aa. Silique linear and longer, at least twice as long as its pedicel.
- c. Hairs mostly stellate and not glandular....1. D. Sophia
- cc. Not stellate, the hairs mostly simple  
and glandular ..... 4. D. sophioides

1. D. SOPHIA (L.) Webb (Sisymbrium Sophia L.; Sophia multifida Gilib.) -- Tansy-Mustard, Flixweed (Sagesse des chirurgiens, Moutarde de chien) -- Very common annual weedy Crucifer, with the grayish-pubescent leaves very finely divided, bipinnate to tripinnate. Pedicels widely ascending. Siliques ± erect.



Late spring to mid-summer. Common weed of light, bare soils.-- G, Mack-Y, NF, NS-BC, US, (Eur).

2. D. Richardsonii (Sweet) O.E. Schultz var. Richardsonii (Sisymbrium incisum var. Hartwegianum AA.; Sophia Richardsoniana sphalm.)-- Tansy-Mustard -- Much like the preceding and similarly grayish stellate-puberulent, but the pedicels 2-6 mm long, strongly ascending to appressed. Siliques 3-10 mm long, straight. Summer. Roadsides and other bare soils. -- Mack-Aka, Q-BC, US.

In var. macrosperma O.E. Schulz (including var. procera (Greene)Breitung) from the western U.S. the herbage is glabrous or nearly so. Var. procera was listed for Waterton, Alta., by Breitung 1957 but the one specimen examined, A.J. Breitung 16357 (ALTA; DAO, photo) turned out to be D. pinnata var. filipes.

We must however mention that two collections from Whitehorse and one from Maple Creek have the foliage pubescent yet are nearly glabrous in the inflorescence. They are thus intermediate to var. macrosperma.

Other intermediates also exist. Some from Whitehorse and B.C. have the pubescence as described above for the Maple Creek sheet but the siliques and pedicels are somewhat shorter, which makes them intermediate to D. pinnata and especially to its var. glabra (Woot. & Standl.) stat. n., Sophia glabra Woot. & Standl., Contr. U.S. Nat. Herb. 16: 127. 1913, in which the siliques are only 5-8 mm long.

3. D. pinnata (Walter) Britton var. brachycarpa (Rich.) Fern. (Sisymbrium canescens AA.; Sophia brachycarpa (Rich.) Rydb.; S. filipes AA.) -- Tansy-Mustard -- Leaves, stem and rachis of the inflorescence lightly to densely glandular-puberulent. Pedicels 6-15 mm long and widely divergent. Silique nearly erect and about as long as its pedicel. Summer. Open soils; common weed throughout the prairie regions. -- Mack, sQ-Alta-(BC), US -- Var. filipes (Gray) M.E. Peck (ssp. intermedia (Rydb.) Detling; D. Richardsonii (Sweet) O.E. Schultz var. viscosa (Rydb.) O.E. Schultz) -- Leaves entirely or mainly stellate-puberulent; stem usually stellate-puberulent below, becoming glandular-pubescent into the inflorescence. Common from Edmonton area westward, local eastward -- Q-O, cS-BC, US.

4. D. sophioides (Fischer) O.E. Schultz -- Rachis of the inflorescence not elongating until the siliques are fully grown, thus the young siliques surround the flower-cluster and overtop it by most of their length. Otherwise much as D. Sophia, but greener, glandular, and the falcate siliques irregularly spreading to nearly erect. Mid summer. Dry gravels northward. -- F, Mack-Aka, nMan, BC, (Eur).

#### 9. ERUCA Adanson

Like Brassica, with a terete silique ending in a long indehiscent beak, but said beak very flat.

1. E. SATIVA Miller var. SATIVA (E. versicaria AA.) -- Rocket (Roquette) -- Petals large and veiny, like those of Raphanus. Annual, somewhat fleshy, slightly glaucous and nearly

glabrous. Calyx about as long as the claw, the claw slightly longer than the blade of the petal, the latter about 1 cm long, white to yellowish and sharply veined in purple. Summer. Rare impurity in seed or exceptional escape. -- Q-O, S, US, SA, Eur.

Groh 1946 reports this species as first appearing in Saskatchewan in 1908, in Alberta in 1910 and in Manitoba in 1911, citing however only one substantiating collection, from Grenfell in 1908. This single sheet is still the only specimen from our area at DAO. A fair amount of correspondance has survived dated around 1910 and relating to specimens sent in for identification and reported on as E. sativa by J.W. Eastham for a series of Ontario sources, by H. Groh for a Bradwell (Sask.) and a Lacombe (Alta.) sending. Also by F. Fyles for a Carnduff (Sask.) correspondent. None of the specimens received were preserved (not an uncommon practice at the time) and all these reports remain unconfirmed to this day. Breitung 1959 mentions 3 more Saskatchewan localities. The Manitoba report remains completely unsubstantiated: no specimen, no correspondance.

#### 10. DIPLLOTAXIS DC.

Similar to Brassica, but the seeds in two rows in each locule.

1. D. MURALIS (L.) DC. (f. caulescens Kittel) -- Skunk-Weed, Sand-Rocket. -- Petals yellow, usually drying pinkish. Plant leafy only in its lower  $\frac{1}{4}$  or the leaves all basal. Leaves lyrate. Stem simple or diffusely branched from the base. Pod linear, ascending on widely divergent pedicels. Beak very short and not obviously distinct from a style. Late spring to early fall. Infrequent weed of disturbed soils. -- NS-Alta, US, Eur.

D. tenuifolia (L.) DC. was reported for Alberta by Groh 1950 on the basis of collections from Calgary, Macleod and Pincher Creek (DAO). All 3 were revised by Dr. C. Frankton to D. muralis on that same year.

#### 11. ERUCASTRUM Presl.

Mid-nerve of the valve strongly prominent, the silique thus  $\pm$  4-angled. Otherwise as in Brassica.

1. E. GALLICUM (W.) O.E. Schulz -- Dog-Mustard (Fausse Roquette) -- Lowest 1-(3) siliques borne in the axil of a pinnatifid leaf. Pubescent throughout, except the pedicels and siliques. Stem retrorse-strigose. Leaves large, pinnatifid, Flowers white. Siliques long linear, widely divergent. Beak short and not obviously distinct from the style. Summer and early fall. Occasional weed of disturbed soils. -- (NF), NS-BC, US, Eur.

#### 12. BRASSICA L.

#### MUSTARD

One of the basic types of the family. Silique terete, the valves dehiscent, the seeds in one row in each locule.

Fruit tapered at the tip into an indehiscent beak which sometimes contains a seed.

- a. Body of the silique densely hispid ..... 1. B. hirta  
 aa. Silique glabrous to slightly retrorse-hispid.  
 b. Upper leaves rounded to cuneate at base.  
 c. Pedicels 2-7 mm long ..... 2. B. Kaber  
 cc. 10-15 mm long at maturity ..... 3. B. juncea  
 bb. Upper leaves deeply cordate and clasping  
 at base ..... 4. B. campestris

1. B. HIRTA Moench (B. alba (L.) Rabenhorst; Sinapis alba).  
 -- White Mustard, Charlock (Moutarde blanche, Moutarde anglaise)  
 -- Body of the silique densely hispid and puberulent. The whole plant more or less retrorse-hispid. Pedicels mostly widely divergent. Beak of the silique obviously flattened and at least as long as the body. Summer. Rare weed: Otterburne, Cudworth, Melville, Beaverlodge. -- (G, Y), PEI-BC, US, Eur.

2. B. KABER (DC.) L.C. Wheeler (var. pinnatifida (Stokes) L.C. Wheeler, var. Schkuhriana (Rchb.) L.C. Wheeler; B. arvensis AA.; -- Mustard, Wild Mustard (Moutarde d'été) -- Somewhat retrorse-hispid in the lower half, sometimes also above, including the siliques. Pedicels stoutish and short. Silique 2-5 cm long, thin and torulose to thickish. Valves with 3 strong nerves nearly equally prominent. Beak about 1 cm long, gradually tapered, somewhat flattened, often containing one seed. Summer. Very common weed, especially in cereal crops. -- (G), sMack-Y-(Aka), L-NF-(SPM), NS-BC, US, Eur.

Specimens with bigger siliques may be called var. pinnatifida and the opposite phenotype can then be labelled var. Schkuhriana. The variation is however continuous and is often very wide on the same plant. Seems to be an arbitrary distinction.

3. B. JUNCEA (L.) Cosson -- Indian Mustard, Chinese Mustard -- Similar to the preceding but glabrous to slightly retrorse-hispid below. Often slightly glaucous. Pedicels thinner and longer. Siliques 2-5 cm long. Valves with only one strong mid-nerve. Beak abruptly contracted at base, seedless and nearly terete. Summer. Common weed of cultivation. -- Mack, (Aka), NF, (NS-NB)-Q-(O-Man)-S-BC, US, Eur.

4. B. CAMPESTRIS L. (B. Napus L.) -- Field-Mustard -- Glaucous and the pods thickish and very long, (3)-5-7-(10) cm long, including the beak 0.6-1.5 cm long. Glabrous or slightly setulose-hispid below. Leaves thickish, the lower lyrate with a very large terminal lobe, the upper much smaller and usually entire, deeply cordate and clasping, largest near the base. Pedicels long, divergent to spreading. Beak usually containing one seed. Summer. Casual weed of crops roadsides and fields. -- (G), sMack-Aka, L-NF, NS-BC, US, CA, SA, Eur.

Two races occur. They may be identified by their pollen size, but are not otherwise readily recognizable in the herbarium except in their extreme forms. Specimens with small petals, less than 10 mm long, or long beaks, at least 14 mm long and at

least  $\frac{1}{3}$  the length of the valves may be referred to *B. campestris* proper. Those with short beaks, less than 10 mm and less than  $\frac{1}{4}$  the length of the valves may be named *B. Napus*. The latter is known as a weed from Brandon, Saskatoon, etc.

## 13. RAPHANUS L.

## RADISH

Fruit divided into two parts; the lower reduced and seedless or abortive; the upper large and seed-bearing, the seeds separated by transversal partitions. Fruit constricted at the level of the partitions.

1. *R. RAPHANISTRUM* L. var. *RAPHANISTRUM* -- Wild Radish, Jointed Charlock (*Rave sauvage*, *Ravenelle*) -- Fruit large and thick, 3-7 cm long, becoming moniliform in drying, breaking up into a series of strongly ribbed articles. Root thin. Petals 1-3 cm long, variable in colour. Silique with 1-8 one-seeded articles. Beak 1.5-2.5 cm long, rather cylindrical. Summer and early fall. Rare and evanescent weed of cereal crops: Tisdale, Two Hills. -- G, L-SPM, NS-O, S-(Alta)-BC, US, Eur -- Var. *SATIVUS* (L.) Beck -- Radish (*Rave*, *Radis*) -- Root thin or inflated into a Radish. Fruit shorter, 2-5 cm long, fleshier, not moniliform nor ribbed in drying, not disarticulating at maturity. Beak coarse and conical, usually about as long as the body of the silique. Summer and fall. Cultivated and infrequently reseeding itself in loose soil for a year or two; rarely as a weed in crops. -- (G, Aka), NS, NB-Man, BC, (US, Eur).

## 14. RAPHISTRUM Crantz

Silique divided transversally into two segments and breaking up at the partition. Lower segment short-cylindrical; upper segment subglobular, apiculate, strongly ribbed, one-seeded, indehiscent.

1. *R. PERENNE* (L.) All. (*Raphanistrum perenne* sphalm.) -- Fruit clavate, the dilated half with 8 very strong ribs. Stiffly hirsute below. Leaves pinnatifid. Silique about 1 cm long, glabrous. First half of summer. Very local weed of field crops: Grenfell, Broadview. -- S, Eur.

## 15. BARBAREA Br.

## WINTER CRESS

Like *Rorippa*, but the silique elongate and narrow, so that the seeds are crowded into a single row.

1. *B. vulgaris* Br. (*B. americana* Rydb.; *B. orthoceras* Led.; *B. stricta* Andrz.) -- Wintercress, Yellow Rocket (*Cresson de terre*, *Cresson d'hiver*) -- In ditches and other wet places, a very conspicuous yellow-flowered. Crucifer in late spring and very early summer. Stiffly erect biennial. Leaves clasping at base, pinnatifid to pinnatipartite, the terminal lobe much the larger. Flowers pale yellow. Siliques divergent to nearly appressed. Late spring to mid summer. Shores and wet, open pla-

ces; sometimes weedy. -- (G), Mack-Aka, L-SPM, NS-BC, US, Eur.

Variable, especially the silique, but we fail to detect anything of interest in the proposed segregates. Most commonly American authors will distinguish an introduced B. vulgaris with larger flowers and a longer beak to the silique, as against a native B. orthoceras. European authors make a parallel distinction between a B. vulgaris and a B. stricta (or B. intermedia Boreau) the latter with smaller flowers and shorter beak. These have never appeared to us as patently distinct populations in the field, while in the herbarium they are part of a morphological continuum. We remain unconvinced, hence the consolidation.

#### 16. RORIPPA Scop.

A basic type, somewhat heterogeneous, with yellow flowers. Pubescence lacking or of simple hairs. Fruit short to elongate, commonly a silicle, but sometimes a typical silique, nearly terete, the seeds in two rows in each locule. Leaves usually pinnately and deeply lobed.

The following treatment takes into account an unpublished monograph by R.L. Stuckey dated 1965.

- a. Main stem-leaves entire to merely serrate.
  - b. Petals longer than the sepals; silicle 1.0-1.5 mm long ..... 2. R. austriaca
  - bb. Shorter than the sepals; silicle longer and ± cylindrical ..... 5. R. curvipes
- aa. Deeply lobed.
  - c. Fruit a typical and elongate silique, much longer than its pedicel ..... 7. R. Nasturtium-aquaticum
  - cc. Fruit a silicle or a short silique on a long pedicel.
    - d. Biennial or annual; petals 1-2 mm long.
      - e. Pedicel 1.5-3.0 mm long ..... 4. R. tenerima
      - ee. Longer ..... 6. R. islandica
    - dd. Perennial; petals much longer.
      - f. Style at least 1 mm long ..... 3. R. sinuata
      - ff. Not exceeding 1 mm ..... 1. R. sylvestris

1. R. SYLVESTRIS (L.) Besser -- Water-Rocket (Herbe à l'oie) -- Silique very thin, less than 1 mm wide. 1.0-1.5 cm long and borne on a pedicel nearly as long. Glabrous or puberulent perennial. Leaves pinnatipartite. Style 0.5-1.0 mm long. Summer. Rare garden weed. -- (G, NF, NS-NB)-Q-(O)-Man-BC, (US, Eur).

Known to us only from Morden, Regina, Olds and Banff. All DAO.

2. R. AUSTRIACA (Crantz) Besser -- Leaves merely serrate, lanceolate. Glabrous perennial. Pedicels many times as long as the small fruit. Silicle ovoid to oblong, 1.0-1.5 mm long, the style about 1 mm long. Early summer. Rare weed of roadsides and cultivated fields: Pilot Mound, Greenstreet, Ft.

Sask. -- Man-Alta, US, Eur.

3. R. sinuata (Nutt.) Hitchc. (R. columbiae AA.) -- Rather similar to R. sylvestris, but the silique larger and the inflorescence, including the fruits, puberulent with small vesicular hairs similar to those of Chenopodium. Pedicel about as long as the fruit. Silique 6-10 mm long, 1-2 mm wide. Style 1-2 mm long. Late spring to early fall. Rare on shores, infrequent as a weed. -- (O), sS-Alta, US.

4. R. tenerima Greene (R. obtusa AA.) -- Like R. islandica with the silicle usually smaller and on a shorter pedicel, (1.5)-2.0-2.5-(3.0) mm long. Glabrous or the silicle minutely vesicular like last. Petals very small, about 1 mm long. Fruit longer than its pedicel. Summer. Wet ground. -- (Mack), swAlta-BC, US.

We have checked specimens from Del Bonita (DAO), Sage Creek (CAN), Calgary (TRT) and Kamloops (DAO). Otherwise nearly all specimens found under R. obtusa at DAO and MTJB have been revised to R. islandica. We do not know to what extent other herbaria need to be similarly reviewed.

An Alaska report by Hultén 1950 was based on a specimen revised to R. curvisiliqua by Stuckey.

5. R. curvipes Greene -- Pedicels often strongly recurved. Leaves entire to merely serrate, oblong to oblanceolate. Inflorescence often secund. Pedicels ascending to recurved, mostly 2-5 mm long, mostly about as long as the silicle, the latter glabrous. Petals as short or shorter than the last. (Late spring and summer?). Wet ground. -- (S-BC, US).

Reported by Stuckey from Caron, Craigmyle, Crow's Nest, Rosedale and Milk River.

6. R. islandica (Oeder) Borbas (var. Fernaldiana Butters & Abbe, var. hispida (Desv.) Butters & Abbe; R. hispida (Desv.) Britton; R. curvisiliqua AA.; R. palustris (L.) Besser; Radicula palustris (L.) Moench, var. hispida (Desv.) Rob.) -- Watercress, Marsh-Cress (Cresson de marais) -- Petals small, 1.5-2.0 mm long. Highly variable annual or biennial plant. Glabrous to hispid. Leaves pinnatifid with a much larger terminal segment. Fruit exceedingly variable, commonly a fat, oblong silicle, about as long as its pedicel. Summer. Wet places, sometimes weedy. -- G, (seK)-Mack-Aka, L-(NF), NS-BC, US, (CA, Eur).

The collection Macoun, Indian Head, 1895 (DAO) was reported as R. curvisiliqua (Hooker) Bessey by Russell 1954 and as R. sinuata by Breitung 1957. We have revised it to R. islandica.

We are not yet convinced that any of the proposed segregates represents a taxonomically significant entity.

7. R. NASTURTIIUM-AQUATICUM (L.) Hayek var. NASTURTIIUM-AQUATICUM -- (Nasturtium officinale Br.; Radicula Nasturtium-aquaticum (L.) Britten & Rendle) -- Watercress (Cresson, Cresson de fontaine) -- Siliques more elongate, (1.2)-1.5-(1.8) cm long and falcate. Leaves seemingly pinnate. Segments mostly 5-9, oblong to suborbicular, the terminal one slightly larger. Stems reclining, soft and weak. Flowers whitish. First half of summer. Creeks and springy places. Rarely cultivated, locally

naturalized at Banff and Pincher Creek. -- NS, sQ-O, swAlta-BC, US, CA, (SA), Eur -- Var. LONGISILIQUA (Th. Irmisch) Boivin (Nasturtium microphyllum (Boenn.) Rchb.) -- Siliques more elongate, 1.5-2.5 cm long. Well established at Aweme. -- NF, PEI-Man, BC, US, Eur, (Afr) -- I. Var. STERILIS (Airy-Shaw) Boivin -- Sterile. Pollen essentially sterile; ovaries not ripening into fruits. An introduced hybrid of our two varieties, known locally at Banff. -- NS, Alta, (US), Eur.

An earlier report of Nasturtium officinale from Manitoba was based on a Rorippa and was discounted by Scoggan in 1957.

Aweme (or Shilo) where we found var. longisiliqua in 1951 and 1959 is an old settlement on the sandy Agassiz deltaic deposits near the junction of the Souris and the Assiniboine. It is now a nearly deserted locality, and not readily identified on modern maps. But it remains well known in biological annals because of the multifarious scientific activities of the many members of the famous Criddle family.

#### 17. ARMORACIA Gaertner, Meyer & Scherbius

Very close to Rorippa; the fruit a silicle, but the flowers white.

1. A. RUSTICANA G., M. & S. (A. lapathifolia Gilibert; Radicula Armoracia (L.) Rob.; Roripa Armoracia (L.) Hitchc.) -- Horseradish (Raifort, Moutarde des Capucins) -- With very large basal leaves on long petioles; the limb (1)-2-3-(5) dm long, ± lanceolate and dentate. Stem about 1 m high. Lower leaves ± pinnatifid; upper leaves ± lanceolate and merely dentate. Inflorescence large and showy. Silicle small, obovoid. Early summer. Cultivated and persisting, sometimes spreading to ditches and roadsides. -- (NS)-PEI-(NB)-Q-BC, US, Eur.

An extension of range to Alaska by Hultén 1945 was probably based on cultivated material since it was based on a collection by Anderson and is not mentioned in the latter's flora.

#### 18. CARDAMINE L.

#### BITTER CRESS

Somewhat similar to Arabis, but the valves elastic and thus becoming spirally coiled upon dehiscence. Glabrous or with simple hairs. Leaves mostly deeply divided to pinnate. Flowers white to purple. Silique thin and long.

- a. Stem leaves entire to coarsely toothed.
  - b. Entire ..... 1. C. bellidifolia
  - bb. Coarsely toothed ..... 2. C. bulbosa
- aa. Stem leaves deeply divided to pinnate.
  - c. Flowers large, the petals 8-13 mm long ..... 3. C. pratensis
  - cc. Flowers clearly smaller.
    - d. Stem pubescent below ..... 5. C. scutata
    - dd. Stem glabrous below.
      - e. Stem leaves with oblanceolate to linear leaflets ..... 6. C. parviflora

ee. Leaflets larger, the terminal one elliptic to reniform ..... 4. C. oligosperma

1. C. bellidifolia L. -- Small tufted alpine perennial with entire, ovate leaves. Only 2-10 cm high. Racemes few-flowered, often maturing only 1-3 siliques. Early summer. Rocky alpine slopes and shale slides. -- G-Aka, L, nQ, swAlta-BC, US, Eur.

2. C. bulbosa (Schreber) BSP. -- Spring-Cress -- Perennial from a fleshy bulb. Leaves reniform to lanceolate, mostly coarsely toothed. Stem solitary, usually simple with a terminal raceme of fairly showy flowers. Mid spring. Wet ground, uncommon. -- swQ-seMan, US.

3. C. pratensis L. var. angustifolia Hooker (var. palustris Wimm. & Graebn.) -- Mayflower, Lady's Smock (Fleur du tonnerre, Chasseraige) -- Leaflets of the stem-leaves narrow and all alike, not or little decumbent, entire, usually petiolate. Basal leaves often with round leaflets, all alike. Stem nearly always simple with a showy raceme of white to pink flowers. First half of summer. Wet and boggy places. -- G-Aka, L-SPM, Q-BC, US, Eur.

Grades into the more northern var. pratensis in which the leaflets are somewhat coarsely toothed, or at least the basal leaves have a three-toothed terminal leaflet.

4. C. oligosperma Nutt. var. kamtschatica (O.E. Schulz) Detling (C. umbellata Greene) -- Inflorescence short, the rachis mostly 1-2 cm long only. Stem simple or slightly branched. Basal leaves many, mostly with suborbicular leaflets, the terminal one much larger and trilobed to crenate. Stem leaves fewer, with narrower and longer leaflets. Early to mid summer. Mountain creeks. -- Y-Aka, swAlta-BC, (US, Eur).

In the more western var. oligosperma the inflorescence elongates and the rachis is usually over 3 cm long. In our more widespread variety the raceme is more condensed, often subumbellate.

5. C. scutata Thunb. (C. pennsylvanica Muhl.) -- Bitter Cress -- More or less hispid below the middle, or exceptionally glabrous when submerged earlier. Commonly, the stem rather branchy. Leaflets variable, the larger lateral ones 3-10 mm wide, decurrent on the proximal side, usually toothed, the terminal one larger. Fruiting racemes ± secund on the lateral branches. Flowers small, the petals 2-4 mm long. Style at least 0.5 mm long. Late spring and early summer. Wet soils, usually near streams. -- (sMack-Aka), NF-SPM, NS-(PEI-NB)-Q-BC, US, Eur.

Our C. pennsylvanica is not obviously different from the asiatic C. scutata, as pointed out to us by a visiting Japanese botanist.

6. C. parviflora L. (var. arenicola (Britton) O.E. Schulz) -- Similar to the preceding, but glabrous throughout. Annual or biennial. Leaflets smaller, 1-3 mm wide, rather all similar, not decurrent and usually entire. Racemes not secund, the branches being incurved. Style short, often less than 0.5 mm. Early



summer. Dry, rocky outcrops, sometimes weedy. -- Mack, (NS, NB) -Q-seMan, Alta-(BC), US, Eur.

American plants, var. arenicola, are supposed to differ somewhat from the eurasian phase, but our specimens do not conform to the differences as expressed in the floras consulted.

#### 19. PHYSARIA Gray

Like Lesquerella, but the silicle greatly inflated into a pair of bladders fused to the much narrower septum.

1. P. didymocarpa (Hooker) Gray var. didymocarpa -- Twin-Pod -- Small alpine perennial with a big and deep tap-root. Stellate-pubescent throughout. The inflated pod perhaps 1 cm across. Style becoming 5-10 mm long in fruit. Early summer. Alpine prairies and screes. -- swAlta- (seBC, US).

Various other varieties are recognized further south, including a larger fruited var. lyrata C.L. Hitchc.

#### 20. LESQUERELLA Watson

A basic type with silicles and yellow flowers. Stellate-pubescent. Pod neither flattened nor greatly inflated, dehiscent at maturity. Stem-leaves entire or nearly so, cuneate at base.

- a. Pedicels recurved in fruit ..... 2. L. ludoviciana
- aa. Pedicels ascending.
  - b. Pod globose or depressed-globose ..... 1. L. arctica
  - bb. Pod elongate, ovoid to narrowly ellipsoid ..... 3. L. alpina

1. L. arctica (Wormsk.) Watson var. arctica -- Much like the following, however the pedicels not recurved but ascending and usually straight, or slightly sigmoid. Flowers yellow. Pod glabrous. First half of summer. Loose gravels and sandy beaches: Churchill. -- G-Mack, Alca, (L)-NF, Q, nMan, nBC, (Eur)-- -- Var. Purshii Watson (L. Purshii (Watson) Fern.) -- Pods minutely white-dotted with stellate hairs. -- F, Mack-Alca, NF, seQ, swAlta-nBC.

The Alberta mention of L. arctica by Macoun 1898 was based on a Spreadborough collection from Lake Brulé (CAN; DAO, photo) in Alberta. In 1937 this specimen was correctly revised by Dr. A.E. Persild to var. Purshii.

Our two varieties have largely coincident distributions in the overall picture, but not so within our area. The type with the stellate pods is the usual one in the Rockies and around the Gulf of Saint Lawrence; elsewhere the glabrous pod is dominant.

Other classifications have been proposed, including one in which our plant is subdivided into 2 species disjunct by some 400 miles. But to achieve this, many of our specimens would have to be identified by placing the emphasis now on one character, now on another, according to their place of origin and in relation to a preconceived distributional pattern.

2. L. ludoviciana (Nutt.) Watson var. arenosa (Rich.) Watson (L. arenosa (Rich.) Rydb.; L. argentea AA.) -- An inconspicuous species of dry hills with racemes of recurved pedicels becoming readily entangled. Perennial with numerous widely spreading stems 0.5-2.0 dm long. Densely stellate-pubescent. The yellow petals often red-tinged. Pod globular. Very early spring to early summer. Dry or eroded hills and sandy soils in the prairie region. -- Man-Alta, cnUS.

Grades further south into a var. ludoviciana with more erect and longer stems, petals yellow and the racemes little, if at all, secund.

3. L. alpina (Nutt.) Watson var. alpina (var. spatulata (Rydb.) Payson; L. spatulata Rydb.) -- Pod elongate. Similar to the preceding, but more erect, flowers yellow and the pods erect on ascending or more commonly sigmoid pedicels. Style about half as long as the pod. Late spring and early summer. Badlands. -- swS-sAlta, US.

In our variety the stem normally elongates in flower and fruit until it is many times taller than the rosette leaves. A more southern type, var. condensata (Nelson) C.L. Hitchc. is shorter, the rosette leaves often overtopping the inflorescence or nearly so.

#### 21. HUTCHINSIA Br.

Silicle compressed laterally, but only slightly so and the stigma sessile. Flowers white. A rather small and unspecialized type.

1. H. procumbens (L.) Desv. -- Small and insignificant plant, annual and less than 2 dm high. Leaves few, small, entire, or the lower sometimes pinnatifid. Petals and sepals about 1 mm long. Pod 1.5-3.5 mm long, obovate to oblong. Late spring to early summer. Shores. -- L-NF, nMan-S-(Alta)-BC, US, Eur.

Unaccountably very rare and very sporadic. Or perhaps maybe too small and easily overlooked. For our area we have examined specimens from Churchill, Parkberg and Little Inglebright.

#### 22. CAPSELLA Med.

#### SHEPHERD'S PURSE

Silicle strongly flattened laterally and obdeltoid.

1. CAPSELLA BURSA-PASTORIS (L.) Med. -- Pick-Pocket, Shepherd's Purse (Tabouret, Corne de lion) -- The very flat silicle obdeltoid to obtriangular or somewhat obcordate. Basal leaves pinnatifid. Stem-leaves mostly entire. All summer. Common weed of disturbed ground. -- G-F, Mack-Aka, L-SPM, NS-BC, US, (SA), Eur, (Oc).

#### 23. CAMELINA Crantz

#### FALSE FLAX

Similar to Lesquerella, but the silicle flattened at the edge into a narrow peripheral wing.

- a. Style 1.5-2.0 mm; the body of the silicle not more than 3 times as long as the style ..  
 ..... 3. C. microcarpa
- aa. Style shorter, 0.5-1.5 mm long, but the body of the silicle longer.
- b. Seed nearly twice as long as wide ..... 1. C. sativa
- bb. Seed about as wide as long ..... 2. C. Parodii

1. C. SATIVA (L.) Crantz -- Dutch Flax, False Flax (Sésame d'Allemagne, Sésame bâtard) -- Similar to the more common C. microcarpa, but the fruit larger and the pubescence essentially of stellate hairs. Body of the pod 6-10 mm long, obovoid, ± stipitate. Style 0.5-1.5 long on the mature pod. Seed about 1 mm wide, nearly twice as long. Summer and early fall. Casual weed of disturbed soils. -- Mack, (Aka), NS, Q-BC, (US), Eur.

2. C. PARODII Ibarra & La Porte (C. dentata AA.) -- Nearly identical to the preceding and perhaps only varietally distinct. Seed larger, 2 X 2 mm. Body of the pod 5-6 mm long, nearly as wide as long, truncate at tip, the stipe indistinct. Late spring and early summer. Rare weed. -- eMan-salta, (US, SA).

This has appeared from time to time in cribbings from the Prairie Provinces and our knowledge of its distribution is mainly from this source. We know of actual specimens from only Arborg, Winnipeg and Aden. The Saskatchewan report rests solely on an envelope of cribbings from Delisle (DAO). Earlier reports from Swift Current were apparently based on a cultivated specimen (DAO).

3. C. MICROCARPA Andrz. -- Annual weed with obovoid and short-stipitate pods in lax racemes. Leaves entire, sagittate at base. Pubescence mixed, of small, stellate hairs and much longer hirsute hairs. Body of the silicle 3-6 mm long, obovoid, substipitate. Style 1.5-2.0 long on the mature pod. Seeds about 1 mm long, slightly narrower. Late spring to mid fall. Frequent weed of disturbed soils. -- NF, NS-BC, US, Eur.

#### 24. NESLIA Desv.

#### BALL MUSTARD

Silicle indehiscent, nearly globular and slightly flattened parallel to the septum.

1. N. PANICULATA (L.) Desv. var. PANICULATA -- Ball-Mustard -- A yellow-flowered weed with long racemes of small, nearly globular and indehiscent fruits. Annual, stellate-pubescent, often simple or nearly so. Pod about 2 mm wide, reticulate-rugose. Early summer to early fall. Frequent weed of disturbed soils. -- Mack-Y-(Aka), NF, NS-BC, (US), Eur, Afr.

The valve of the pod, in the typical phase, lacks a midnerve. In southern Europe and the Near East it grades into a var. apiculata (F., M. & L.) stat. n., N. apiculata F., M. & L., Ind. Sem. Hort. Petr. 8: 68. 1842 with valves showing a well

defined midnerve, barely sinuous, continuous from base to summit, and more strongly rugose than the lateral nerves.

## 25. DRABA L.

Similar to *Arabis*, but the fruit shorter. A basic type with a typical silicle strongly compressed parallel to the septum. Flowers white or yellow. Hairs of 4 main types. Simple, forked, branched and stellate. Branched hairs have the branches spreading in all directions. Stellate hairs are lower, nearly sessile, with the branches parallel to the leaf surface and radiating from a central point.

- a. Stem leafless, or sometimes with a single small leaf ..... Group A  
 aa. Stem leafy ..... Group B

## Group A

Stem scapose.

- a. Annual; inflorescence very short and the pods 1.0-1.5 cm long ..... 17. D. reptans  
 aa. Perennial; inflorescence elongate and/or the silicles shorter.  
 b. Flowers yellow, sometimes fading white.  
 c. Leaves glabrous or somewhat ciliate towards the tip ..... 4. D. crassifolia  
 cc. Leaves more or less pubescent, at least on the back.  
 d. Stem glabrous ..... 6. D. oligosperma  
 dd. Stem pubescent.  
 e. Low plant with narrow leaves, averaging 1 mm wide..... 1. D. stenopetala  
 ee. Taller and the leaves wider, all or mostly 1.5-4.0 mm wide.  
 f. Leaves pilose to branched-pubescent ..... 2. D. alpina  
 ff. Leaves stellate-pubescent dorsally ..... 7. D. incerta  
 bb. Flowers white.  
 g. Leaves not ciliate, but densely and finely stellate throughout ..... 5. D. nivalis  
 gg. Long ciliate.  
 h. Densely stellate-pubescent throughout, including the silicles..... 12. D. cinerea  
 hh. Less pubescent, at least the silicles and stem glabrous or at the most pubescent near the base only.  
 i. Leaves glabrous, at least on back ..... 4. D. crassifolia  
 ii. Leaves more or less pubescent dorsally ..... 3. D. fladnizensis

## Group B

Stems leafy.

- a. Stem leaves all or mostly opposite ..... 17. D. reptans  
 aa. Alternate.  
 b. Flowers yellow.  
 c. Stem-leaves 1-5.  
 d. Pedicel  $\frac{1}{2}$  as long to slightly longer than the silicle ..... 15. D. stenoloba  
 dd. Pedicel longer,  $1\frac{1}{2}$  to 4 times as long as the silicle ..... 16. D. nemorosa  
 cc. Stem-leaves more numerous, commonly 10-15 ..... 8. D. aurea  
 bb. Flowers white.  
 e. Stem-leaves numerous, 6-25 per stem; biennial ..... 9. D. incana  
 ee. The stem less leafy; mostly perennial species.  
 f. Silicle glabrous.  
 g. Perennial; pedicels narrowly divergent ..... 10. D. hirta  
 gg. Biennial; pedicels widely divergent ..... 15. D. stenoloba  
 ff. Silicle pubescent.  
 h. Leaves somewhat long-ciliate towards the base; usually with only 1 stem leaf ..... 12. D. cinerea  
 hh. Not long-ciliate, merely stellate along the edge; stem leaves commonly 3-5.  
 i. Plant stellate-pubescent throughout, including the silicles ..... 13. D. lanceolata  
 ii. Fruit pubescence of simple hairs only, or in part bifurcate; stem long pilose towards the base.  
 j. Perennial with broadly lanceolate pods about 3mm wide ..... 9. D. McCallae  
 jj. Biennial with linear pods about 2 mm wide ..  
 ..... 14. D. praealta

1. D. stenopetala Trautv. var. stenopetala (D. densifolia AA.; D. Paysanii var. Trelessii (O.E.S.) C.L.H.) -- Small alpine perennial, densely pulvinate, the branches of the caudex densely covered with a sheath of marcescent leaves. Scape up to 5 cm high. Branched-pubescent. Leaves broadly linear, up to 5 mm long and 1 mm wide, abundantly long-ciliate, somewhat pubescent with tangled hairs. Pod ovate. Early summer. Alpine shale slides. -- (Aka), swAlta-BC, US, Eur.

It would appear that earlier Canadian reports of D. densifolia were based on specimens of other species, mostly D. stenopetala. However the B.C. report by Taylor 1966 seems justified as it is presumably based on a correctly identified sheet from Sage Creek (DAO, and probably also at UBC).

Our typical variety has pods 2-5 mm long and styles 0.5-0.8 mm long. In the southern Rockies it grades into a var. Paysonii (Macbr.) stat. n., D. Paysonii Macbr., Contr. Gr. Herb. 56: 52, 1918 with bigger pods, 5-8 mm long, and longer style,  $\pm 1$  mm.

Hultén 1945 points out the similarity of the siberian D. stenopetala with the american D. densifolia Nutt. Actually, by its smaller and more pubescent leaves and its small pod, D. stenopetala is closer to one of the segregates of D. densifolia, namely D. Paysonii, hence the nomenclature followed here. D. stenopetala is the earlier name by nearly 40 years for our Rocky Mountain plant.

2. D. alpina L. (var. Hydeana Boivin) -- Large scapose species with rather large pods and leaves, the flowers yellow. Leaves usually 3-5 mm wide, mostly oblanceolate, long-ciliate and pubescent, at least dorsally, with simple or forked or, usually, branched hairs. Mostly 1.0-1.5 dm high. Petals yellow, 4-5 mm long. Silicle very variable, commonly ovate to oblong and 4-5 mm wide, often purplish. Early summer. Open and rocky places in arctic tundra. -- (G)-F-Mack-(Y)-Aka, L, nQ-(O)-nMan, Eur.

Reports from Alberta and B.C. proved to be all based on other species and specimens found under that name in various herbaria have all been revised to other entities such as D. incerta, etc.

3. D. fladnizensis Wulfén var. heterotricha (Lindblom) Ball (D. lactea Adams) -- Resembling D. alpina, but smaller, the flowers white and the stem glabrous above the base. Leaves branched-pubescent dorsally, long ciliate, the cilia often forked or branched. Petals sometimes fading yellowish. Style short. Early summer. Wet sands and gravels in the arctic. -- (G)-F-K-(Mack-Y)-Aka, L, Q, nMan, (swAlta-BC), Eur.

All Manitoba collections were atypical, the leaves being glabrous dorsally, but abundantly ciliate with stellate hairs.

In the typical phase found in Eurasia and the northwest of us, the leaf pubescence is of simple hairs only, while they are dimorphic in our variety being stellate dorsally and simple or bifurcate marginally.

4. D. crassifolia Graham var. crassifolia (D. albertina Greene; D. Parryi Rydb.) -- Glabrous or nearly so and the leaves slightly fleshy. Otherwise quite similar to the preceding. Up to 1 dm high. Stigma sessile or very nearly so. Early summer. Alpine ridges and gravels. -- (G)-F-K-(Mack)-Y-(Aka, L), Q, swAlta-BC, US, Eur.

In the more southern and nevadan var. nevadensis C.L. Hitchc. the stem and inflorescence are pubescent.

5. D. nivalis Lilj. var. nivalis -- A small perennial species with the leaves densely and finely stellate-pubescent, not

ciliate. Flowers white. Scape mostly about 5 cm high. Silicle  $\pm$  lanceolate, flat to slightly twisted, less than 1 cm long. Early summer. Rocky outcrops north of or above timberline. -- G-Mack-(Y)-Aka, (L-NF), Q-nMan, swAlta-BC, (US), Eur -- Var. slongata Watson (D. lonchocarpa Rydb.) -- Fruit longest and most twisted. Silicle 1.0-1.5 cm long, linear, twisted by  $\frac{1}{2}$  to  $1\frac{1}{2}$  turns. -- (Y-Aka), swAlta-BC, (US).

6. D. oligosperma Hooker var. oligosperma -- Resembling D. stenopetala by its marcescent leaves forming a dense sheath around the branches of the caudex, but the scape glabrous and the leaves appressed-stellate-pubescent. Scapes 1-6 cm high. Leaves linguiform, 1 mm wide or less, the pubescence not very abundant and all of stellate hairs. Silicle  $\pm$  ovate. Spring. Dry rocky slopes, usually below timberline. -- (Mack-Aka), swAlta-BC, US.

The last monograph recognizes a diminutive phase known from California as var. subsessilis (Watson)Schulz.

7. D. incerta Payson -- Much as D. alpina, but the leaves stellate-pubescent dorsally. More loosely tufted. Scape pubescent. Leaves often narrower, commonly 1.5-2.5 mm wide and oblanceolate. Silicle green,  $\pm$  3 mm wide and most often broadly lanceolate. Spring and early summer. Shale slopes above timberline. -- (Mack), swAlta-BC, wUS.

8. D. aurea Vahl. var. aurea (D. minganensis (Vict.) Fern.) -- The stem very leafy like D. incana, but the flowers yellow and usually a short-lived perennial. Stellate-pubescent throughout, the stem also somewhat pilose. Pod lanceolate, slightly twisted, puberulent, the hairs often simple, short and reflexed. First half of summer. Subarctic or subalpine, on gravelly or sandy shores and cliffs, especially if disturbed. -- (G), K, (Y-Aka), L, Q-BC, US -- Var. leiocarpa (Payson & St. John) C.L. Hitchc. -- Silicle glabrous. -- (Alta)-BC, (US).

9. D. McCallae Rydb. -- Closer to the last by its pubescence, but more similar to D. hirta by its habit. Herbage stellate-puberulent throughout but the stem long pilose below. Stellate hairs with simple branches. Stem leaves (3)-5-(12). Flowers white, fading yellowish. Silicle (7)-8-10-(12) mm long, (2)-3-(4) mm wide, narrowly oblong to lanceolate, densely puberulent with simple and somewhat ascending hairs. Early summer. Alpine gravels and talus slopes. -- swAlta-neBC.

10. D. incana L. (var. confusa (Ehrh.) Lilj.) -- Very leafy biennial. 1-4 dm high. Stem and leaves densely pubescent, the pubescence mixed, part stellate, part pilose. First year rosette very dense, hemispherical, marcescent. Leaves numerous, dentate. Flowers white. Pod lanceolate, slightly twisted. Mid summer. Usually on gravel, especially if disturbed. -- G, K, L-SFM, PEI, Q-nMan, (US), Eur.

Macoun and other older authors were wont to use this name in the sense of D. hirta, but his report of 1883 from the Bow River Pass turned out to be based on a specimen of D. aurea (CAN; DAO, photo). The numerous Manitoba reports proved to be all based on misidentifications except those from Churchill.

The Bell collection from York Factory in 1880 (QK; DAO, photo) was a D. hirta, while his Churchill River collection of 1879 (QK; DAO, photo) is more accurately referred to D. lanceolata. Similarly, Macoun's reports from B.C. were also based on specimens of other white-flowered species, including D. lanceolata.

11. D. hirta L. var. hirta (D. arabisans Mx.; D. dahurica sphalm.; D. daurica DC.; D. glabella Pursh) -- A middling species with white flowers and leafy stem. Perennial. Leaves dentate, the stem ones usually 3-5. Stellate-pubescent throughout, except the glabrous pods. Hairs doubly stellate, some of the primary branches being minutely branched toward the tip. Stems 1-4 dm high. Silicle about 1 cm long, lanceolate, flat to slightly twisted. Early summer. Dry cliffs and gravels.-- G-Mack-(Y)-Aka, L-NF-(SPM), NS, NB-Man, (BC), US, Eur.

We can detect no substantial difference between D. arabisans, D. daurica and D. glabella. And D. arabisans is the earliest name. But we have used the still earlier D. hirta, a name discarded by most authors because of past misuse, abuse and confusion.

Two other varieties occur around the Gulf of Saint Lawrence, a var. laurentiana (Fern.) Boivin with the stem pubescence mixed with longer and simple hairs towards the base, and a var. pycnosperma (Fern. & Knowlt.) Boivin with shorter and fleshy pods.

12. D. cinerea Adams -- Intermediate between the scapose and leafy species, the stem usually bearing only 1 leaf. Fruiting stems about 1 dm high. Densely stellate-puberulent throughout, and pubescent on the leaf faces and pods with doubly stellate hairs, like the last, the leaves also long-ciliate below the middle. Leaves 1-4 mm wide, ovate to oblanceolate. Flowers white, often drying yellow. Early summer. Silicles oblong to lanceolate. Sandy or gravelly shores and banks. -- G-(F)-K-Mack-(Y-Aka), Q-nO, nWS-swAlta-(nBC), Eur.

The only reported Manitoba collection, E. Beckett 184a, Churchill, Aug. 1, 1953 (CAN; DAO, photo) has been revised to D. lanceolata.

13. D. lanceolata Royle -- Silicles pubescent with partly stellate hairs. Otherwise pretty much like a smaller D. hirta and perhaps of debatable value. Early summer. Dry gravels and cliffs. -- G, seK, Y-(Aka), L, NB-Q-(O)-nMan-nS-swAlta-BC, US, Eur.

14. D. praealta Greene -- Siliques elongate and  $\pm$  linear like the next, but pubescent and the flowers white. Biennial, pubescent throughout and often much branched below. Pedicels about half as long as the siliques, the latter erect and mostly 1.0-1.5 cm long. Mid spring to early summer. Open rocky places -- Mack-(Y), swAlta-BC, US.

15. D. stenoloba Led. var. stenoloba -- Flowers yellow, often lightly pink-tinged near the tip. Biennial plant, glabrous above the middle, lightly stellate-pubescent below, including the leaves. Stem leaves few. Siliques erect, lanceolate to linear, about as long as the widely divergent pedicels.



Early to mid summer. Subalpine to alpine slopes. -- (Y)-Aka, swAlta-BC, (US) -- Var. nana (O.E. Schulz) C.L. Hitchc. -- Stem more coarsely pubescent, mainly pilose, the hairs spreading and mostly simple to bifurcate. Leaf pubescence tending to be similar. -- Y, swAlta-sBC, US.

Var. nana may be an essentially sympatric segregate, hence of questionable value.

16. D. nemorosa L. var. nemorosa (D. nemoralis sphalm.)-- Annual with lanceolate silicles on very long pedicels. Pilose to stellate-puberulent throughout, including the puberulent pods. Leaves variable, often rather large for the genus. Pedicels 0.7-3.0 cm in fruit. Early spring to early summer. Light soils, especially if disturbed. -- O, sS-BC, US, Eur -- Var. leiocarpa Lindblom (D. lutea Gilib.) -- Fruit glabrous. -- F, Mack-Y-(Aka), swQ-Alta-(BC), US, Eur.

17. D. reptans (Lam.) Fern. var. micrantha (Nutt.) Fern. (var. stellifera (O.E. Schulz) C.L. Hitchc.; D. caroliniana Walter var. micrantha (Nutt.) Gray) -- Silique elongate, like the last three, and annual, but the pedicels very short. Less than 1 dm high, tufted and easily overlooked. Leaves coarsely pubescent, all basal, or some of them borne near the base and mostly opposite. Stem naked for most of its length. Inflorescence short, its rachis shorter than the pods. Siliques strigose, 1.0-1.5 cm long, mostly 3-5 times longer than their pedicel. Early to mid spring. Sandy or gravelly prairie, especially if disturbed. -- sMan-sS-sAlta, US.

The more eastern typical phase has glabrous pods.

#### 26. SMELOWSKIA C.A. Meyer

Resembles Draba or Eutrema, but the silicle barely compressed and strongly keeled along the midnerve of the valves.

1. S. calycina (Stephan) C.A. Meyer var. americana (Regel & Herder) Drury & Rollins -- Similar to Draba, but the leaves pinnatifid. Densely tufted perennial. Pubescent throughout, but the density variable; usually the basal leaves are whitish-stellate and the inflorescence is long villous. Stem leaves more deeply divided than the basal ones. Silicle  $\pm$  1 cm long, narrowly oblanceolate, lightly long villous to glabrous. Early summer. Alpine rock slides and rocky ridges. -- swAlta-sBC, (US).

The more northern var. integrifolia (Seeman) Rollins has the leaves entire or merely slightly toothed.

#### 27. THELLUNGIELLA O.E. Schulz

Similar to Arabis, but the silique terete and the whole plant glabrous. Flowers white.

1. T. salsuginea (Pallas) O.E. Schulz (Arabidopsis glauca (Nutt) Rydb.; Halimolobos virgata AA.) -- Glabrous and glaucous biennial resembling an Arabis. Rather branchy. Stem leafy, the leaves oblong, entire, deeply amplexicaul. Siliques nearly

erect on widely divergent pedicels. Mid spring to mid fall.  
Sandy alkaline soils. -- Mack-Y, (W0)-Man-BC, (US, Eur).

## 28. ARABIS L.

ROCK CRESS

A basic type with a typically narrow silique flattened parallel to the septum. Flowers white to mauve. Silique dehiscent to the tip, without a beak. Stigma sessile or nearly so. Pubescence present, of branched or stellate hairs, often with some simple ones mixed in. One species is quite atypical.

- a. Siliques recurved-falcate and slightly ascending to descending or pendulous and straight.
  - b. Pedicels sharply reflexed at base; siliques pendent, straight ..... 9. A. retrofracta
  - bb. Pedicels and siliques spreading to descending.
    - c. Silique 2-5 cm long ..... 8. A. Lemmonii
    - cc. Longer, 5-10 cm, but narrower.... 7. A. divaricarpa
- aa. Siliques ascending to erect, mostly straight.
  - d. Pedicels and siliques closely appressed to the rachis and parallel to one another.
    - e. Silique  $\pm$  1 mm wide, cylindrical to  $\pm$  flattened.
      - f. Flowers yellow, silique 5-9 cm long ..... 2. A. glabra
    - ff. Flowers white, silique 3-5 cm long ..... 4. A. hirsuta
  - ee. Siliques 1.5-3.0 mm wide, strongly flattened.
    - g. Rosette leaves with malpighiaceous pubescence ..... 5. A. Drummondii
    - gg. Rosette leaves glabrous to densely stellate pubescent ..... 6. A. Lyallii
- dd. Pedicels and siliques  $\pm$  divergent.
  - h. Siliques 5-7 cm long ..... 7. A. divaricarpa
  - hh. Siliques 1-5 cm long.
    - i. Siliques 1.5-3.0 mm wide.
      - j. Siliques 3-5 cm long ..... 6. A. Lyallii
      - jj. Siliques shorter, 1-3 cm long ..... 10. A. arenicola
    - ii. Siliques narrower, 0.5-1.5 mm wide.
      - k. Basal leaves lyrate to pinnatifid ..... 1. A. lyrata
      - kk. Entire ..... 3. A. Nuttallii

1. A. lyrata L. -- Rosette leaves sometimes dentate, but mostly lyrate-pinnatifid. Stems 1-3 dm high, often numerous. Stem leaves oblanceolate to oblinear, long cuneate at base. Siliques divergent, about 2-3 cm long. Mid spring to mid summer. Sandy places, especially in open Jack Pine forests. -- Mack-Aka, (Q)-0-BC, US, (Eur).

The distinction of a less pubescent var. kamchatica Fisher does not appear to be taxionomically significant.

2. A. glabra (L.) Bernh. (Turritis glabra L.) -- Tower-Mustard (Moutarde blanche, Tourette) -- Siliques terete, flowers yellow. Tall and stiffly erect biennial, somewhat glaucous, glabrous except near the base and on the rosette. Siliques (5)-6-7-(9) cm long, appressed. Summer. Sandy or rocky soils, in open or semi-open places, often weedy. -- Y-Aka, Q-BC, US, Eur.

3. A. Nuttallii Rob. -- Resembling A. lyrata but the leaves entire. Plant glabrous above, pilose below. Stem-leaves broader, oblong to oblanceolate, cuneate at base. Siliques divergent, about 2 cm long. Mid to late spring. Dry rocky places in the foothills. -- swAlta-BC, US.

Porsild 1951 would extend the range by about 600 miles to Withehorse in southwestern, Yukon. But the justifying specimen (CAN; DAO, photo) is rather unconvincing, being fragmentary, barely coming into flower and does not seem susceptible of uncontrovertible identification.

4. A. hirsuta (L.) Scop. var. hirsuta (var. pyncocarpa (Hopkins) Rollins; A. ovata (Pursh) Poirlet; A. pyncocarpa Hopkins) -- (Moutarde Blanche, Tourette) -- Stiffly erect and generally resembling A. glabra, but not so tall, hairy up to about the middle, the siliques somewhat flattened and shorter, 3-5 cm long. Petals 3-5 mm long. Pod tightly appressed to the rachis. Late spring to early summer. Dry open places. -- Mack-Aka, NS, NB-BC, US, Eur -- Var. glabrata T. & G. -- Flowers larger, the petals 5-10 mm long. Pubescence coarser, not so abundant and generally restricted to the lower part of the plant. -- (swAlta) -sBC, nwUS.

The american plants (var. pyncocarpa) reputedly differ from the eurasian ones. The difference, if real, is not evident to us.

5. A. Drummondii Gray var. Drummondii -- Siliques stiffly appressed as in A. glabra and A. hirsuta, but wider and strongly flattened. Biennial, 4-10 dm high. Rosette leaves and base of stem malpighiaceus-pubescent, otherwise glabrous. Siliques 5-7 cm long., 1.5-2.2 mm wide. First half of summer. Dry places near the edge of woods. -- Mack-Aka, (L-NF), NS, NB-BC, US -- Var. connexa (Greene) Fern. -- Siliques broader, 2.2-3.0 mm wide. -- NF, seQ, swAlta-sBC, (US).

6. A. Lyallii Watson -- Similar to the preceding, but shorter, perennial, stellate-pubescent, and the siliques not always tightly appressed. Stem (1)-2-3-(5) dm high. Rosette leaves densely stellate-puberulent to nearly glabrous, the plant otherwise glabrous. Flowers mauve. Siliques (2)-3-5-(6) cm long, 2.0-2.5 mm wide, tightly appressed to somewhat divergent, often only 5 pods or less per plant. Mid summer. Rocky places at alpine and subalpine levels. -- swAlta-BC, US.

7. A. divaricarpa Nelson var. divaricarpa (A. brachycarpa (T. & G.) Britton) -- A middling and variable type, with long and narrow siliques spreading at a variety of angles. Stem 3-8 dm high, hirsute near base. Rosette and lower leaves stel-

late-puberulent, the plant otherwise glabrous except sometimes the tips of the sepals. Flowers usually mauve. Siliques 5-7 cm long, (1.0)-1.5-2.2 mm wide, strongly flattened. Fruits straight and ascending at about 45° in the typical variety. Late spring to early summer. Dry and well drained, open places. -- Mack-(Y-Aka), NB-BC, US -- Var. dacotica (Greene) Boivin (var. hemicylindrica Boivin, var. pinetorum AA.; A. Bourgovii Rydb.; A. Holboellii var. pinetorum AA.) -- Inflorescence more variable. Siliques straight to falcate, spreading to descending, sometimes spreading at a variety of angles in the same inflorescence, or even nearly pendulous. Pedicels always glabrous, always ascending to spreading, or at most gradually recurved, never abruptly reflexed at base. Flowers ascending to spreading at anthesis. Inflorescence sometimes somewhat secund. More common in our area. -- Mack-Aka, Q-BC, US.

Var. dacotica is the common phase in the western part of the range. Further east it is highly localized and almost entirely replaced by the typical phase.

8. A. Lemmonii Watson var. Lemmonii -- Siliques falcate and more or less spreading in a secund raceme. Perennial, 1-4 dm high, stellate-puberulent below. Siliques (2)-3-4-(5) cm long, 2.0-2.5 mm wide. Mid summer. Alpine shale slides and outcrops. -- sAlta-BC, wUS -- Var. drepanoloba (Greene) Rollins -- Siliques broader, 2.5-3.5 mm wide. -- sAlta, wUS.

9. A. retrofracta Graham var. retrofracta (A. Holboellii Horn. var. retrofracta (Graham) Rydb.) -- Pedicels abruptly reflexed at base and normally stellate-puberulent. Biennial, stellate-puberulent below. Rosette leaves somewhat longer than the stem leaves. Inflorescence commonly somewhat secund. Flowers mostly white, spreading to descending at anthesis. Pods 4-5 cm long, about 1 mm wide, pendent, straight. Late spring and early summer. Dry and open places. -- Mack-Aka, scQ-BC, US -- Var. Collinsii (Fern.) Boivin (A. Collinsii Fern.; A. Holboellii Horn. var. Collinsii (Fern.) Rollins) -- Stem hirsute near the base, the pubescence coarser and simple or at least less divided than that of the rosette leaves. More common and especially frequent on dry hillsides. -- Mack-Y, Q-BC, US -- Var. multicaulis Boivin -- Short-lived perennial. Many-stemmed. Rosette leaves about twice as long as the few stem leaves. Pods 5-6 cm long, about 1.5 mm broad. Pubescence as in var. retrofracta -- Y, Alta.

Var. retrofracta and var. Collinsii have been gradually filling out to each other's range and may eventually turn out to be sympatric phenotypes of no particular significance.

The extension by Boivin 1966 of the range of var. multicaulis to Alaska was apparently a mere lapsus calami.

Our species is often treated as so many varieties under A. Holboellii Horn., but the latter has much larger siliques, 2.0-2.5 mm wide, falcate, strongly flattened and descendent rather than pendent. Further it seems restricted to Greenland and reports from various other areas, including those from Bic, Quebec, were based on specimens of other species. Reports by Hitchcock

1964 Rollins 1941 and Hultén 1945 of typical Holboellii from Wash., B.C. and northward have not been investigated yet.

10. A. arenicola (Rich.) Gelert var. arenicola -- Similar to A. Nuttallii, but the basal leaves dentate and the pods coarser. Perennial, glabrous, 1-2 dm high. Stem leaves slightly fleshy, oblong to oblanceolate, cuneate at base. Raceme secund or not. Silique straight, ascending, (1)-2-(3) cm long, 1.5-2.5 mm wide. First half of summer. Arctic and subarctic sands and gravels. -- G-neK, nL, nQ, nWS -- Var. pubescens (Watson) Gelert-- Basal leaves and lower part of stem hirsute. -- (F)-K-aMack, nQ-nMan-nWS.

## 29. ERYSIMUM L.

## TREACLE MUSTARD

Flowers yellow; silique not compressed; pubescence malpighiaceus, sometimes also partly stellate. Biennials or annuals.

- a. Flowers purple; pods purplish ..... 5. E. Pallasii
- aa. Flowers yellow; pods green.
  - b. Petals 15-25 mm; pods 6-10 cm long ..... 4. E. asperum
  - bb. Petals and fruits shorter.
    - c. Plants grayish-puberulent; petals 6-10 mm long.
      - d. Leaves with mostly 2-pronged hairs ..... 3. E. inconspicuum
    - dd. Mostly stellate with 3-5 branches ..... 2. E. hieraciifolium
  - cc. Plant green; petals 3-5 mm long ..
    - ..... 1. E. cheiranthoides

1. E. CHEIRANTHOIDES L. (Cheirinia cheiranthoides (L.) Link) -- Wormseed-Mustard, Treacle-Mustard (Herbe aux chantres) -- Tall, virgate, nondescript annual. Leaves lanceolate, entire or nearly so. Pedicels thin, about 1 cm long. The whole plant abundantly puberulent, yet remaining greenish. All summer. Disturbed soils. -- (sek)-Mack-Aka, NF, NS-BC, US, Eur, (Afr).

Reputedly native in Alaska (Hultén 1945) and in Saskatchewan (Breitung 1959). We are skeptical and note that the label data of the specimens at hand would hardly support this opinion.

2. E. HIERACIIFOLIUM L. (E. durum Presl & Presl) -- Very much like the next but the pubescence mainly stellate. Pods commonly appressed. Summer. Rare roadside weed: Staughton -- NS, Q-O, S, Eur.

There is also a sight record for Moose Jaw but no substantiating specimens for such a critical identification.

European botanists will often recognize the segregate E. durum mainly on its slightly smaller flowers and entire leaves (sinuate in E. hieraciifolium). The distinction may not be a tenable one as we have noticed a number of intermediate specimens, combining the smaller flowers with the sinuate leaves, and originating from various parts of the European range, including Sweden. Our introduced plants are a closer match for these intermediates.

3. E. inconspicuum (Watson) MacM. var. inconspicuum (E. parviflorum Nutt.; Cheirinia inconspicua (Watson) Rydb.) -- Similar to the following and often growing with it, but generally smaller and the pods narrowly divergent. Siliques 2-5 cm long. Pubescence almost entirely of malpighiaceus hairs, with a few stellate (3 branches) hairs mixed in. Early to mid summer. Steppes and disturbed soils. -- Mack-Y, NS, NB-BC, US.

Our variety has seeds  $\pm$  1 mm long. In fruit a var. coarctatum (Fern.) G.B. Rossbach may be distinguished by its larger seeds, 2 mm long or a bit less. Its siliques also average a bit longer. Var. coarctatum is a disjunct entity, being known from around the Gulf of Saint Lawrence and also from northern B.C. (at Taylor) to Alaska. All the material examined from Alaska belonged to var. coarctatum.

4. E. asperum (Nutt.) DC. var. asperum (Cheirinia aspera (Nutt.) Rydb.) -- Western Wallflower, Prairie-Rocket -- Very long, spreading and squarish pods. Grayish-puberulent throughout, 2-5 dm high. Leaves remotely dentate. The yellow flowers rather large for the family. Early summer. Rolling steppes and sandhills. -- Q-Alta-(BC), US.

Native with us, but only a casual adventive further east. Our typical phase may be contrasted with the following variety.

Var. angustatum (Rydb.) stat. n., E. angustatum Rydb., Bull. N.Y. Bot. Gard. 2: 171. 1901 has narrower leaves, (1)-2-3-(5) mm wide, and nearly all are entire. It is known only from Dawson and vicinity in Yukon. Reports from Alaska seem to be based on Yukon collections from the vicinity of Dawson.

5. E. Pallasii (Pursh) Fern. var. Pallasii -- The purple flowers large and showy; the pods half as long as the plant. Biennial, 1-2 dm high. Leaves linear, numerous, crowded. Petals 1-2 cm long. Siliques 6-10 cm long, ascending. Early summer. Shale and gravel slides. -- G-F, Mack-Y-(Aka, swAlta).

The alaskan var. bracteosum G.B. Rossbach is leafy-bracted in the lower part of the raceme(s).

### 30. ALYSSUM L.

### ALYSSUM

Superficially resembling Lepidium, but the silicle compressed parallel to the partition. Petals white, entire.

a. Silicle stellate-pubescent ..... 1. A. desertorum  
aa. Glabrous ..... 2. A. alyssoides

1. A. DESERTORUM Stapf (A. alyssoides AA.) -- Branchy annual, stellate-puberulent throughout, except the silicles. Sepals falling off before the silicle is fully grown. Pod about 3 mm wide, orbicular, very flat along the edge, but strongly convex nearer the center. Mid spring to late summer. Along roads and railways, rare. -- sMan-swAlta, nwUS, Eur.

2. A. ALYSSOIDES L. -- Closely resembling the first but the silicle stellate-pubescent, like the rest of the plant. Sepals persisting on the fruit until it is ready to shed its seeds. Early summer. Rare weed of waste places, first appeared in 1964 at Coleman. -- Q-O, swAlta-BC, US, Eur, (Oc).

### 31. BERTOCREA DC.

Resembles Draba, but the white petals are bifid. No rosette.

### ERYSIMUM

1. *B. INCANA* (L.) DC. -- Like a large, white-flowered *Dra-*  
*ba*. Annual, 1-10 dm high, densely stellate-puberulent through-  
out including the fruits. Leaves entire. Silicle topped by a  
thin style, about 1/3-1/2 as long as the body of the fruit. Sum-  
mer and fall. Roadsides and fields; locally abundant. -- NS,  
NB-S-(Alta)-BC, US, Eur.

The only Alberta report goes back to Groh 1944 and was ba-  
sed on an High River specimen which was returned to its collec-  
tor, hence is not readily verifiable.

32. *BRAYA* Sternb. & Hoppe

Variable. Our species resembles an *Arabis* or *Erysimum* with  
white flowers and torulose siliques.

1. *B. humilis* (C.A. Meyer) Rob. var. *interior* (Böcher)  
Boivin -- Lowermost flower (or fruit) bearing a bract  $\frac{1}{4}$  of the  
way up its pedicel. Tufted perennial up to 3 dm high. Leaves  
linear, the main ones remotely dentate. Flowers white and more  
or less purplish tinged. Silique straight or falcate, 1.5-3.0  
cm long, about 0.5 mm wide or slightly broader. Style about  
3/4 mm long. Stigma  $1\frac{1}{2}$ -2 times broader than the style. Around  
mid summer. Arctic shores and open sands and gravels. -- no-  
Man-- Var. *americana* (Hooker) Boivin (*B. Richardsonii* (Rydb.)  
Fern.) -- Bract about halfway up the pedicel. Leaves all or  
mostly entire. Siliques 1.0-2.5 cm long, about 1 mm wide. Style  
about 0.5 mm long. Stigma barely wider than the style. River  
gravels and roadsides in the mountains. -- (NF?), swAlta-(BC).

In a monograph of the genus by E.C. Abbe, *Braya* in Boreal  
Eastern America, *Rhodora* 50: 1-15. 1948, this species was sub-  
divided in taxa termed "races", but unnamed and merely numbered.  
These taxa are somewhat confluent morphologically and not always  
readily defined, yet they are of restricted distribution and of  
some taxonomic and phytogeographical interest. As could be ex-  
pected, the merely numbered races were soon to receive one or  
more names each. What is most remarkable is the wide variety of  
ranks used in naming a series of essentially comparable taxa;  
they range from form (*capitata*) to variety (*interior*) to subspe-  
cies (*arctica*) to species (*novae-angliae*). Two of these taxa  
were even placed into a segregate genus (*Torularia*). This wide  
range of usage reflects in part the lack of agreement among mo-  
dern taxonomists on the definition of the various taxonomic  
categories currently in use. It may also reflect the indifferen-  
ce of some taxonomists to the philosophic justification of said  
categories. The most common type of indifference is that of the  
taxonomist who would call everything a species. However this  
latter attitude does not seem to have come into play in the pre-  
sent case.

All these segregates of *Braya humilis* have the same nature  
and the same value; logically it would seem highly desirable that  
they be rated as all of the same rank. Which rank in this case  
corresponds to our concept of variety. Hence the following  
transfers with the concordance to Abbe's races.

Var. *Abbei* (Böcher) stat. n., *B. novae-angliae* (Rydb.) Th.  
Spr. ssp. *Abbei* (Böcher), *Medd. Grøn.* 124, 7: 21. 1956; Race 4.

- Var. americana (Hooker) stat. n., B. alpina Sternb. & Hoppe  
 var. americana Hooker, Fl. Bor. Am. 1: 65. 1830.  
 Var. glabella (Rich.) stat. n., B. alpina Stern. & Hoppe  
 var. glabella Rich. ex Franklin, Narr. Journ., Bot. App. 743.  
 1823; Race 1.  
 Var. interior (Böcher) stat. n., B. novae-angliae (Rydb.)  
 Th. Sp. var. interior Böcher, Medd. Grön. 124, 7: 20. 1956;  
 Race 6.  
 Var. laurentiana (Böcher) stat. n., B. novae-angliae (Rydb.)  
 Th. Sp. var. laurentiana Böcher, Medd. Grön. 124, 7: 19. 1956;  
 Race 3.  
 Var. leiocarpa (Trautv.) Fern., Rhodora 39: 276. 1937;  
 Races 2 et 5.  
 Var. ventosa (Rollins) stat. n., ssp. ventosa Rollins, Rhodora 55: 114. 1954.  
 Comparable designations will now be available for these essentially comparable entities.

## 33. MALCOLMIA Br.

Similar to Hesperis but the stigmas back to back, decurrent on the entire style.

1. M. AFRICANA (L.) Br. (Macloviana africana sphalm.) -- Lowest silique borne \* opposite a normal leaf. Diffuse annual, puberulent through. Sepals and petals persistent until the fruit is about fully grown. Flowers violet or purple. Silique about 5 cm long, terete. Early summer. Cultivated and casually reseeding itself; doubtfully reported for Swift Current. -- (swS), US, Eur, (Afr).

## 34. HESPERIS L.

ROCKET

Style bifid at tip and the stigmas decurrent on the inner face of the lobes, thus the two stigmas facing one another. Otherwise, similar to Erysimum, but the flowers purple.

1. H. MATRONALIS L. -- Dame's Violet, Mother-of-the-Eve-ning (Julienne des dames) -- Showy annual, tall and virgate, with large purple flowers. Commonly around 1 m high. Leaves dentate, rather large for the family. Petals 1.5-2.5 cm long. Fruit 6-10 cm long, thin, somewhat torulose, narrowly divergent. Summer and fall. Commonly cultivated and readily reseeding itself in open soil, sometimes in great abundance, invading shaded places. -- (Aka), NF, NS-BC, US, Eur.

## 35. MATTHIOLA Br.

Style more deeply bifid than in Hesperis, developing into a pair of horns at the summit of the mature fruit.

1. M. BICORNIS DC. -- Evening-Stock, Perfume-Plant -- Fruit ending in a pair of divergent and horn-like projections about 5 mm long. Similar to Hesperis matronalis, but more diffusely branched and the flowers and fruits sessile. Early



summer. Casual and fleeting escape from flower gardens: Saskatoon. O, S, Eur.

36. *CONRINGIA* Link      HARE'S EAR MUSTARD  
Siliques quadrangular, tapering to a short indehiscent and seedless beak.

1. *C. ORIENTALIS* (L.) Dum. (*Erysimum orientale* (L.) Br.)-- Hare's Ear -- Glaucous and glabrous annual, usually virgate, 3-8 dm high, with rather large, entire and clasping leaves. Leaves oblong, deeply amplexicaul, entire or subundulate at margin. Flowers pale yellow, almost white. Silique about 1 dm long. First half of summer. Frequent weed of disturbed soils, rarely abundant. -- (G), NF, NS-(PEI)-NB-BC, US, Eur.

37. *HALIMOLOBOS* Tausch  
Similar to *Arabis*, but the silique is terete.

1. *H. virgata* (Nutt.) O.E. Schulz -- Abundantly hirsute and stellate throughout, except the terete siliques. Otherwise similar to *Arabis*. Petals 2.0-3.5 mm long, white. Pods 1-3 cm long, nearly erect on divergent pedicels. Spring and first half of summer. Steppes, rare: Bois  Coteau. -- (Y), swS-seAlta, (US).

The Manitoba report of *H. mollis* (Hooker) Rollins is based on two fragments collected in early flowering and labeled Anderson, L. Winnipeg, Grand Rapide, Fort de traite, 17 June 1851 (CAN; DAO, photo). Because of the pubescence, the date of flowering, the direction of the pedicels, etc., we are of the opinion that these fragments belong to *Arabis divaricarpa*.

*Coronopus didymus* (L.) Sm. is reported from Banff, Alta., by R. Campbell, Can. Rec. Sc. 8: 172. 1900. This was repeated by Grch 1950. Most later authors have ignored the many papers by Campbell and his numerous additions and range extensions. And rightly so as nearly all his unusual reports and many of the run of the mill ones are based on errors of identification. Thus his reports of *Silene acaulis* and *Sibbaldia procumbens* from Wolseley, Sask. are based respectively on *Phlox Hoodii* (QK; DAO, photo) and *Potentilla concinna* (QK; DAO, photo). Other reports by Campbell were systematically ignored; too many of them border on the fantastic.

#### Order 41. RESEDALES

Like the 4 previous orders, the floral parts free except for the fused carpels. But the flower zygomorphic. Single family.

VA physiographic feature similar to the Coteau de Prairie and the Missouri Coteau; the northern edge, 200 to 2000 feet high, of a plateau which runs along the northern edge of the Cypress Hills east to the Big Muddy Lake, south to Plentywood in Montana.

## 72. RESEDACEAE (MIGNONETTE FAMILY)

Floral parts variable in number, mostly in 5's or 6's. Sepals not all the same size. The petals also of different sizes.

## 1. RESEDA L. MIGNONETTE

Petals palmately lobed from a scale-like basal portion.

Ovary (and fruit) incompletely closed at summit.

- a. Leaf entire in the lower half or third, pinnatipartite to bipinnatipartite above the middle....1. *R. lutea*  
 aa. Leaf pinnatipartite to the base ..... 2. *R. alba*  
 1. *R. LUTEA* L. -- Dyer's Rocket, Mignonette (Grand'mère, Réséda sauvage) -- Leaf entire to trifid below the middle, trifid to much divided above. Tufted perennial. Perianth in 6's. Flowers yellow. Late spring to late summer. Cultivated and rarely escaped. -- O-S, BC, US, Eur.

We know of only one Saskatchewan collection, from Grenfell (SASK; DAO, photo). The earlier report by Groh 1944 from Trevarga was based on a specimen (DAO) since revised to *R. alba*.

2. *R. ALBA* L. -- Similar to the preceding but the leaf division of a more standard pattern. Perianth in 5's, but the carpels 4. Flowers white. Late summer. Rare garden escape. -- Q-S, BC, US, Eur.

## Order 42. CARYOPHYLLALES

This and the next two orders have axile or central placentation; that is the ovules are borne, not along the edges of the carpels, but on a central column. In this Order the petals are usually present and the fruit is many-seeded. Leaves opposite, except some *Portulacaceae*.

- a. Sepals 3-5.  
 b. Ovary 2-5 locular ..... 73. *Elatinaceae*  
 bb. Ovary essentially unilocular ..... 74. *Caryophyllaceae*  
 aa. Sepals 2. .... 75. *Portulacaceae*

## 73. ELATINACEAE (WATERWORT FAMILY)

Like the following family, but the ovary fully divided into 2-5 locules.

## 1. ELATINE L.

Inconspicuous and insignificant small plants growing on the mud. Wall of the fruit very thin and transparent, the seeds clearly distinct inside.

1. *E. triandra* Schkuhr var. *americana* (Pursh) Fassett (var. *brachysperma* AA.; *E. americana* (Pursh) Arnott) -- Leaves usually with a deep-red marginal dot at the end of each nerve. Stem less than 1 dm long. Leaves obovate to oblanceolate. Flowers axillary, inconspicuous, nearly always 3-merous. Fruit 1-2 mm across, subglobose. Seeds elongate, reticulate, the areoles hexagonal. Mid to late summer. Shallow water and mud flats.-- sMack, NB-Alta-(BC), US, (CA), eEur.

The eurasian var. *triandra* is a generally larger plant with mostly lanceolate leaves, the marginal notches usually deeper and the placentation more clearly axile. The latter is prac-

tically basal in our variety.

74. CARYOPHYLLACEAE (PINK FAMILY)

The basic type of the order. The opposite leaves linked by transnodal lines of tissue or by pairs of stipules that are more or less fused 2 by 2 so that they usually look as if there was only 2 stipules to each pair of leaves. Seeds centrally borne. Ovary unilocular or partly 3-celled.

- a. Sepals free ..... Group A  
 aa. Sepals fused ..... Group B

Group A

Both sepals and petals free.

- a. Stipules present.  
 b. Axillary fascicles present in every axil,  
 the leaves thus seemingly verticillate..... 5. Spergula  
 bb. Axillary fascicles irregularly distributed,  
 the leaves obviously opposite ..... 6. Spergularia  
 aa. Stipules lacking.  
 c. Petals deeply bilobed or bifid, often  
 appearing as if there were 10 petals.  
 d. Capsule dehiscent into 6 to 8 valves...1. Stellaria  
 dd. Capsule dehiscent at the apex only  
 and by 10 teeth .....2. Cerastium  
 cc. Petals (4)-5, entire or emarginate.  
 e. Styles (and valves) as many as the  
 sepals, usually 5 ..... 3. Sagina  
 ee. Style (and valves) only 3 and fewer  
 than the sepals ..... 4. Arenaria

Group B

Sepals fused, but the petals free.

- a. Calyx subtended by 1-3 pairs of bracts ..... 11. Dianthus  
 aa. Calyx not bracted at base.  
 b. Calyx-lobes 2-3 cm long, much longer  
 than the tube .....7. Agrostemma  
 bb. Calyx-lobes much smaller and shorter  
 than the tube.  
 c. Calyx with 5 main nerves.  
 d. Flower 1 cm long or less ..... 10. Gypsophila  
 dd. Much larger ..... 12. Saponaria  
 cc. Calyx with 10-35 nerves.  
 e. Calyx with 10 main nerves ending  
 alternately in the lobes and sinuses.  
 f. Styles essentially 3 ..... 8. Silene  
 ff. Styles 5, exceptionally less....9. Lychnis  
 ee. Calyx with 20-35 nerves.  
 g. Calyx glabrous or glandular, the  
 lobes symmetrical ..... 8. Silene

gg. Calyx hirsute, not glandular,  
somewhat asymmetrical at the  
mouth ..... 12. Saponaria

1. STELLARIA L. CHICKWEED, STARWORT

Herbs, often weak and tangled, with 5 bifid, white petals.  
Styles 3. Capsule opening by 3-(4) bifid valves.

- a. Flowers in the axils of green leaves or bracts..... Group A  
aa. Inflorescence bracteolate, the bracts membranous  
or membranous-margined ..... Group B

Group A

Flowers solitary and axillary or terminal, or borne in cy-  
mes, the latter leafy or somewhat bracteolate, but with green  
bracts.

- a. Leaves oblong to broadly ovate, the main ones  
petiolate.  
b. Petiole about half as long as the blade ....1. S. media  
bb. Much shorter, only 1-2 mm long.  
c. Leaves broadly ovate and less than  
1 cm long ..... 2. S. obtusa  
cc. Narrowly ovate and larger; sepals  
longer and acute ..... 3. S. crispa  
aa. Leaves sessile.  
d. Flowers in a terminal, leafy cyme.  
e. Petals about as long as to a little  
longer than the sepals .....5. S. crassifolia  
ee. Much shorter, or even lacking .... 7. S. calycantha  
dd. Flowers solitary.  
f. Plant densely glandular-pubescent  
throughout ..... 4. S. americana  
ff. Foliage glabrous or slightly puberulent.  
g. Leaves fleshy, oblong to ovate...6. S. humifusa  
gg. Leaves lanceolate to linear.  
h. Flowers mostly appearing axil-  
lary; leaves of branches only  
half as large as the stem-leaves..  
..... 5. S. crassifolia  
hh. Flowers clearly terminal; branch-  
leaves not reduced ..... 10. S. laeta

Group B

Flowers in bracted cymes, the bracts membranous or at  
least membranous-margined.

- a. Inflorescence terminal, of only 1-(3) flowers ..  
..... 12. S. Edwardsii  
aa. Flowers more numerous.  
b. Pedicels ascending to erect; the central  
flowers on more stiffly erect pedicels

- than the others ..... 11. S. longipes  
 bb. Inflorescence more open, with some of  
 the pedicels, especially those of the central  
 flowers, spreading to deflexed.  
 c. Petals about as long as, to slightly longer  
 than, the sepals ..... 9. S. longifolia  
 cc. Absent or at least smaller, about 2/3 as  
 long as the sepals or shorter.  
 d. Leaves irregularly and rather long-  
 ciliate towards the base; petals  
 mostly present ..... 7. S. calycantha  
 dd. Eciliate; petals absent..... 8. S. gonomischia

1. S. MEDIA (L.) Cyrillo -- Chickweed (Cresson, Mouron des ciseaux) -- Leaves broadly ovate, the main ones petiolate, the others ± sessile. Petiole about half as long to nearly as long as the blade. Leaf commonly 1 cm wide. Stem pilose in lines. Inflorescence diffuse to well defined, leafy to bracteolate, the bracts green. Sepals pilose. Petals short. Early summer to early frosts. Forming tangled carpets in waste places and on cultivated ground. -- G, Mack-Aka, L-SPM, NS-BC, US, Eur, Oc.

2. S. obtusa Eng. -- Forming a tangled carpet and much like a diminutive S. media. Glabrous. Leaves mostly around 5 mm long, on pedicels mostly around 1 mm long. Flowers solitary in the manner of the next. Sepals mostly oblong, 1.5-2.5 mm long, broadly acute to rounded at tip. Petals minute or lacking. Late spring and early summer. Wet places and shores, rare: Blairmore. -- sAka, swAlta-seBC, wUS.

3. S. grisea C. & S. -- Also resembles the first, but the leaves not quite so broad and nearly sessile. Glabrous. Stem elongated. Branches few. Leaves gradually smaller. Flowers remote, solitary, seemingly axillary and only one to a node. Sepals lanceolate, 2.5-3.5 mm long, sharply acute. Petals lacking. Late spring to mid summer. Damp woods and shores in Waterton. -- (swY)-Aka, (swAlta)-BC, US.

4. S. americana (Porter) Standley -- Glandular-puberulent throughout. Low, rather leafy and few-flowered. Leaves rather large, oblong, sessile. Mid summer. Alpine shale slides in Waterton. -- swAlta, (US).

5. S. crassifolia Ehrh. -- Rather nondescript and often misidentified. Leaves lanceolate, in two sizes, those of the branches only half as large. Variable in habit, but glabrous and slightly fleshy. Flowers in leafy cymes or terminal and solitary, often appearing axillary through the development of a subterminal branch. Petals about as long to slightly longer than the sepals. First half of summer. Shores and damp places. -- (F)-K-Aka, L-(NF, NS)-PEI-BC, US, Eur -- F. gemmiflora Norman (S. gracilis Rich.) Bulbiferous in the axils of the upper leaves. -- (K), Q-S-(Alta). Perhaps the normal autumnal phase.

Two collections (CAN, DAO) reported by Turner 1949 as S. sitchana Steudel have since been revised to S. crassifolia.

6. S. humifusa Rottb. var. humifuga (var. suberecta Boivin) -- Fleshy and matted, the small leaves ovate to oblong. Forming a tangled carpet. Glabrous. Leaves all about the same size, commonly 4-6 mm long. Flower solitary, terminal. Petals about as long as the sepals. Mid summer. Sandy to rocky seashores. -- G-Aka, L-(NF)-SPM, NS-Q-(neO)-nMan, Eur.

On the Pacific Coast and on Prince Edward Island the typical variety is partly replaced by a var. oblongifolia Fenzl, more or less erect and with longer and narrower leaves, the latter being  $\pm$  lanceolate and mostly 8-15 mm long.

7. S. calycantha (Led.) Bong. var. calycantha (var. isophylla Fern., var. latifolia Boivin; S. borealis Big.) -- Flowers in a leafy cyme, the petals small. Very variable in size. Leaves slightly ciliate towards the base; internodes sometimes very finely scabrous; otherwise the whole plant glabrous. Leaves elliptic to linear. Flowers in a single terminal cyme. Petals about 2/3 as long as the sepals, or shorter and vestigial. Sepals 1.5-3.0 mm long, or up to 4 mm in fruit. First half of summer. Damp places. -- G, (K)-Mack-Aka, L-NF-(SPM, NS-PEI)-NB-BC, US, Eur -- Var. floribunda Fern. -- Inflorescence ample and the flowers rather numerous. Leaves becoming gradually smaller into the inflorescence, the ultimate bracts scarious or green with a wide scarious margin. -- (NF), NS-(PEI)-NB-Man, (BC), US.

S. graminea L. is not improbable for our area. Resembles typical S. calycantha, but all the inflorescence bracts are membranous and the larger sepals are usually ciliate. Tending to be erect and (2)-4-(8) dm high. Leaves lanceolate or somewhat narrower. Cyme very diffuse. Sepals 4-6 mm long. However, previous reports of this weed from our area do not seem justified. H.H. Marshall at Morden (DAO) has been revised to S. longipes; J.M. Gillett at Churchill (DAO) has been revised to S. crassifolia and W. Krivda at The Pas (CAN; DAO, photo) is typical S. longifolia. We have found no Roseisle specimen in the private herbaria of de Ruyck and Champagne; they held only collections from Riding Mountain and Pine Falls which we have revised to S. longipes. Finally, a York Factory collection distributed as S. graminea has also been revised to S. longifolia, while the collection reported from Lake Waskesiu (SASK) was revised to S. longipes in 1956.

8. S. gonomischia Boivin (S. umbellata AA.) -- Resembles S. calycantha, especially var. floribunda, but eciliate and mostly about 1 dm high and the upper stem internode (or lower inflorescence internode) rather elongate, often half as long as the height of the plant. Stem leaves abruptly passing into the inflorescence bracts, the latter many times shorter. Cyme single, terminal and diffuse, the internodes mostly longer than the pedicels, the ultimate bracts scarious-margined. Flowers small and apetalous, the sepals mostly 2 mm long. Capsule less than twice as long as the sepals. Mid summer. Wet spots in subal-

pine forests; Waterton. -- swAlta, wUS.

The related asiatic S. umbellata Turcz. has a more congested inflorescence, subumbellate in the manner of Holosteum umbellatum L., capsules larger, at least twice as long as the sepals, etc. We have seen no matching specimen from North America and despite a number of reports of S. umbellata for Canada, all specimens examined proved to belong to other species, mostly S. calycantha.

9. S. longifolia Muhl. var. longifolia (S. graminea AA.) -- Rather nondescript and easily confused with S. calycantha and the next two species. The upper pair of stem-leaves usually subtends 1-(2) elongate branches that will often overtop the inflorescence. (Such a branch is always lacking in S. calycantha and S. longipes). The leaves are narrow, linear to linear-lanceolate, up to 1.5-5.0 mm wide, usually with parallel margins, sometimes slightly wider towards the middle. (In the other species, and especially so in S. laeta, they tend to be broadest below the middle and tapering to the tip). Inflorescence bracteolate throughout. (Leafy at base in S. calycantha var. floribunda). Sepals 2.8-4.0 long, not ciliate. Petals longer than the sepals. (Shorter in S. calycantha). Capsule greenish to straw-coloured or pale brown. Mid spring to late summer. Forming tangled masses in wettish places. -- (NF)-SPM, NS, NB-BC, US -- Var. atrata J.W. Moore (S. atrata (J.W. Moore) Boivin) -- Sepals smaller and ciliate. Capsule purplish black. Generally smaller throughout. Leaves mostly 0.5-1.0 mm wide, the largest rarely up to 2 mm. Sepals 2-3 mm long. The usual phase northward. -- Mack-I, (Q)-O-Man, Alta, US -- Var. eciliata Boivin (S. atrata (J.W. Moore) Boivin var. eciliata Boivin) -- As var. atrata, but the sepals eciliate. The common phase westward. -- (seK)-Mack-Aka, Q-BC.

10. S. laeta Rich. var. laeta -- A small species with a single (rarely 2-3) terminal flower. Usually less than 1 dm high. Stoloniferous and forming dense to lax carpets. Leaves narrowly ovate to narrowly lanceolate, ± canaliculate, all about the same size or the upper reduced, but not reduced to membranous bracts. Not glabrous, but at least the sepals ciliate and also commonly puberulent on back; the stem often pubescent. Generally similar to the next two species but for the reduced inflorescence. First half of summer. Loose sands. -- G-F-(K)-Mack-Aka, nQ, nMan, (swAlta)-BC, (Eur) -- Var. altocaulis (Hultén) Boivin (S. Hulténii Boivin; S. monantha Hultén) -- Sepals not ciliate. Plant entirely glabrous or sometimes somewhat puberulent. Loose gravels and shales. -- G-Aka, L-NF, nNB-nMan, swAlta-BC, wUS.

11. S. longipes Goldie (S. graminea AA.; S. stricta Rich.) -- Commonly a very glaucous herb with strongly contrasting dark purple capsules. Glabrous perennial, about 2 dm high, stoloniferous, green to glaucous. Leaves somewhat carinate, narrowly lanceolate to linear, broadest near the base and gradually tapering to a very sharp point. Inflorescence open, occupying the upper half of the plant, bracteolate, the bracts membranous.

Pedicels ascending to erect, the central one longer and stiffly erect. Petals longer than the sepals. Early to mid summer. Forming tangled carpets on moist sands or gravels. -- seF-(K)-Mack-Aka, L-(NF), NB-Alta-(BC, US) -- Var. subvestita (Greene) Pol. (S. subvestita Greene) -- Stem ± pubescent. Leaves glabrous to slightly pubescent. -- (K-Y)-Aka, Q-O-(Man)-S-Alta-(neBC) -- Var. arenicola (Raup) Boivin (S. arenicola Raup) -- Capsule straw-coloured, the valves becoming strongly recurved and reflexed. Sand dunes of lake Athabaska. -- nWS.

12. S. Edwardsii Br. var. Edwardsii (S. ciliatosepala Trautv.) -- Somewhat intermediate between S. laeta and S. longipes, the plant small and the inflorescence reduced as in the former, the pedicels with membranous bracts as in the latter. Sepals finely ciliate. Early summer. Sands and gravels. -- G-F-(K-Y)-Aka, nMan, (Eur) -- Var. crassipes (Hultén) Boivin (S. crassipes Hultén) -- Sepals glabrous and not ciliate. -- G-F-(K-Mack, L-NF), nQ-nWS, BC, (Eur).

Reports of S. Alsine from Manitoba were based in part on collections from Gillam and Churchill (DAO) now revised to S. calycantha and on a York Factory specimen (QK; DAO, photo) which belongs to S. crassifolia f. gemmificans.

## 2. CERASTIUM L.

## MOUSE-EAR-CHICKWEED

Rather similar to Stellaria, but the styles 5 and the cylindrical capsule opening by 10 short teeth.

- a. Annual; capsule 2-3 times as long as the calyx ..
- ..... 5. C. mutans
- aa. Perennial; capsule usually shorter.
- b. All leaves but the upper pair subtending an axillary fascicle.
- c. Foliage green ..... 3. C. arvense
- cc. White-tomentose ..... 4. C. tomentosum
- bb. Axillary fascicles few, or more often lacking.
- d. Leaf and stem pubescence similar, either soft pilose or glandular-pilose to nearly glabrous ..... 1. C. alpinum
- dd. Pubescence of two types: the leaves stiffly hirsute and ciliate, the stem soft pilose to glandular-puberulent ..... 2. C. vulgatum

1. C. alpinum L. var. alpinum (var. glanduliferum AA., var. strigosum Hultén; C. arcticum Lange, var. vestitum Hultén; C. Beeringianum C. & S., var. grandiflorum (Fenzl) Hultén; C. terrae-novae Fern. & Wieg.) -- Perennial with numerous short basal branches forming dense ground cover. Mostly 1 dm high. Pubescence variable, commonly long pilose, varying to glandular or to nearly glabrous. Leaves obovate to narrowly lanceolate, their pubescence similar to that of the stem. Flowers generally few and rather large. Inflorescence bracts usually green. Sepals (3.5)-5.0-8.0-(10.0)mm long. Petals commonly  $1\frac{1}{2}$ -2 times



the length of the sepals. First half of summer. Arctic and subarctic gravels. -- G-Aka, L-(NF), Q-nS-(Alta-BC, Eur) -- Var. capillare (Fern. & Wieg.) Boivin (C. Earlei Rydb.) -- Pubescence shorter; the glandular hairs only 0.1-0.3 mm long on the pedicels. Alpine outcrops and shale slides. -- swAlta-BC, WUS.

2. C. VULGATUM L. (var. holosteoides Fries, var. hirsutum Fries; C. holosteoides Fries; C. triviale Link) -- Sometimes seeming to run into the preceding, but generally taller and of more diffuse growth, with scarious-margined bracts and smaller flowers. Biennial or short-lived perennial, (1)-2-(4) dm high. Leaves ± lanceolate, uniformly hirsute and ciliate, or nearly glabrous. Stem pubescence different, soft pilose to glandular-pubescent, often densely so, or nearly glabrous. Inflorescence with bracts usually scarious or broadly scarious-margined. Sepals (4)-5-(7) mm long. Petals commonly just a little longer than the sepals. Early to mid summer. More or less ubiquitous weed, not frequent in our region. -- G, Y-Aka, L-SPM, NS-BC, US, (SA), Eur, (Afr, Oc).

3. C. arvensis L. (var. viscidulum Greml; C. campestre Greene) -- Whiteweed (Mouron d'alouette) -- Flowering stems appearing very leafy as all leaves, except the upper pair, subtend either a short branch or an axillary tuft of small narrow leaves. Otherwise a perennial generally resembling C. vulgatum but densely glandular-puberulent throughout. Leaves marcescent, narrowly lanceolate to linear. Petals about  $1\frac{1}{2}$  times as long as the sepals. Late spring to mid summer. Dry open places. -- (G, K) Mack-Aka, L-SPM, NS-BC, US, Eur.

4. C. TOMENTOSUM L. -- Snow-in-Summer, Dusty Miller (Barbette, Argentine) -- Foliage as the preceding, but the whole plant densely white-tomentose. Inflorescence stiff and open, reminiscent of Stellaria longipes. Petals white, large, fading brownish-black. Early summer. Cultivated for its whitish foliage and sometimes spreading to nearby meadows; Matlock. -- NS-PEI, Q-Man, BC, (US), Eur.

5. C. nutans Raf. var. nutans (var. occidentale Boivin) -- Annual. Viscid-pilose, erect, often many-stemmed. Inflorescence with green bracts. Pedicels rather long, geniculate just below the fruit. Petals variable, from  $1\frac{1}{2}$  the length of the sepals or shorter to lacking. Capsule 2-3 times longer than the sepals. Summer. Shores and wet shaded ground, rarely weedy. -- sMack, swQ-neBC, US -- Var. brachypodum Eng. (C. brachypodum (Eng.) Rob.) -- Inflorescence more compact, the pedicels not geniculate, but often reflexed, about as long as the capsule, or shorter. Rare and perhaps a mere extreme of variation: Gilham, Falcon Lake, Consul. -- Man-S-(Alta), US.

Var. brachypodum is not recognized by Hitchcock 1964. There seems to be good justification for his stand except that in Canada, on the basis of the collections examined to date, the two varieties are far from being sympatric.

### 3. SAGINA L.

### PEARLWORT

Similar to Stellaria, but the petals not bifid, rather entire or merely emarginate. Sepals (4)-5. Styles as many as

the sepals. Capsule opening by (4)-5 entire valves.

- a. Bulbiferous; flowers larger, the petals about twice as long as the sepals ..... 3. S. nodosa
- aa. Not bulbiferous; petals about as long as, to shorter than, the sepals.
  - b. Annual with an evanescent rosette ..... 1. S. decumbens
  - bb. Tufted perennials with a well developed and marcescent rosette.
    - c. Capsule  $1\frac{1}{2}$ -2 times as long as the calyx ..... 2. S. saginoides
    - cc. Capsule shorter, slightly longer than the calyx; plant smaller ..... 4. S. nivalis

1. S. DECUMBENS (Ell.) T. & G. -- Inconspicuous and very thin annual. Usually less than 1 dm high. Petals usually insignificant. Flowers alternate in a somewhat racemose inflorescence. Resembling a small Arenaria serpyllifolia in fruit, but the leaves linear. Early summer. Footpaths (?) on light soil. Very rare weed from the eastern U.S.: Cypress and Hand-hills. -- (Aka), NB-O, S-BC, US.

Probably native in B.C., but more likely introduced elsewhere north of the U.S.A.

The floral mery is variable and on that basis the species is often subdivided into a tetramerous S. decumbens and a pentamerous S. occidentalis. The Canadian material examined does not fall readily into this dichotomy; some were pentamerous (Montreal, Ottawa, Prince Rupert and Victoria), or tetramerous (Cypress Hills), while some collections (St. John and Hand Hills) were made up of both types.

2. S. saginoides (L.) Karsten -- Small and inconspicuous perennial with a taproot and tending to form a small cushion of basal or near basal filiform leaves. Glabrous. Stems short, only a few cm long, bearing only 1-(3) terminal flowers. Sepals usually scarious-margined. (Mid summer?) Wet open ground in alpine habitats; rare or overlooked: Rockies. -- (G)-F, (Y)-Aka, L-NF, NB-Q, Alta-BC, US, Eur.

Not to be confused with the somewhat similar species of Arenaria. The latter are glandular-puberulent at least on the peduncles.

3. S. nodosa (L.) Fenzl var. nodosa -- Bulbiferous, the bulblets small, usually about 1 mm long and mostly made of a cluster of 4 fleshy leaflets. Short-lived perennial, glabrous or slightly glandular-puberulent at the top of the pedicel. Rosette leaves long filiform, much longer than the stem leaves. Bulblets few to numerous, terminal or axillary, often  $\pm$  replacing the flowers. Flowers few, terminal. Summer. Sandy or rocky shores of large bodies of water. -- (G-K)-Mack, (L)-NF, NS-S-(Alta), US, Eur.

Further east, and primarily in maritime regions, there occurs a var. pubescens Mert. & Koch, more or less glandular-puberulent, at least on the pedicels.

4. *S. nivalis* (Lindl.) Fries var. *caespitosa* (J. Vahl) Boivin (*S. caespitosa* (J. Vahl) Lange) -- Similar to *S. saginoides*, but generally smaller and the sepals usually with a deep purple border. Inconspicuous short-lived perennial, 1-2 cm high, tufted from a dense rosette. Glabrous. Stems short, usually shorter than the rosette leaves, bearing a single flower on a long pedicel. (Early summer?). Arctic shores and polygonic soils. -- G-K, L, nQ, (nMan, US), Eur.

Var. *nivalis* is more widely distributed in arctic regions; it is a taller plant, the upper part of the stem overtopping the basal foliage.

## 4. ARENARIA L.

## SANDWORT

Stypes mostly 3 and fewer than the 5 sepals as in *Stellaria*, but the petals entire, as in *Sagina*. Capsule opening by 3 entire or bifid valves.

- a. Leaves with a well developed limb ..... Group A  
 aa. Limb very narrow ..... Group B

## Group A

Limb narrowly lanceolate to broadly ovate, more than 1 mm wide.

- a. Inflorescence bracts very small, scarious-margined.  
 b. Sepals obtusish to rounded; leaves pilose below along the midnerve ..... 5. *A. lateriflora*  
 bb. Sepals somewhat acuminate; leaves glabrous below ..... 6. *A. macrophylla*  
 aa. Inflorescence leafy or the leaves gradually reduced to green and leaf-like bracts.  
 c. Glabrous and very fleshy sea-coast plant ..... 12. *A. peploides*  
 cc. Little if at all fleshy, and at least the pedicels puberulent.  
 d. Annual; puberulent throughout ..  
 ..... 1. *A. serpyllifolia*  
 dd. Perennial; leaves glabrous ..... 2. *A. humifusa*

## Group B

Leaves linear or subulate to filiform, usually 0.5-1.0 mm wide.

- a. Sepals obtuse or more often rounded at summit.  
 b. Leaves 1-6 cm long.  
 c. Inflorescence glandular ..... 3. *A. capillaris*  
 cc. Glabrous ..... 4. *A. congesta*  
 bb. Leaves 1 cm long or less ..... 7. *A. laricifolia*  
 aa. Sepals clearly acute to acuminate.  
 d. Leaves spinescent and recurved ..... 11. *A. Nuttallii*  
 dd. Leaves not spiny, straight and more appressed.

- e. Flowers 2 or more in a cymose inflorescence.
  - f. Usually glabrous; most stem-leaves subtending an axillary fascicle...8. A. stricta
  - ff. Glandular-puberulent at least in the inflorescence; axillary fascicles few or none ..... 10. A. verna
- ee. Flowers solitary, terminal.
  - g. Sepals pale green ..... 8. A. stricta
  - gg. Deep red ..... 9. A. Rossii

1. A. SERPYLLIFOLIA L. -- Sandweed -- Annual. Densely puberulent, retrorsely so on the internodes, slightly scabrous and usually many-stemmed. Leaves ovate, subsessile, less than 1 cm long. Petals half as long as the sepals. Inflorescence elongating in fruit, often becoming somewhat racemose with the fruits more or less alternate. Late spring to early summer. Rare weed of cultivated fields: Kamsack, Tisdale. -- NS-O, S, BC, US, Eur.

2. A. humifusa Wahl. (A. cylindrocarpa Fern.) -- Capsule deep brown above. Peduncle and upper part of stem finely puberulent. Small, matted, stoloniferous and slightly fleshy perennial. Leaves small, lanceolate to ovate. Flower solitary, terminal. Early summer. Coastal sands and gravels. -- (G-F)-K-Mack-(Y)-Aka, (L)-NF-(SPM), Q, nMan, (Alta-BC, Eur).

3. A. capillaris Poiret var. americana (Maguire) Davis (A. formosa AA.) -- Leaves longest, the lower ones mostly 2-4 cm long. Glabrous below, finely glandular above. Densely tufted with the leaves mostly near the base. The numerous and sparsely leafy stems 1-2 dm high. Cyme often corymbiform with the lateral pedicels successively much shorter. First half of summer. Montane and low alpine grassy slopes and rock slides. Rockies. -- swAlta-BC, nwUS.

The more northern typical variety is glabrous in the inflorescence.

4. A. congesta Nutt. var. lithophila (Rydb.) Maguire (var. prolifera Maguire; A. lithophila Rydb.) -- Much resembling the preceding, but glabrous, except for the finely ciliate lower leaves. Inflorescence more congested. Pedicels tending to be shorter than the flowers. Late spring and early summer. Dry montane prairies: Cypress Hills, Sweetgrass Buttes and southward. -- swS-seAlta.

South of us, the typical variety has a still more congested inflorescence, the flowers being sessile or nearly so.

5. A. lateriflora L. (Moehringia lateriflora (L.) Fenzl) -- Commonly a simple herb with a single seemingly lateral inflorescence. Long stoloniferous and forming large loose colonies. About 1 dm high and nearly always with 1-(2) inflorescences which arise terminally but usually appear to be lateral due to the growth of a single branch from one of the upper axils. Leaves elliptic to narrowly lanceolate, more or less pubescent, at least ciliate at margin and densely pilose below along the mid-nerve. Inflorescence bracteolate, with 1-3 flowers. Sepals

2-3 mm long, rounded at tip. Late spring and early summer. Very common forest species. -- seK-Aka, L-SPM, NS-BC, US, Eur.

6. A. macrophylla Hooker (Moehringia macrophylla (Hooker) Torrey) -- Resembling the preceding, but with larger flowers. Leaves commonly larger and more acute, sometimes scaberulous at margin and minutely puberulent above along the midnerve, otherwise quite glabrous. Sepals 3.5-4.5 mm long,  $\pm$  acute. Late spring. Dry, open, rocky places, rare -- Mack, L, Q-O, nS, BC, US, (Eur).

7. A. laricifolia (L.) Rob. var. occulta (Ser.) Boivin -- (A. arctica Steven; A. obtusiloba (Rydb.) Fern.; A. sajanensis W.) -- Sepals obtuse and somewhat cucullata at tip. Loosely to densely tufted perennial. Glandular-puberulent above and usually nearly glabrous below, but at least the leaves ciliolate. Flowers small to large, tending to be solitary. Petals as long as, to longer than, the sepals. Mid summer. Forming small to large mats on rock slides and exposed alpine habitats. -- F-Aka, swAlta-BC, nwUS, Eur.

In our variety the upper leaves and bracts are normally glabrous or ciliate. The typical phase of southern Europe tends to be larger, laxer, and its bracts and upper leaves are as densely puberulent or glandular as the rest of the inflorescence.

8. A. stricta Mx. var. litorea (Fern.) Boivin (A. dawsonensis Britton; A. uliginosa Schleicher; Sabulina dawsonensis (Britton) Rydb.) -- Loosely tufted perennial with narrow leaves and numerous axillary tufts; the very open inflorescence occupying most of the height of the plant. Glabrous throughout. Usually 1-2 dm high. Leaves mostly 1-nerved or sometimes weakly 3-nerved. Pedicels very unequal, the central one being  $1\frac{1}{2}$ -2 times as long as the lateral. Sepals 3-5 mm long. Petals included. Early to mid summer. Cliffs and dry, open places. -- (seK-Aka), L-(NF), Q-Alta-(BC, ncUS) -- Var. puberulenta (Peck) C.L. Hitchc. (A. tenella Nutt.) -- Somewhat glandular-puberulent in the inflorescence. Reported for southwestern Alberta. -- (swAlta)-BC, nUS -- Var. uliginosa (Schleicher) Boivin (A. uliginosa Schleicher) -- Generally smaller and fewer-flowered. Glabrous. Foliage mostly restricted to the lowest 1-2 cm. Pedicels subequal or solitary. Sepals 2.5-3.0 mm long, acute at summit. First half of summer. Wetter spots in arctic tundra. -- (G)-F-K-(Mack-Aka, L), Q-nMan, (Eur).

Not to be confused with certain similar species of Sagina. The latter have more numerous styles and valves and the sepals are rounded at tip.

Our three varieties are usually treated as species, but we find that they are very closely related and intergrade to some extent.

9. A. Rossii Br. var. columbiana Raup -- Forming dense cushions pinned with numerous solitary white flowers with red sepals. Glabrous. Leaves 2-5 mm long. Pedicels usually reddish and commonly short, rarely up to 2 cm long. Flower terminal. Petals somewhat shorter than the deep red sepals. Mid summer. Alpine rock slopes. -- Mack-Y, (swAlta)-BC, (nwUS) --

Var. apetala Maguire -- Petals lacking or very small and very narrow, less than half as long as the sepals -- (Y), swAlta-eBC, (nwUS).

10. A. verna L. (A. rubella (Wahl.) Sm.; Sabulina propinqua (Rich.) Rydb.) -- Rather resembling a small A. stricta. Smaller, less than 1 dm high. Glandular-puberulent throughout or at least above. Leaves 3-nerved, the lateral nerves often nearly as strong as the middle one. Stem leaves bearing few, if any, axillary fascicles. Pedicels shorter, not exceeding 1.5 cm long. Summer. Dry and open montane or alpine places in the Rockies and Cypress Hills; also northward in subarctic and arctic regions. -- G-Aka, L-NF, Q-BC, US, Eur.

The phenotype with the petals shorter than the sepals is commonly segregated as A. rubella.

The Bell collection from York Factory (QK; DAO, photo) has been revised to A. stricta var. uliginosa.

11. A. Nuttallii Pax var. Nuttallii -- Leaves divergent-falcate and ending in a sharp spinescent point. Otherwise resembling A. stricta by its inflorescence and acute sepals, but A. laricifolia by its mode of growth and densely carpeting habit. Densely glandular-puberulent throughout. Mid nerve very strong, nearly half as wide as the whole leaf. Sepals usually acuminate into pungent tips. First half of summer. Talus slopes in the mountains -- (swAlta)-BC, wUS.

Three other varieties are known to occur further south.

The series may be keyed out as follows:

- a. Petals included, shorter than the sepals.
  - b. Leaves falcate and mostly 1 cm long or slightly less ..... var. Nuttallii
  - bb. Straight and shorter, 5-8 mm long ..  
..... var. gracilis (Gray) Rob.
- aa. As long or longer than the sepals.
  - c. Sepals 3.5-4.5 mm long...var. gregaria (Heller) Jepson
  - cc. Flowers larger, the sepals 5.5-6.5 mm long, the petals about as long ..  
..... var. fragilis (Mag. & Holmgr.) C.L. Hitchc.

12. A. peploides L. var. diffusa Horn. -- A very fleshy maritime plant. Stoloniferous and forming a loose carpet of stems 1 dm high or less. Glabrous. Leaves with a paler and finely crenulate margin. Fruit large, solitary, globular, somewhat less than 1 cm across. First half of summer. Sandy or gravelly beaches at high tide level. -- G-nMack-(nY)-nAka, L-NF, nQ-nMan.

Provided the Old World variations are ignored, our american specimens can be readily divided into three fairly satisfactory geographical varieties: a smaller and more northern var. diffusa, a larger west coast var. major Hooker, and a fleshier and more leafy east coast var. robusta. However the european material is also very variable and we do not see clearly how to relate the typical and other transatlantic material to our cisatlantic va-

riations. We have therefore ignored all the paleogeographic material in our statements of distributions. Not a very satisfactory solution intellectually, but the only practical one in the present stage of our knowledge.

## 5. SPERGULA L.

SPURREY

Stipules present. Otherwise much as in Sagina, with 5 sepals, 5 styles and entire petals. Capsule dehiscent by 5 valves.

1. S. ARVENSIS L. (var. sativa (Boemm.) Rchb.) -- Povertyweed, Spurrey (Grippe, Herbe de poudre) -- Filiform leaves numerous, seemingly verticillate, but actually opposite and subtending axillary fascicles. Annual, glabrous to glandular, usually many-stemmed. Inflorescence leafless, merely bracteolate. Pedicels becoming reflexed right after flowering, the full grown plants thus tangling very readily. Summer and fall. Infrequent weed of crops and waste places: Edmonton region; more doubtfully elsewhere. -- G, sMack-Y-(Aka), NF-SPM, NS-O-(Man-S)-Alta-BC, US, SA, Eur.

Var. sativa is often distinguished rather arbitrarily as a more glandular type with non-papillose seeds. The nomenclature of the distinction is unsound as var. sativa is based on the same type as S. arvensis.

## 6. SPERGULARIA J. &amp; C. Presl

Stipules present. Otherwise much as in Arenaria, with 5 sepals but only 3 styles and the petals entire. Capsule dehiscent by 3 valves.

1. S. marina (L.) Gris. (var. leiosperma (Kindb.) Gürke; S. diandra (Guss.) Boiss.; S. salina J. & C. Presl; S. sparsiflora (Green) Nelson) -- Each pair of leaves with only one pair of deltoid stipules. Annual, glandular-puberulent and viscid throughout. Leaves linear with few, if any, axillary fascicles. Inflorescence leafy, imperfectly cymose, tending to become racemose. Fruiting pedicels mostly reflexed. Petals much shorter than the sepals and often pinkish. Seeds variable, less than 1 mm wide, brown to blackish, smooth to papillose, sometimes with a peripheral wing. Summer. Native on alkaline shores; sporadically weedy. -- sMack, (NF)-SPM, NS-BC, US, (CA, SA), Eur, (Afr).

## 7. AGROSTEMMA L.

Calyx lobes prolonged into leaf-like appendages. Similar to Lychnis, but the 5 styles opposite the petals.

1. A. GITHAGO L. -- Corn-Cockle, Corn-Campion (Nielle des blés) -- Calyx lobes very long, overtopping the petals, similar to the leaves and about half as long as the latter. Densely strigose annual, stiffly erect. Leaves long-linear. Flower large and showy, purple red, on a very long peduncle. All sum-

mer. Old fashioned weed of cereal crops, now practically eliminated. -- (Aka), NS-PEI-(NB)-Q-S, BC, US, Eur.

## 8. SILENE L.

CATCHFLY, CHAMPION

Styles only 3, otherwise as in Lychnis. Capsule dehiscent by 6 teeth.

- a. Stemless and forming compact cushions ..... 7. S. acaulis
- aa. Stem elongate and obvious.
  - b. Calyx densely glandular-pubescent.
    - c. Calyx less than 1 cm long ..... 9. S. Menziesii
    - cc. Larger, clearly over 1 cm long.
      - d. Calyx with about 35 nearly equal longitudinal nerves ..... 1. S. conoidea
      - dd. With 10 nerves only.
        - e. Weedy annual ..... 3. S. noctiflora
        - ee. Native perennial with shorter calyx lobes ..... 8. S. Scouleri
    - bb. Calyx glabrous except for the ciliate lobes.
      - f. Calyx up to 8 mm long, with 10 simple nerves.
        - g. Inflorescence a dense thyrse .... 6. S. sibirica
        - gg. Flower few in an open cyme ..... 2. S. antirrhina
      - ff. At least 10 mm long, with  $\pm$  20 main nerves.
        - h. Calyx nerves strongly reticulate above the middle ..... 4. S. Cucubalus
        - hh. Nerves weakly branched and barely reticulate ..... 5. S. Cserei

1. S. CONOIDEA L. -- Calyx conic-lanceolate at flowering. Annual, viscous-glandular throughout. Calyx 2-3 cm long, with about 30-35 nerves, the internerves membranous, the lobes  $\pm$  1 cm long. Petals purple, large. Capsule pyriform. Mid summer. Rare weed of field crops and elevator areas: Lacombe. -- Alta, (US), Eur.

2. S. antirrhina L. -- Sleepy Catchfly -- The upper internodes with a heavy glutinous zone; these zones at first pale green, soon turning purple-black and becoming very conspicuous. Thin and wiry annual, glabrous above, retrorse-scaberulous below, the leave scaberulous at margin. Calyx 6-8 mm long, with ciliolate lobes. Early summer. Open sandy places. -- NB-BC, US, (CA, SA, Eur).

Frequent from Roche-Percée eastward and it may also be common across the northern parts of our area, but as of yet we have seen only two other collections from west of Manitoba: Lake Athabaska and Fort Chippewyan.

3. S. NOCTIFLORA L. -- Sticky Cooekle (Fleur de nuit)-- Large white flowers snowy in the evening, closed and inconspicuous in the daytime. Annual, glandular-pubescent throughout. Leaves  $\pm$  lanceolate. Calyx 2.0-2.5 cm long, the lobes nearly



1 cm long. Early to mid summer. Crop fields and roadsides. -- (G), Aka, NF, NS-BC, US, Eur.

Not to be confused with Lychnis Loveae. The latter is a perennial with shorter calyx lobes.

4. S. CUCUBALUS Wibel var. CUCUBALUS (S. latifolia (Miller) Britton & Rendle; S. vulgaris Garcke) -- Bladder-Campion, Maiden's Tears (Pétards, Péteux) -- Calyx with  $\pm$  20 main nerves and strongly reticulate above the middle. Nearly glabrous perennial, 3-8 dm high. Leaves  $\pm$  lanceolate, commonly 1-2 cm wide. Inflorescence variable, usually cymose. Calyx lobes tomentulose at tip. Summer. Infrequent weed of cultivated ground, roadsides and waste places. -- NF, NS-BC, US, Eur.

Many authors prefer S. vulgaris but as pointed out by Hitchcock 1964, this was based on the illegitimate Behen vulgaris and the epithet vulgaris takes date only from the legitimate publication of Silene vulgaris Garcke 1869. See the note under Art. 72 of the Code. S. Cucubalus Wibel 1799 is much earlier as a legitimate epithet. Hence our nomenclatural choice.

European authors often recognize a wide selection of variants. One of them, var. latifolia (Rchb.) Beck from Central Europe, has been reported as introduced south of our borders. It is a generally larger plant with leaves 2-3 cm wide and calyxes 1.5-2.0 cm long.

This and the next are quite obviously different in the field, but when we came to write our key, we were surprised to find how difficult it is to select a convenient and reliable key character. This awkwardness in communicating one's knowledge in writing does not in any way impair the distinctiveness of the two entities.

5. S. CSEREI Baumg. -- Much like the preceding, but biennial, larger, more fleshy, glaucous and with a conspicuous fork in the inflorescence. Showy, 5-15 dm high. Leaves elliptic, to lanceolate, mostly 2-4 cm wide. The two main branches of the inflorescence 1-3 dm long and bearing their flowers somewhat laterally. Early summer. Open ground, mainly on railway cinders, and still spreading rapidly. -- Q-BC, US, Eur.

6. S. SIBIRICA (L.) Pers. -- All stem leaves subtending copious axillary fascicles. Tufted perennial, more or less scaberulous, especially the leaves. Flowers numerous in a rather dense, elongate inflorescence. Calyx small, about 5 mm long. Fruit stipitate, the stipe about  $1\frac{1}{2}$  mm long. (Early summer?). Local weed of cultivated fields, invading grasslands.--cS, eEur. Known from Maymont, Duck Lake, Bladworth, Nokomis and Bethune.

7. S. acaulis L. var. excava (All.) DC. -- Form dense cushions in alpine habitats and very conspicuous when speckled with flowers. Perennial with a strong taproot and a tightly branched caudex. Flower purple, solitary, borne just above the cushion on a short peduncle. Early summer. Rocky tundra and talus slopes: Rockies and lake Athabaska region. -- G-Aka, L-SPM, eNS, Q, nWS-swAlta-BC, US, Eur.

Divisible into three intergrading varieties, the typical one being eurasian. In ours the calyx is 3-6 mm long and mostly longer than its peduncle. In the more western var. subacaulescens (F.N. Williams) Fern. & St. John in the larger calyx is commonly 7-10 mm long and usually shorter than its peduncle. We must admit that we find much of the Yukon and Alaska specimens to be rather intermediate.

8. S. Scouleri Hooker var. Scouleri -- Native alpine species similar to some species of Lychnis. Tufted perennial, glandular-viscous above, reflexed-puberulent below, mostly 3-4 dm high. Leaves up to 5-10 mm wide. Flowers clustered, on pedicels rarely over 1 cm long shorter than the calyces. Calyx 10-15 mm long, the lobes 2-4 long. Early summer. Montane prairies. -- swAlta-swBC, nwUS -- Var. Macounii (Watson) Boivin (S. Parryi (Watson) Hitchc. & Mag.) -- Smaller, mostly 2-3 dm high. Leaves 2-5 mm wide. Pedicels variable, the one of the terminal flower 1-3 cm long. -- swAlta-sBC, nwUS.

9. S. Menziesii Hooker var. Menziesii -- Second smallest species. Stoloniferous, 1-3 dm high, glandular-pubescent out. Leaves narrowly to broadly oblanceolate. Flowers few, small. Calyx only 5-9 mm long, the nerves inconspicuous. Capsule purple-black. Late spring to early summer. Wooded ravines and shores, rarely weedy. -- sMack-Y-(Aka, wCMan)-sS-BC, US.

To the southwest of us there is a var. Dorrii (Kellogg) stat. n., S. Dorrii Kellogg, Proc. Cal. Ac. 3: 44, 1863, with the glandular pubescence of the lower part of the stem much shorter, minute, and much more sparse. And to the northwest a var. Williamsii (Britton) Boivin which differs mainly by its larger calices, 9-11 mm long.

A mention of S. dichotoma Ehrh. by Budd 1957 and 1964 was apparently based on R.E. Anderson, Melfort, Sask., July 18, 1951 (SCS: DAO, photo), but this sheet is a specimen of Lychnis Loveae.

## 9. LYCHNIS L.

CAMPION

A basic type with fused calyx but free petals. Styles normally 5, alternate with the petals. Calyx with 10 main nerves.

Treatment approximate as most of our specimens are on loan to a specialist at the moment.

- a. Leaves more than 1 cm wide.
  - b. Flowers red in a compact inflorescence ..
    - ..... 2. L. chalconica
  - bb. Flowers white in a very open cyme ..... 1. L. Loveae
- aa. Leaves narrower, 7 mm wide or less.
  - c. Flowers nodding, purple.
    - d. Calyx 2-3 times as long as wide ..... 5. L. attenuata
    - dd. Calyx ovoid to subglobular ..... 6. L. apetala
  - cc. Flowers erect, white.

- e. Flowers closed and the petals included  
in the daytime ..... 4. L. pudica
- ee. Flowers open and the petals well exerted  
in the daytime.
- f. Calyx 8-10 mm long ..... 3. L. Drummondii
- ff. Calyx 10-13 mm long ..... 7. L. triflora

1 X. L. LOVEAE Boivin (L. alba AA.; Melandrium album AA.)--  
White Campion, White Cockle (Compagnon blanc, Passe-jacée) --  
Flowers showy, open in daytime, closed at night. Coarse and  
sticky perennial with a widely diffused inflorescence. Calyx  
at first cylindric, then distended by the fruit and becoming  
nearly globular. Calyx lobes 3-6 mm long. Petals white. Sum-  
mer. Roadsides and cultivated fields; a hybrid of L. alba X  
rubra, escaped from cultivation. -- Aka, NS-BC, US, Eur.

Seems clear that our plant is not the european L. alba,  
white-flowered and opening at night, but rather a garden hybrid  
of L. alba X dioica. The L. dioica parent is red-flowered,  
opening in the daytime, while our plants are white-flowered and  
open in the daytime.

A report of Silene dichotoma Ehrh. by Budd 1957, 1964, was  
based on a collection of Lychnis Loveae from Melfort (SCS; DAO,  
photo).

2. L. CHALCEDONICA L. -- Scarlet Lychnis, Maltese Cross  
(Croix de Jérusalem, Lampette de Calcédoine) -- Flowers brick-  
red in a compact corymbiform cyme. A coarse hirsute perennial.  
Capsule long-stipitate, the stipe at least half as long as the  
body of the fruit. Mid summer. Sometimes cultivated and tend-  
ing to escape to nearby ditches and fields. -- PEI, Q-S, BC,  
(US, Eur).

3. L. Drummondii Watson var Drummondii (L. affinis AA.;  
Wahlenbergella Drummondii (Watson) Rydb.) -- Similar to Silene  
Scouleri but with 5 styles, and the calyx shorter. (Early sum-  
mer?). Alpine habitats. Reported for the Rockies of Alberta,  
but these reports are doubtful and may be based on a Silene or  
on the following species. -- (swAlta), US.

Two of Watson's specimens have been examined. One from  
Weber Valley, Utah (HUH), has white and exerted petals; it is  
considered typical of the species. The other is from Uintas  
(HUH) and has the characteristic purplish petals of the follow-  
ing variety.

L. Drummondii Watson var. heterochroma var. n. Petalis  
exsertis, lamina purpurea. Type: C.L. Porter 4650, Medicine  
Bow Mountains near Keystone, 9000 ft., July 14, 1948 (DAO). Pa-  
ratypes from Wyoming, Utah and Colorado.

See the next species for more on the typification of this  
name.

4. L. pudica Boivin (L. Drummondii AA.; Wahlenbergella  
Drummondii AA.) -- Calyx closed and the petals included in day-  
time. A rather inconspicuous perennial, virgate, 3-6 dm high,  
glandular-puberulent. Flowers few, opening at night. Calyx  
cylindric. Seed small and wingless. Petals white, slightly

exserted at night. Late spring to mid summer. Steppes, prairies and Pine woods. -- (Mack), Man-BC, US.

L. Drummondii Watson -- As a doubtful synonym Watson cited Silene Drummondii Hooker and the two names are usually treated as synonyms but two quite different species are actually involved. Watson was quite aware of discrepancies between the two taxa and in his text he pointed out differences between his Lychnis and Hooker's Silene. Since Watson expressed a clear doubt about the synonym he quoted, it seems best that Watson's name be typified by the specimens which he had at his disposal. These belong to the Rocky Mountain element of the western U.S. for which the name is currently used. This is the Silene-like type with conspicuous petals. The other element is the L. pudica of our text.

5. L. attenuata Farr (L. apetala L. var. attenuata (Farr) C.L. Hitchc.) -- Similar to the following and often confused with it. Petals slightly exserted. Pubescence sometimes purplish throughout, but usually white throughout except on the calyx nerves. Stem lower, 5-10 cm high. Calyx narrower, narrowly ovoid to narrowly ellipsoid. Mid summer. Alpine rock slides: Rockies. -- swAlta-seBC -- F. glabra (Regel) Boivin -- Herbage glabrous. -- (swAlta).

6. L. apetala L. var. arctica (Fries) Cody -- Flower nodding, the petals included. Perennial, 0.5-2.0 dm high, not viscid, but with purplish pubescence. Flower terminal, nearly always solitary. Petals purple. Calyx ovoid to subglobose, erect in fruit. Seed broad, with a large inflated wing. (Early summer?). Wet tundra and shores of arctic streams. -- (G)-F-Mack-(Y)-Aka, nL, nQ, nMan.

In the eurasian var. apetala the petals are white and a bit longer, almost exserted.

7. L. triflora Er. var. elatior (Regel) Boivin (L. affinis AA.; L. Gillettii Boivin) -- Very glutinous tufted perennial. Glandular pubescent throughout. Mostly with 3 flowers on elongate pedicels. Flowers white and open in the daytime and the calyx  $\pm$  oblong. Seed over 1 mm wide, with an inflated wing. (Early summer?). Arctic gravels. -- (F-K)-Mack-Aka, nO-nMan.

In the more widely distributed and more northern var. triflora the calyx is bigger, 1.2-1.5 cm long, and the seeds smaller 1.0-1.2 mm wide. Specimens from northern Manitoba, including those reported as L. affinis, have a calyx only 0.8-1.2 mm long but the seeds 1.2-1.8 mm wide and belong to var. elatior.

The application of the name L. triflora was discussed by Boivin 1959.

A report of Melandrium affine (J. Vahl) Hartm. from the Rockies of Alberta by Porsild 1959 has not been investigated.

#### 10. GYPSOPHILA L.

Similar to Saponaria but the capsule dehiscent by 4 valves instead of 4 teeth.

a. Petals  $\pm$  1 cm; annual ..... 3. G. elegans  
LYCHNIS 98

aa. Much smaller, perennial.

b. Inflorescence glabrous ..... 1. G. paniculata

bb. Densely glandular ..... 2. G. scutifolia

1. G. PANICULATA L. -- Baby's Breath (Oeillet d'amour)-- Tall perennial with a diffusely branched inflorescence of numerous small flowers. Commonly 5-8 dm high and glabrous throughout or at least in the inflorescence. Stem strongly inflated at the nodes. Sepals petaloid, with a large purple midnerve and broad white margins. Petals white, 2-3 mm long, slightly exceeding the sepals. Mid summer to early fall. Cultivated and sometimes invading adjacent grassland in great numbers. -- Q-sManseBC, US, Eur.

2. G. ACUTIFOLIA Fischer (G. perfoliata var. latifolia AA.) -- Similar to the preceding but glabrous below while glandular-puberulent in the inflorescence. Leaves larger and thicker. Calyx somewhat petaloid. Petals deep pink, about 5 mm long. Mid to late summer. Local escape from cultivation: Calgary. -- Alta, (Eur).

Our specimens seem to fit the description in the Fl. URSS. 7: 757-8. 1936 except for the flower colour. However we notice that Fournier 1952 describes the flowers as being indifferently white or pink.

3. G. ELEGANS Bieb. -- Smaller annual with larger flowers. Glabrous throughout, 2-5 dm high. Calyx greenish with white margins. Petals white, up to 1 cm long. Summer. Cultivated and sometimes reseeding itself on roadsides and waste places: Hoosier, Edmonton, Ft. Sask. -- (Aka), Q,swS-Alta, (US, Eur).

#### 11. DIANTHUS L.

Calyx closely subtended by 1-3 pairs of leafy bracts. Otherwise similar to Saponaria.

a. Leaves 7-20 mm wide ..... 1. D. barbatus

aa. Only 2-4 mm wide ..... 2. D. sylvestris

1. D. BARBATUS L. -- Sweet William, French Pinks (Jalousie, Oeillet de poète) -- Inflorescence congested into a compact terminal corymbiform cyme as in Lychnis chalconica, but the latter is hirsute with scabrous leaves. Glabrous except for the finely ciliate or scabrous-margined leaves and bracts. Inflorescence somewhat involucreted with spinescent leaves. Bracts long-attenuate into a long stiff point. Petals white to pink, drying dark red. First half of summer. Cultivated and a casual roadside weed: Morden, Mossy Portage, Waterton. -- Q-O-(Man), Alta-BC, US, Eur.

2. D. SYLVESTRIS Wulfen -- Wood-Pink (Oeillet sauvage) -- Flower solitary or only 2-3 together. Bracts 1/4 to 1/3 as long as the glabrous calyx. Calyx with 20-40 nerves. Flower pink, showy. Late summer. Cultivated and rarely becoming weedy: Fort Saskatchewan. -- Alta, (Eur).

## 12 SAPONARIA L.

## SOAPWORT

Similar to Lychnis and Silene, but the styles normally only 2 and the capsule opening by 4 teeth. Calyx with 5 or 20 longitudinal nerves.

- a. Calyx cylindric, with 20 nerves ..... 1. S. officinalis  
 aa. Calyx wing-angled on the 5 nerves ..... 2. S. Vaccaria

1. S. OFFICINALIS L. -- Bouncing Bet, Soapwort (Herbe à savon, Savonnière) -- The large leaves rather clearly 3 nerved. Quite showy perennial, 5-8 dm high, stoloniferous and forming large colonies. Hirsute in the inflorescence, glabrous below. Calyx cylindric, slightly asymmetric, with two lobes almost completely fused and one sinus more deeply cut than the others. Flowers usually pink, often double. Summer. Cultivated and sometimes invading banks and roadsides. -- NS-BC, US, Eur.

2. S. VACCARIA L. (Vaccaria segetalis (Necker) Garcke; V. vulgaris Host) -- Cowherb, Cow-Cockle (Blé de vache, Herbe au veau) -- Calyx produced into 5 deep green, winged ridges, with each of the 5 nerves running on the top of a ridge. Glabrous and slightly glaucous annual with connate leaves. Inflorescence very open. Petals pale to deep pink. Summer. Casual weed in grain crops and around elevators. -- Y-(Aka, NS, NB-Q)-O-Alta-(BC, US), Eur -- F. GROHII Boivin -- Flowers white. Local. -- Man-S.

## 75. PORTULACACEAE

## (PURSLANE FAMILY)

Rather unusual family by having only 2 sepals or only 2 calyx lobes. Other floral parts are in 3's, or 4's or 5's. Otherwise resembling the Caryophyllaceae.

- a. Stem very branchy ..... 2. Portulaca  
 aa. Stem simple or nearly so, or the plant scapose.  
 b. Stem leafy ..... 1. Claytonia  
 bb. Leaves all basal, the scapes merely bracteolate ..... 3. Lewisia

## 1. CLAYTONIA

## SPRING-BEAUTY

Sepals 2, persistent, enveloping the 3-valved capsule.

- a. Leaves alternate.  
 b. Leaves ovate to lanceolate ..... 1. C. parviflora  
 bb. Leaves linear.  
 c. Annual; petals white ..... 3. C. linearis  
 cc. Perennial with superficial leafy stolons; petals pink, larger ..... 2. C. Bostockii  
 aa. Leaves opposite.  
 d. Leaves mostly basal; the root a huge taproot ..... 6. C. megarrhiza  
 dd. All or mostly cauline.  
 e. Leaves only two ..... 5. C. caroliniana

ee. More numerous and many times

smaller ..... 4. C. fontana

1. C. parvifolia Moç. (Montia parvifolia (Moç.) Greene) -- The tufted stems elongate and becoming very thin towards the tip. Basal leaves numerous, fleshy. Stem leaves remote, narrower and rapidly much smaller. Old stems decumbent and rooting at the nodes. Flowers pink, few, in a terminal raceme which is often congested into an umbel. Summer. Wet rocks below timberline: Waterton. -- seAka, swAlta-BC, wUS.

2. C. Bostockii Pors. -- Resembling the following, but perennial with leafy superficial stolons. Petals pink,  $\pm$  1 cm long. Wet places. (Spring?). Reported for northern Manitoba.-- Y-Aka, (nMan).

3. C. linearis Douglas (Montia linearis (Douglas) Greene; Moniastrum lineare (Douglas) Rydb.) -- Annual with 2-3 long-linear leaves. Sometimes tufted or with 1-2 branches. Petals white, about as long as the sepals. Late spring. Wet mossy places in the mountains; Cypress Hills and Twin Butte. -- swS-BC, US.

4. C. fontana (L.) R.J. Davis (Montia lamprosperma Cham.) -- Blinks, Indian Lettuce (Petit cresson) -- A small and slightly fleshy herb with opposite and oblanceolate leaves mostly  $\pm$  1 cm long. Shallow-rooted annual in tangled colonies. Leaves trinerved, the two lateral nerves submarginal, meeting at the tip of the leaf and anastomosing with the median. Flowers few or solitary, on strongly arched peduncles. Summer. Cold springs in maritime regions: Churchill. -- (G-F)-K-(Mack), Aka, (L-SPM, NS-NB)-Q-nMan, BC, US, (CA, SA), Eur, (Afr, Oc).

5. C. caroliniana Mx. var. lanceolata (Pursh) Watson -- Tufted herb from a deeply buried corm. Stem bearing two sessile, lanceolate leaves and a terminal raceme of delicate flowers. Petals white to pink, about 1 cm long. Late spring and early summer. Mountain meadows and coniferous forests: Cypress Hills and Rockies. -- swS-BC, nwUS.

Many other varieties are known. The following occur in the western U.S.A.: var. sessilifolia Torrey has longer and narrower leaves; var. flava (Nelson) stat. n.; C. flava Nelson, Un. Wyo. Publ. Bot. 1: 142. 1926 has orange yellow flowers; var. chrysantha (Greene) stat. n., C. chrysantha Greene, Leafl. Bot. Obs. Crit. 2: 45, 1910 also has yellow flowers but broader leaves; var. Peirsonii (Munz & Johnston) stat. n., C. lanceolata Pursh var. Peirsonii Munz & Johnston, Bull. Torr. Bot. Club 49: 352. 1923 has a foreshortened and umbelliform inflorescence.

6. C. megarrhiza Parry -- Densely tufted herb from a huge taproot. Basal leaves numerous and crowded, suborbicular to obovate. Stem leaves petiolate, narrower. Inflorescence  $\pm$  overtopping the leaves. Petals white, nearly 1 cm long. Mid summer. Alpine summits and rock slides: Rockies -- swAlta-BC, wUS.

## 2. PORTULACA L.

PURSLANE

Ovary semi-inferior. Capsule circumcissile.

1. P. OLERACEA L. -- Purslane, Pusley (Pourpier sauvage, Porcelaine) -- A very fleshy weed with the stem and branches spread out on bare ground. Very antagonistic to the usual herb-arium-making processes; gradually shedding its leaves, resisting for about a month and turning into a brittle blackened skeleton before giving up. Leaves alternate, spatulate. Main branches tending to be subopposite. Flowers, small, yellow. Late summer. Infrequent weed of bare ground, gardens and cultivated crops. -- NS-(PEI)-NB-BC, US, Eur.

## 3. LEWISIA Pursh

Ovary superior. Sepals persistent. Capsule circumcissile and also dehiscent at top.

1. L. pygmaea (Gray) Rob. var. pygmaea -- A rosette of somewhat fleshy, long-linear leaves arising from a fleshy tap-root. Scapes with two opposite bracts and long overtopped by the leaves. Petals white to pink, up to 1 cm long. First half of summer. Alpine meadows in Waterton. -- swAlta-BC, US.

To the southwest of us it grades into a var. nevadensis (Gray) Fosberg with longer sepals, 5-12 mm long, and usually larger leaves.

## Order 43. POLYGONALES

A reduced type from the Caryophyllales, the fruit being reduced to a single seed. Flower typically 3-merous.

- a. Leaves alternate or verticillate ..... 76. Polygonaceae  
 aa. Leaves opposite ..... 77. Illecebraceae p. 117

## 76. POLYGONACEAE (BUCKWHEAT FAMILY)

Most genera in this family have large stipules united into a cylindrical sheath at each node. This sheath is termed "ocrea". Petals lacking, but the sepals often petaloid. Fruit an achene.

- a. Leaves all basal or essentially so.  
 b. Flowers in clusters subtended by a verticillate involucre ..... 2. Eriogonum  
 bb. Panicle not involucreted ..... 4. Oxyria  
 aa. Stem leafy.  
 c. Uppermost leaves in a verticil of about 3 leaves ..... 1. Koenigia  
 cc. Leaves all alternate.  
 d. Fruit wingless or sometimes the outer tepals winged dorsally ..... 6. Polygonum  
 dd. Fruit winged.  
 e. Wings formed by the 3 inner and enlarging tepals ..... 3. Rumex



ee. Wings borne directly on the achene, the sepals remaining small.

f. Sepals and stamens 4; wings 2..... 4. Oxyria  
ff. Sepals and stamens 6; wings 3..... 5. Rheum

1. KOENIGIA L.

Resembling Polygonum, but the stipules not fused into a sheath and the flowers somewhat reduced. Sepals and stamens 3.

1. K. islandica L. -- Small to minute annual with a pair of basal leaves, one or a few alternate stem leaves and a terminal verticil of usually 3 leaves. Flowers small, mostly in a terminal cluster. Mid summer. Wet and more or less bare ground. -- G-K-(Mack-Y)-Aka, L, nQ, (swAlta-neBC, wUS), Eur.

We have yet seen no specimens from Alberta or B.C. and consider that the reports from those areas are questionable.

2. ERIOGONUM Mx.

UMBRELLA-PLANT

Stipules lacking. Flowers in clusters, each cluster subtended by a cupulate involucre. Clusters often gathered in umbels. Often semi-shrubby.

a. Flower clusters gathered in  $\pm$  secund racemes... 1. E. cernuum  
aa. Inflorescence umbellate.

b. Inflorescence a simple umbel of clusters, subtended by a verticil of reduced bracts.

c. Leaves ovate to suborbicular..... 3. E. ovalifolium

cc. Leaves lanceolate to narrowly linear.

d. Leaves in dense rosettes..... 5. E. androsaemum

dd. Leaves merely subbasal in crowded pairs ..... 2. E. multiceps

bb. Umbel compound and subtended by a verticil of leaf-like bracts.

e. Bracts of the umbel lanceolate and

ascending ..... 4. E. flavum

ee. Bracts spatulate and drooping..... 6. E. umbellatum

1. E. cernuum Nutt. -- Flower clusters on somewhat reflexed pedicels and in  $\pm$  secund racemes. Leaves suborbicular, whitish-tomentose below, not so densely tomentose above. Leaves borne in a somewhat elevated rosette with a few alternate leaves below the rosette. Ramification of the inflorescence rather elaborate: first verticillate, then dichotomous, then racemose. Bracts small. Flower clusters small and whitish. Second half of summer. Open sands, rare: Abbey, Webb, Express, Writing-on-Stone. -- swS-sAlta, US.

2. E. multiceps Nees -- Leaves not quite crowded into a rosette but separated by short internodes and \* clearly opposite. Grayish-white tomentose throughout. With a woody taproot and a branched caudex, also woody and buried. Leaves oblanceolate to linear, paler below. Inflorescence a simple umbel of clusters. Bracts very small to elongate. Flowers pinkish. First half of

summer. Eroded clays in badlands, where it acts as a soil binder. -- swS, (seBC), ncUS.

3. E. ovalifolium Nutt. -- Silver-Plant -- Forming compact cushions of white leaves. Taproot, branched caudex and marcescent leaves as in the following. Leaves ovate to suborbicular, white-tomentose on both faces. Flowers yellow in a dense umbel, often tinged pink. Mid summer. Talus slopes in the mountains. -- swAlta-seBC, US.

4. E. flavum Nutt. var. flavum -- Much in evidence in early summer on hillsides, a cushion-forming herb with umbells of yellow flowers. Taproot and caudex woody, the caudex branches few and densely clothed with the blackened remnants of old leaves. Leaves lanceolate, white-tomentose below, green and tomentose to villous above. Scape tomentose. Early summer. Near the top of hills, bluffs and coulées. -- swMan-sBC, US -- Var. Piperi (Greene) M.E. Jones (E. Piperi Greene) -- Not quite so densely pubescent: the scape merely villous and the hairs not tangled. Leaves villous above. Not a clear cut variation, but often replacing the type in the mountains: Rockies. -- swAlta-seBC, nwUS.

5. E. androsaceum Benthem -- Forming compact cushions of discolour leaves. Mode of growth as in the preceding, but the leaves smaller, about 1 cm long, linear-oblancoelate, white-tomentose below. Scape lower, less than 1 dm high. Inflorescence a simple umbel of clusters. Flowers yellow to deep red. Before mid summer. Alpine rock slides: Rockies. -- swAlta-seBC, nwUS.

6. E. umbellatum Torrey (E. subalpinum Greene) -- The woody caudex creeping on the ground and with obvious internodes, thus a carpet forming species. Leaves broadly oblanceolate, white-tomentose below, green and nearly glabrous above, clustered in numerous rosettes. Scapes 1-3 dm high. Inflorescence compound, subtended by a verticil of spatulate and drooping bracts which are somewhat smaller than the leaves. Flowers yellow. First half of summer. High montane and low-alpine on open rocky ground. -- swAlta-sBC, wUS.

### 3. RUMEX L.

### DOCK, SORREL

Fruit with 3 wings, the 3 inner sepals enlarged and persistent to form those 3 wings. Achene hidden between the wings. Mid-nerve of the wings (or valves) often thickened into a seed-like grain or tubercule. Ocrea conspicuous as in Polygonum. Fruiting pedicel often with a thickening termed "articulation".

a. Fruit very large and showy, 1-3 cm wide..... 1. R. venosus  
aa. Fruit much smaller.

b. Flowers dioecious; leaves mostly hastate or sagittate.

c. Leaves long cuneate at base .... 14. R. psucifolius

cc. Leaves hastate or sagittate.

d. Sepals small, about 1 mm long,  
less than 2 mm long in fruit..12. R. Acetosella

- dd. Sepals and valves longer ..... 13. R. Acetosa
- bb. Flowers mostly or all perfect; leaves hardly, if at all, hastate or sagittate, mainly cuneate to cordate.
  - e. Wing margin produced into a few elongated acicular lobes.
  - f. Inflorescence moniliform ..... 10. R. dentatus
  - ff. Inflorescence dense and continuous ..... 11. R. maritimus
- ee. Wings entire to merely erose or denticulate.
  - g. Pedicel not articulated or the articulation not thickened and ± vestigial.
  - h. Valves without grains... 5. R. occidentalis
  - hh. Each valve with a large grain ..... 7. R. orbiculatus
  - gg. Pedicel with a thickened articulation ..... Group A

## Group A

Fruit borne on an articulated pedicel. Flowers all or mostly perfect. Fruit middle-size, without acicular lobes.

- a. Fruit with (1)-3 large grains; each at least 1/5 the width of the valves.
  - b. Usually tufted and ascending at an angle, with all stem leaves subtending a branch or an axillary tuft ..... 2. R. salicifolius
- bb. Tall virgate herbs; axillary tufts and branches none or few and poorly developed below the inflorescence.
  - c. Valves entire to shallowly toothed... 8. R. crispus
  - cc. Valves conspicuously and sharply toothed ..... 9. R. stenophyllus
- aa. Fruit without grains or with only 1 small grain.
  - d. Valves rather cordate, commonly about 4 mm wide ..... 3. R. fennicus
  - dd. Valves larger, somewhat reniform and mostly 6-8 mm wide.
    - e. Leaves lanceolate to linear ..... 4. R. longifolius
  - ee. Much broader, triangular-cordate .. ..... 6. R. confertus

1. R. venosus Pursh -- Wild Begonia, Sour Greens -- Showy sand species with a panicle of large, coloured fruits. Stolonerous and decumbent, the stem 1-3 dm long. Leaves entire, slightly fleshy, broadly lanceolate. Fruit yellow or pink to deep red. Valves reniform, entire, 1-3 cm wide. Late spring, shedding its fruits before mid summer. Sandy and semi-open soils. -- sMan-Alta, US.

2. R. salicifolius Weinm. var. angustifolius Meisner (R. mexicanus Meisner var. angustifolius (Meisner) Boivin, var. triangulivalvis (Danser) Lep.: R. pallidus Big.; R. triangulivalvis Rech. f.; R. utahensis Rech. f.) -- Most obviously different in the field by its habit: all the stem-leaves subtending branches or axillary tufts. Stems 3-10 dm high, tufted,  $\pm$  ascending. Leaves 1-(2) dm wide, linear-lanceolate, entire, thickish. Panicle open. Valves 3-4 mm long, 2.5-3.0 wide, triangular to triangular-deltoid, somewhat dentate in the lower half. Grains 3, rarely only 1, exceptionally none, about 2 mm long, up to 1 mm wide. First half of summer. Wet places and sloughs, sometimes weedy. -- sMack, NF-SPM, NS-BC, US.

Very variable, much divided and subjected to many name changes. It is not easy to arrive at a satisfactory classification of its more significant types. Many phenotypes have received varietal or specific names, but most such entities are local or sporadic variants of no particular interest and we have relegated them to synonymy. In our present understanding of the series, only one geographical variation occurs in our area. But three other varieties are to be found east, west and south of us, respectively as follows.

Around Hudson Bay, a var. subarcticus (Lep.) stat. n., R. subarcticus Lep., Nat. Can. 82: 191. 1955 with smaller leaves, less than 1 dm long, purplish inflorescence, moniliform racemes and tardily developing grains.

To the west of us the typical var. salicifolius, including R. sibiricus Hultén, with the grains relatively larger, about 2/3 as long and at least half as large as the valves.

Further to the south, var. mexicanus (Meisner) C.L. Hitchc, with larger fruits, the valves 4-5 mm long, 3.5-4.0 mm wide.

2 X. R. Franktonis Boivin -- Hybrid of R. fennicus with R. salicifolius var. angustifolius. The stem tall, coarse and erect as in R. fennicus, but branchy and with numerous fascicles as in mexicanus. Leaves crisp, but often narrow. Valves triangular-ovate, entire or nearly so, subcordate at base. Grains small or insignificant, about 1 mm long, mostly 1-2 per fruit. Sterile or nearly so, but producing a fertile amphiploid. Local: Kindersly -- S.

3. R. FENNICUS Murb. -- (Patience, Doche) -- A tall virgate herb, its large and compact inflorescence much in evidence around sloughs towards the end of the summer. Stem 8-15 dm high, coarse, with a solid core, simple. Axillary fascicles poorly developed. Leaves few, large, strongly crisp-margined, long cuneate at base. Valves entire or merely wavy-margined, (3)-4-(5) mm wide, short cordate, the base deeply cordate. Around mid summer or rarely earlier. Low places -- Y, Q-BC, US, Eur.

Perennial, but apparently able to flower the first year, hence probably its success as a weed. Spreading rapidly and still very local at the limits of its range: Dawson in Yukon, Thetford Mines in Quebec, Calgary and Writing on Stone in Alberta, Davie Lake in B.C.

4. *R. LONGIFOLIUS* DC. (*R. domesticus* Hartm.) -- (Patience, Doche) -- Much like *fennicus* in habit and other characters, but the valves larger, mostly 6-(8) mm wide, tending to be somewhat larger than long and rather reniform in outline. Stem often somewhat fistulose. Stem leaves commonly broader at base, usually broadly cuneate to cordate. Grains lacking or minute, may be 1/10 the width of the valve. Early summer. Recent and still rare weed of wet places: Austin, Virden, Yorkton. -- G, sAka, NF-(SPM), NS-ecS, seBC, (US, Eur).

A report from Otterburne was based on a collection since revised by Dr. C. Frankton to *R. crispus*.

5. *R. occidentalis* Watson var. *occidentalis* (var. *fenestratus* AA.; *R. fenestratus* AA.) -- Habitally similar to *R. fennicus* etc., but the pedicel devoid of an articulation. Stem fistulose. Leaves cordate at base. Valves deltoid-ovate, entire to subdentate, quite grainless. Early summer. Sloughs and wet places. -- K-Y, Q-BC, US.

In our variety the valves are 4-6 mm long and the seeds 3-4 mm. In more maritime regions their occurs a large fruited and disjunct var. *labradoricus* Rech. f. (including var. *procerus* (Greene) J.T. Howell), its valves 6-8-(11) mm long, its seeds 4-5 mm long.

6. *R. CONFERTUS* W. (*R. Patientia* AA.) -- Leaves broadest, triangular-cordate, the blade shorter than the petiole. Basal leaves commonly 2 dm wide, the stem leaves similar but somewhat smaller and the upper longer than their petiole. Valves  $\pm$  8mm wide, dentate, reniform, broader than long. Grains small or lacking, usually less than 1 mm wide. Early summer. Rare roadside weed: Ethelbert. -- Man, Eur.

Reports of *Rumex Patientia* L. in canadian botany are generally to be discounted, especially the older ones. While it has been frequently reported from Nova Scotia to British Columbia, its actual canadian range is apparently restricted to a few Ontario localities. We have verified specimens from Ottawa, Kingston, Salmon Pt., Woodstock and Napanee. All other canadian collections checked turned out to belong to some other species, and all other unchecked reports are held as questionable pending checking of their vouchers.

7. *R. orbiculatus* Gray (*R. britannica* AA.) -- Yellow Dock, Pale Dock -- Also habitally similar to *R. fennicus*, but the valves grain-bearing and the pedicels without articulation. Stem fistulose, its leaves long cuneate at base, weakly dentate below the middle. Grains 2-3 mm long, borne on a stipe-like base  $\pm$  0.5 mm long. Mid summer. Wet meadows and marshes in fresh water areas. -- (NF-SPM), NS-Alta, US.

A range extension by Henry 1915 to the lower Fraser in B.C. has never been confirmed and was ignored by Taylor 1966; it should be discounted as unsubstantiated. This and many other similar reports of various species by Henry may not be verifiable as his herbarium was reputedly destroyed by the executor of the estate.

8. *R. CRISPUS* L. -- Curled Dock, Sour Dock (Patience sauvage, Reguette) -- Again habitually similar to *R. fennicus*, but the valves with 3 grains of very unequal size. Stem nearly solid. At least the upper leaves truncate to cordate at base. Valves broadly cordate. Larger grain about 1/3 as wide as the valve, not at all stipitate. Second grain much smaller and the last minute. Just before mid summer. Ditches; tolerant of saline soils. -- (Y-Aka, L)-NF-(SPM), NS-Q-(O)Man-S-(Alta-BC, US, Eur).

9. *R. STENOPHYLLUS* Led. (*R. obtusifolius* AA.) -- Again habitually similar to *R. fennicus*, but the valves sharply dentate. Glabrous. Stem leaves broadly to narrowly cuneate at base. Inflorescence more open, partly moniliform. Valves deltoid, coarsely and sharply dentate, the teeth less than 1 mm long. Grains large, but one of them usually smaller than the other 2. All summer. Wet places, mostly ditches. -- sQ-swAlta, US, Eur.

The only report of *R. obtusifolius* L. from our area was based on Dore & Breitung 12552, Weyburn, 1950 (DAO, SASK). In 1964 this was revised by Dr. C. Frankton to *R. stenophyllus*. We concur.

10. *R. DENTATUS* L. -- Valves acicular-lobed like the following, but the branches glabrous and the pedicel with an articulation. Only 3-4 dm high and very branchy. Pedicels thick, shorter than the fruits. Grains 3, large. (Mid summer?) Rare weed of cultivated land: Lethbridge. -- swO, swAlta, Eur, (Afr).

Subdivided in 7 subspecies in the latest regional monograph. The paucity of specimens at hand allows neither an evaluation of these taxa nor a more accurate determination of our only collection.

11. *R. maritimus* L. (var. *fueginus* (Phil.) Dusén; *R. persicarioides* L.) -- Golden Dock -- Valves with 5-(7) acicular lobes. Branchy, 2-6 dm high. Short pubescent on the stem, branches and midnerves. Leaves ± crisp-margined. Pedicels thin. Valves with lobes ± 2 mm long, longer than the width of the undivided part of the blade. Summer. Common on shores and wet places, fresh or saline. -- (sMack)-Y-(Aka), NS-BC, US, (SA), Eur.

11 X -- *R. Alexidis* Boivin -- Hybrid of *R. stenophyllus*. Puberulent in the inflorescence and branchy in the manner of *R. maritimus*. Coarser, broader-leaved and with larger fruits, as *R. stenophyllus*. Valves 3-4 mm long, ± 2 mm wide, the acicular teeth less than 2 mm long and very uneven in length. Local: Regina. -- S.

12. *R. ACETOSELLA* L. -- Sorrel, Redweed (Petite Oseille, Surette) -- Valves only marginally wider than the achene. Stoloniferous, dioecious, 1-4 dm high. Most leaves conspicuously hastate, otherwise entire. Outer sepals small, less than 1 mm long, but the valves up to 1.5 mm long. Summer. Occasional weed of acid soils -- G, Y-Aka, L-SPM, NS-BC, US, (CA, SA), Eur, (Afr, Oc).

13. *R. Acetosella* L. (*R. alpestris* (Scop.) Löve) -- Sweet-leaf, Sally Chives (Oseille, Grande Oseille) -- Outer sepals

tightly reflexed in fruit. Dioecious perennial, less than 1 m high. Stem leaves sagittate to  $\pm$  hastate at base. Sepals about 1 mm long in flower, enlarging to 2 mm in fruit, those of the male plants about 2 mm long. Valves entire, orbicular-reniform, with a minute and inconspicuous grain. Early summer. Sometimes cultivated and rarely escaping to roadsides; native to the alpine prairies of the Rockies. -- G, Mack)-Y-Aka, NF-SPM, NS-(PEI)-NB-BC, US, (SA), Eur, (Afr, Oc).

Native plants tend to larger basal leaves, those often cordate at base rather than sagittate or hastate. These tendencies are not sufficiently constant to enable us to implement a taxonomic distinction that would not rely heavily on the habitat or locus of collecting.

14. R. paucifolius Nutt. (R. pauciflorus sphalm.) -- Resembling R. Acetosa, but the leaves oblanceolate and long cuneate at base. Sepals of the male flowers 1.5-2.0 mm long, those of the female ones less than 1 mm long, spreading on the fruit. Valves cordate, grainless. Mid summer. High alpine; reported for the Rockies. -- (swAlta)-seBC, wUS.

#### 4. OXYRIA Hill

Basic floral number is 2 while the rest of the family favors 3. Valves not winged and only slightly larger than the 2 outer sepals. Fruit winged.

1. O. digyna (L.) Hill -- Rhubarb, Mountain Sorrel -- Herb with reniform basal leaves. Stem leaf none or only one small one. The whole plant often bright red, especially the fruit wings. Sepals and valves oblanceolate to spatulate. Wings forming a near circular ring around the achene. Early to mid summer. Alpine and subalpine gravel slopes. -- G-Aka, L-NF, NS-Q, swAlta-BC, US, Eur.

#### 5. RHEUM L.

Fruit 3-winged, subtended by 6 small sepals.

1. R. RHAPONTICUM L. -- Rhubarb, Pie-Plant (Rhubarbe) -- Huge, ovate rosette leaves with a succulent petiole. Forming large tufts. Inflorescence rather tall, whitish in flower. Fruits brownish. Early summer. Often cultivated and persisting indefinitely around abandoned homesteads. -- NB-S, BC, (US, Eur).

#### 6. POLYGONUM L.

#### KNOTWEED

Basic type of the family. Fruit not winged, but surrounded by the persistent calyx of  $\pm$  5 tepals.

- a. Stem with a ring of long, reflexed hairs at the nodes; usually climbing ..... 20. P. cilinode
- aa. Nodes not specially pubescent.
  - b. Climbing by twining stems.
  - c. Fruit wingless ..... 21. P. Convolvulus

- cc. With 3 broad wings ..... 22. P. scandens
- bb. Not climbing.
  - d. Flowers in panicles or corymbs.
    - e. Flowers in axillary panicles..23. P. cuspidatum
  - ee. Flowers in elongating corymbs at the end of the stem and branches.
    - f. Seed smooth ..... 24. P. Fagopyrum
    - ff. Seed verrucose ..... 25. P. tataricum
- dd. Flowers in axillary glomerules or in terminal racemes.
  - g. Flowers solitary or in axillary glomerules ..... Group A
  - gg. Flowers all or mostly in leafless terminal racemes ..... Group B

## Group A

Flowers solitary or in numerous small axillary glomerules. Or the inflorescence sometimes becoming spiciform towards the end of the branches, but then at least the lower clusters conspicuously bracted. Ocrea deeply lacerate into mostly 2-3 lanceolate to linear lobes.

- a. Fruit reflexed or pendant on a recurved pedicel.
  - b. Calyx 3-4 mm long .....8. P. Douglasii
- bb. Calyx 2.0-2.5 mm long; plants smaller.
  - c. Leaves narrowly lanceolate to linear ..... 6. P. Engelmannii
  - cc. Broader, the main ones oblanceolate to obovate ..... 7. P. Austiniae
- aa. Fruit ascending or erect.
  - d. Glomerules crowded towards the end of the branches into dense and leafy spiciform inflorescences.
    - e. Leaves ovate to elliptic ..... 5. P. minimum
  - ee. Narrower, lanceolate to narrowly linear.
    - f. Achene chestnut-brown ..... 9. P. Kelloggii
    - ff. Achene jet-black .....10. P. confertiflorum
- dd. Glomerules distant to scattered; some of the glomerules may be gathered in poorly defined and leafy, spiciform, terminal inflorescences.
  - g. Calyx lobes about as long as the tube; leaves broad ..... 3. P. achoreum
  - gg. Lobes twice as long as the tube.
    - h. Leaves rather large, the main ones 1.0-2.5 cm wide, and very finely pencilled in white at the margin..2. P. erectum
    - hh. Narrower and the margin green.
      - i. Stiffly erect; flowers greenish ..... 4. P. ramosissimum



- ii. Normally depressed to decumbent; tepals with a broad white to red margin ..... 4. P. aviculare

## Group B

Flowers in well defined and leafless terminal racemes. Axillary glomerules also present in some species. Ocrea not lacerate, but more or less truncate at mouth.

- a. Leaves 1-3-(4); stem simple and bearing a single terminal raceme.  
 b. Flowers replaced by bulblets in the lower part of the raceme ..... 17. P. viviparum  
 bb. Lacking bulblet ..... 18. P. bistortoides  
 aa. At least the leaves more numerous.  
 c. Leaves broadly cordate ..... 20. P. cilinode  
 cc. Leaves broadly to narrowly lanceolate.  
 d. Perennial with the erect branches usually simple and bearing only 1-(2) racemes ..... 11. P. amphibium  
 dd. Annual and branchy, with many racemes.  
 e. Leaves deeply cordate at base ..  
 ..... 19. P. sagittatum  
 ee. Cuneate at base.  
 f. Perianth abundantly glandular-punctate; racemes lax.  
 g. Most stem-nodes with the ocrea distended or ruptured by a glomerule of enclosed cleistogamous flowers ..... 16. P. Hydropiper  
 gg. No axillary glomerules ..  
 ..... 15. P. punctatum  
 ff. Not punctate but glabrous or beset only with sessile glands; racemes dense.  
 h. Main ocrea long ciliate; achene lenticular.... 12. P. Persicaria  
 hh. Not ciliate; achene discoid.  
 1. Achenes small; overtopped by the calyx lobes ..  
 ..... 13. P. lapathifolium  
 ii. Larger, at least the beak of the style protruding ..  
 ..... 14. P. scabrum

1. P. ramosissimum Mx. (P. exsertum Small; P. interior Brenckle) -- Stiffly erect annual, resembling P. Douglasii, but the fruits  $\pm$  erect. Stem (3)-5-7-(10) dm high and quite branchy. Leaves lanceolate to linear, the main ones much larger, becoming much reduced towards the end of branches. Glomerules tending to form moniliform inflorescences towards the tip of the branches. Calyx green with paler margins. Outer sepals

obviously longer than the inner. Achene purple-brown. Mid summer. Shores and wet meadows. -- (Y-Aka), NS-O-(Man)-S-Alta-(BC, US).

2. *P. erectum* L. -- Erect or decumbent and rather coarse, resembling the last, but the leaves broad, even broader than the next. 5 dm high or more and the fairly abundant foliage rather light green. Leaves elliptic to elliptic-lanceolate, very finely crenulate and very finely pencilled in white at the margin. Calyx deeply lobed and mostly yellowish white at margin. Mid to late summer. Shores and other exundated places. -- Aka, NF, PEI-Man-(S-BC), US.

3. *P. ACHOREUM* Blake -- Calyx not so deeply divided, the tube about as long as the lobes and reaching slightly beyond the broadest part of the achene. Resembling the following, but coarser, not so depressed and rather decumbent with ascending tips. Leaves rather broad, obovate to oblong, about twice as long as broad, the main ones commonly around 1 cm wide. Flowers greenish. Summer and fall. Around buildings and along roadsides, at least since 1880. -- Mack-Aka, NB-BC, US.

Paler green and broader-leaved than *P. aviculare*, it tends to branch, when not tramped too much, into a globose mass reminiscent of the Rolling Mustards. We do not know if it actually behaves like a Rolling Mustard in late fall. It is especially in evidence at the edge of newly graded highways where it is often the most conspicuous and abundant pioneer. We find this entity to be quite readily distinguished from *P. aviculare* and we must admit of some puzzlement over the frequency of misidentifications, some by leading taxonomists. In one such case Fernald, *Rhodora* 52: 18, 1950, reported *P. achoreum* occurring as a native on the shores of the Bay of Fundy. This being the only report of the species for the province, the justifying sheet was borrowed for study and it turned out to be a specimen of *P. aviculare sensu lato*, one of those seacoast specimens one might have expected Fernald to identify as *P. Fowleri* or *P. boreale*.

4. *P. AVICULARE* L. (var. *angustissimum* Meisner, var. *littorale* (Link) W.D.J. Koch; *P. boreale* (Lange) Small; *P. buxifor-me* Small; *P. caespitosum* A. & G.; *P. Fowleri* Rob.; *P. heterophyllum* Lindman; *P. neglectum* Besser; *P. ovalifolium* Lehm.; *P. prolificum* (Small) Rob., var. *autumnale* Brenckle) -- Knotweed, Doorweed (Trainasse, Herbe à cochons) -- A common and exceedingly variable species, often subdivided into a series of microspecies. Creeping to suberect annual. Leaves broadly to narrowly oblanceolate, usually less than 1 cm wide. Calyx lobes with a broad white to pink or red margin. Achene greenish brown to chestnut brown. Early summer to frost. Open to semi-open ground, especially in barnyards and tramped places. -- (G), seK-Aka, L-SPM, NS-BC, US, Eur, (Oc).

Highly variable, highly plastic and responding most readily to ecological conditions; especially tolerant of tramping, even of excessive tramping. Treatments of this species vary greatly from author to author and some will recognize up to 20 segregates. We find that the 3 segregates that precede are reasonably

distinct, but we are not convinced that further splitting is justified within the Canadian material. We are especially dubious of characters of size of achenes as these obviously vary greatly in any area, with late season specimens tending to produce longer achenes, and the odd specimen bearing some unusually large achenes. As pointed out by one author, accurate determinations of heterophylly can be made only in young well grown plants. This means that with most herbarium specimens one has to start by guessing either at the heterophylly or at the fruit size if an attempt is to be made at recognizing segregates of *P. aviculare*. The most commonly recognized segregate is *P. Fowleri*, a seashore type said to range along the northern seacoasts from Maine, to Washington State. We have studied an extensive series of specimens so determined or verified by various specialists of the group and we have been unable to detect any consistent difference, other than the seashore habitat, between these plants and the rest of *P. aviculare*.

5. *P. minimum* Watson -- Small annual species with rather large leaves. Up to 1.5 dm high, often branched from the base. Main stem nodes elongate, but most leaves and flowers crowded at the tip of the branches. Leaves less than 1 cm long, ovate to oblong. Summer. Dry hillsides and rocky outcrops in the Rockies. -- swAlta-BC, wUS.

6. *P. Engelmannii* Greene -- Similar to *P. Douglasii*, but smaller. Less than 2 dm high and usually very branchy from the base. Leaves narrow and tepals small. Summer. Disturbed soils; rare: Waterton, Pincher Creek, Livingstone Gap. -- swAlta-(seBC), wUS.

7. *P. Austiniae* Greene -- Resembling the preceding, but the leaves broader, the main ones oblanceolate to obovate or spatulate. Around 1 dm high. Tepals with a broad white margin. Summer. Disturbed soils in the mountains. -- swAlta-sBC, wUS.

8. *P. Douglasii* Greene var. *Douglasii* -- Fruits reflexed to pendant. Stiffly erect annual (1)-3-(7) dm high. Leaves lanceolate to narrowly linear. Flower mostly solitary, mostly borne in the axil of reduced upper leaves and tending to form very lax spiciform inflorescences. Summer. Dry hillsides and rocky outcrops. -- swQ-BC, US -- Var. *latifolium* (Eng.) Greene-- Main leaves broader, commonly oblong-lanceolate to lanceolate, mostly about 1 cm wide. Tending to replace the typical phase in the mountains: Cypress Hills and Rockies. -- swS-swAlta-sBC, (wUS).

9. *P. Kelloggii* Greene (*P. Watsonii* Small) -- Achene chestnut brown. Small erect annual less than 1 dm high. Glomerules mostly aggregated towards the tip of the branches into very leafy inflorescences. Upper bracts sometimes narrowly white-margined in the manner of the following species. First half of summer. Exsicated places: Cypress Hills, Redcliff. -- swAlta-(swBC), wUS.

The Cypress Hills collection was by Macoun in 1880 (QK; DAO, photo). No further precision was available on the place of origin of this specimen and no modern collection has been

made that could provide further information.

10. P. confertiflorum Nutt. -- Much like the preceding, but most of the inflorescence bracts with a conspicuous white margin. Achenes jet black. Early summer. Exsicated places. Rare or overlooked: Bélanger. -- swS-(Alta-BC, US).

11. P. amphibium L. var. amphibium (var. Hartwrightii (Gray) Bissell, var. stipulaceum (Coleman) Fern., f. fluitans (Eaton) Fern., f. hirtuosum (Farw.) Fern.; P. natans Eaton, f. Hartwrightii (Gray) Stanford; Persicaria fluitans (Eaton) Greene; Persicaria nebraskensis Greene; Persicaria psychrophila Greene) -- Lakeweed, Red Shanks -- Stoloniferous perennial, submerged to terrestrial. A rather coarse herb, hirsute to glabrous. Leaves oblong-lanceolate to linear-lanceolate, broadest near the middle. Spike 1-5 cm long, pinkish red, terminal and normally solitary. Mid summer. Muddy shores and shallow waters. -- Mack-Y-(Aka, L-NF)-SPM, NS-BC, US, Eur -- Var. emersum Mx. (P. coccineum Muhl., f. natans (Wieg.) Stanford, f. terrestre (W.) Stanford, var. pratincola (Greene) Stanford, var. rigidulum (Sheldon) Stanford; P. Muhlenbergii Watson; Persicaria coccinea (Muhl.) Greene; Persicaria mesochora Greene; Persicaria Muhlenbergii (Watson) Small; Persicaria pratincola Greene; Persicaria rigidula (Sheldon) Greene) -- Leaves narrowly ovate-lanceolate, broadest near the base, more acuminate. Spike usually longer, up to 4-10 cm long and elongate-cylindric. -- Mack, NS-BC, US.

Most current floras will subdivide our plant in two species and even further into a more or less elaborate series of varieties and forms. The specific distinction is based on the leaves being more acuminate, the peduncles pubescent and the spike longer. On the basis of the material at hand, the peduncle pubescence is not linked to the leaf form or spike length, but to the water level; it appears to be an ecological character. The spike length is not a discontinuous character, it is only an extreme of variation and is readily detectable only in late season. Similarly the leaf shape is only an extreme of variation and is to be recognized readily only on vigorous and emersed plants. Both extremes are weakly linked and neither occurs in the eurasian specimens examined; they appear to characterize a weak geographical variation. Other characters studied did not appear to be in any way significant.

In a normally amphibious species, floating and emersed forms are part of the normal variation and are not deemed worthy of taxonomic designation.

12. P. PERSICARIA L. -- Heart's Ease, Black Heart (Fer à cheval, Pied rouge) -- Resembling the following but the ocrea with the nerves long excurrent in the form of long and stiff cilia. Leaves often with arrowhead-shaped purple blotch above, not punctate below, but glabrous to lightly scabrous. Ocrea pubescent with flexuous and partly adnate hairs. Inflorescence glabrous or sometimes somewhat glandular. Racemes usually pink. Achene 2 mm wide or less, slightly concave on one side, convex on the other, usually overtopped by the calyx lobes. Summer and

early fall. Infrequent weed of disturbed soils. -- (G, Y)-Aka, L-NF-(SPM), NS-BC, US, Eur.

13. P. lapathifolium L. (var. salicifolium Sibth.; P. Persicaria L. var. lapathifolium (L.) Meisner; Persicaria incar-nata (Ell.) Small; Persicaria lapathifolia (L.) S.F. Gray) -- Leaves glandular-punctate in yellow underneath. Annual, usually erect, with  $\pm$  lanceolate leaves. Ocrea eciliate and glabrous, or the lowermost and uppermost very short-ciliate. Leaves glabrous below. Racemes normally pink. Inflorescence glabrous or sometimes glandular. Achene small, 1.5-2.0 mm wide, overtopped by the calyx lobes, more flattened than in the preceding, discoid and concave on both sides. Mid summer. Wet places, mostly exsiccated. -- (G, Mack), Aka, (NF-SPM), NS-Alta-(BC), US, Eur.

The Scoggan 1957 report of P. pensylvanicum L. from our area was based on a sheet, E. Scamman 2878, Clear Lake, 1941 (GH), which we have since revised to P. lapathifolium. A report by Löve 1959 of Persicaria pensylvanica (L.) Gomez f. albinea (Farw.) Löve & Bern. was also based on a sheet (MSM; DAO, photo) similarly revised since to P. lapathifolium.

14. P. SCABRUM Moench (P. tomentosum Schrank; Persicaria incana (F.W. Schmidt) S.F. Gray; Persicaria tomentosa (Schrank) Bickn.) -- Much as in the preceding but the racemes usually pale green. Leaves punctate and glabrous to lightly tomentose below. Inflorescence very glandular. Achene  $\pm$  2.5 mm wide, discoid and concave on both faces, usually somewhat protruding between the tips of the calyx lobes. Summer. Common weed of crops and disturbed soils. -- (Mack), Aka, (L)-NF, NS-(PEI-NB)-Q-BC, (US, Eur).

15. P. punctatum Ell. var. confertiflorum (Meisner) Fassett (var. leptostachyon AA.) -- Racemes lax and somewhat drooping at tip. Otherwise with the general habit of P. Persicaria and the ocrea similarly long-ciliate. Axillary glomerules lacking. Ocrea strigose with stiff and half adnate hairs. Raceme irregularly moniliform. Perianth green with white margins. Second half of summer. Wet places and shores. -- NS-ecS, sBC, US, (CA).

Our variety is annual while the typical variety is perennial and its leaves are often larger.

Our plant has also been called var. leptostachyum (Meisner) Small, but this is an illegitimate name and further it is based on a javanese variant, not on our cisatlantic phase.

16. P. Hydropiper L. (var. projectum Stanford) -- Smartweed, Water-Pepper (Gurage, Polvre d'eau) -- Both terminal racemes and axillary glomerules present. Otherwise much as in the preceding. Axillary glomerule more or less included in the ocrea. Perianth white-margined or more commonly pinkish. Late summer. Shores: Red River. -- (Aka, NF-SPM), NS-(PEI-NB)-Q-Man, BC, US, Eur, (Afr, Oc).

17. P. viviparum L. var. viviparum -- Bistort, Serpent-Grass (Petite bistorte) -- Raceme with a large proportion of the flowers replaced by fleshy bulblets, the remaining flowers sterile. Tufted perennial. Stem 1-3 dm high, stiffly erect,

simple, mostly with only 1 leaf. Leaves lanceolate to linear, usually pilose below. Inflorescence linear, whitish, less than 1 cm wide. Early to mid summer. Wetter spots in arctic and alpine prairies. -- G-Aka, L-SPM, Q-nMan-nS-BC, US, Eur.

A Saskatchewan report for lake Athabaska by Breitung 1957 is credited to Raup 1936. But the latter cites only Alberta and Mackenzie collections. Our Saskatchewan report is based on a Lake Hansen collection (DAO).

Along southern Alaska occurs a var. Macounii (Small) Hul-tén, coarser and with a smaller calyx.

18. P. distortoides Pursh -- Similar to P. viviparum, but not bulbiferous. About twice taller with mostly 3 stem leaves. Raceme oblong, 1.5-2.5 cm wide. Early summer. Montane prairies: Cypress Hills and Rockies. -- sAlta-(eBC), wUS.

19. P. sagittatum L. -- Arrow-Vine, Tear-Thumb (Gratte-cul) -- Stem and branches very rough and very catchy because of lines of very small and recurved prickles. Climbing on surrounding vegetation. Leaves sagittate-lanceolate, prickly along the mid nerve. Flowers in terminal capitate racemes. Second half of summer. Wet open places. -- NF-SPM, NS-Man, US, (Eur).

20. P. gilinode Mx. (Bilderdykia cilinodes (Mx.) Greene) -- Bindweed -- An erect native perennial with deltoid-hastate leaves. Stem reflexed-puberulent, not infrequently twining at tip. Leaves hastate at base, acuminate at tip. Inflorescence a panicle of lax racemes. Early summer. Open sands and granite outcrops. -- (NF), NS-cS, US.

Macoun 1886 reports it from the Lesser Slave Lake, but in 1964 we leafed through subgenus Tiniaria at CAN without finding a justifying specimen. To our knowledge this species does not extend west of Lac La Ronge.

21. P. CONVOLVULUS L. (Bilderdykia Convolvulus (L.) Dum.) -- Bindweed, Black Bindweed (Chevrier, Vrillée sauvage) -- Annual weed with twining stems. Leaves deltoid-hastate. Stem minutely scabrous in lines. Flowers either in axillary clusters or mostly in interrupted racemes borne on long axillary pedicels. Summer. Frequent weed of cultivated fields and waste places. -- G, Mack-Aka, L-SPM, NS-BC, US, Eur, (Afr, Oc).

22. P. scandens L. var. scandens (var. dumetorum AA.) -- False Buckwheat, Wild Buckwheat (Vrillée bâtarde) -- Similar to the previous two but the fruit much larger and with 3 conspicuous wings. Perennial with twining stems, the latter glabrous and smooth or nearly so. Leaves similar to the previous two. Flowers in interrupted and bractedate axillary racemes. Fruit 9-15 mm long, measured from the articulation, the body only 6-10 mm long, with wings arising from the midnerve of the 3 outer tepals. Second half of summer. Shores. A rare native in southern Manitoba, or perhaps only a weed with us. -- (NF), NS-Man-swS-cAlta-(seBC), US.

In var. dumetorum (L.) Gleason the fruit is somewhat smaller, not exceeding 10 mm if measured from the articulation, the body  $\pm$  5 mm long. Reputedly, this paleogean var. dumetorum is naturalized at a number of places in North America, but all

New World specimens examined have been revised to var. scandens.

23. P. CUSPIDATUM Sieb. & Zucc. -- Japanese Knotweed, Horse-Buckwheat (Jérusalem) -- Tall coarse herb with large nearly round leaves, truncate at base, abruptly short-acuminate. Up to 3 m high. Leaves about 1 dm long. Flowers in axillary panicles. Fruit similar to P. scandens. End of summer. Sometimes cultivated and often persisting indefinitely, more rarely spreading to adjacent fields: Winnipeg. -- (Aka), NF, NS-Man, swBC, neUS, eEur.

There is an earlier P. cuspidatum W., but the latter is only a nomen nudum and its existence does not proscribe the present usage. See Merrill in Rhodora 40: 290-1, 1938.

24. P. FAGOPYRUM L. (Fagopyrum esculentum Moench; F. sagittatum Gilib.) -- Buckwheat (Sarrazin, Blé noir) -- Leaves deltoid, cordate at base, somewhat acuminate at tip. Annual. Flowers commonly white, in ± corymbose clusters that will often elongate in fruit to become somewhat racemose and irregularly interrupted. Tepals about half as long as the achene. Summer. Crop plant which sometimes reappears a second year or as an impurity in cultivated fields. -- NF, (NS)-PEI-O-(Man)-S, US, Eur.

25. P. TATARICUM L. (Fagopyrum tataricum (L.) Gaertner) -- Buckwheat, Tartary-Buckwheat (Sarrazin de Tartarie, Fagrée) -- Seeds coarsely and irregularly undulate-verrucose, especially on the angles. Flowers somewhat smaller and usually greenish, the tepals 1.5-2.0 mm long. Otherwise much as in the preceding. Summer. Rare impurity in crops or a roadside weed. -- (NF, NS), NB-O-(Man)-S-Alta, (US), Eur.

#### 77. ILLECEBRACEAE (ILLECEBRUM FAMILY)

Reduced type from the Caryophyllaceae, the fruit being reduced to a 1-seeded utricle. Leaves opposite, etc., but the petals lacking as in the Polygonaceae.

a. Stipules conspicuous ..... 1. Paronychia  
aa. Lacking ..... 2. Scleranthus

#### 1. PARONYCHIA Miller WITLOW-WORT

Herbs with conspicuous stipules and generally resembling the Caryophyllaceae. Petals lacking.

1. P. sessiliflora Nutt. (P. depressa AA.) -- Cushion-forming species with membranous stipules mostly longer than the leaves. Puberulent. Leaves stiff, with spinescent tips. Sepals cucullate above and ending in a deflexed spinescent tip. Not particularly conspicuous at flowering. First half of summer. Dry hills. -- sS-sAlta, US.

Not to be confused with Phlox Hoodii of similar habit. The latter lacks the numerous, large and transparent stipules.

## 2. SCLERANTHUS L.

KNAWEL

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

1. S. ANNUUS L. -- Knawel, 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, ± 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 Grch 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, 1945 (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  $\frac{1}{2}$  entire. Calyx lobes  $\neq$  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, Poullette grasse) -- The common middling type. Annual erect herb,  $\neq$  mealy, especially on the lower leaf surfaces. Main leaves more or less ovate and coarsely toothed. Calyx lobes deltoid. Seed  $\neq$  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'oise) -- 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

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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-n)Man, US -- Var. LITORALIS (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: Steeveville, 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 man-  
ner of Atriplex Nuttallii. Dioecious. Leaves linear, revolute.  
Inflorescence 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 spi-  
ke 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 col-  
lection goes back only to 1886.

## 9. KOCHIA Roth

As Chenopodium, but the mature calyx developing a peripher-  
al 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 turn-  
ing red in the fall. Late summer. Cultivated ornamental, fre-  
quent weed of streets, roadsides and waste places. -- NS, sQ-  
BC, (US), Eur.

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

## 10. BASSIA All.

As Kochia, but the mature calyx developing 5 spirally coil-  
ed 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 alka-  
line 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. rubricaulis 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 ± 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.

SUAEDA

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## 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 preced-  
ing, but generally smaller. Leaves only half as large. Seeds  
small, like those of A. albus. Mid to late summer. Rare road-  
side weed: Cypress Hills, Calgary, Herronton, Manyberries. --  
swS-sAlta, wUS.

6. A. SPINOSUS L. -- Careless Weed (Epinard rouge, Epinard  
épineux) -- Most leaf axils bearing a pair of sharp spines about  
1 cm long. Erect annual. Leaves ovate. Spikes thin and elon-  
gate. 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. Flo-  
wer 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 invo-  
lucre 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. egalikensis
  - 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. Stoloniferous 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 arrowhead, 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. Maedica AA.; D. pauciflorum (Durand) Greene; D. radicum 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. radicum. 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, Erythaea 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, Yûk. 3: 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. radicum 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. radicum ssp. radicum 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. (Naumbergia thyrsiflora (L.) Reich.) -- Tufted Loosestrife (Cornelle 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 preceding, 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: Kleeefeld. -- 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-SFM, 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.

TRIENTALIS

## 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, numerous. 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. APMERIA 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

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. Stolonerous, commonly 1 m high. Leaves ± 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. nutans (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 minaturization 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, swEC, 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 preceding, 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 carpels 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 flowers 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  $\frac{1}{2}$  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 trifold 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 Saxi-  
 fraga rhomboidea, etc., but the stem typically bearing one lar-  
 ge leaf which is † cordate at base. Basal leaves oblong, thick-  
 ish, serrate, the nerves impressed above. Inflorescence densely  
 glandular in red. Flowers marcescent. Petals white, narrow and  
 inconspicuous, † linear. Early summer. Along creeks and sho-  
 res. -- Y-Aka, sw Alta-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. virginiensis

## 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 sub-truncate 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 preceding, 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 preceding. 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  $\pm$  reddish. Early summer. Rock crevices at the Hot Springs of Roche Miette. -- sAlta-(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. Trifoliolate ..... 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 trifoliolate. 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

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. septentrionalis 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 exerted. 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 exerted 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 exerted capsule, more strongly exerted 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 exerted 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 trifold. 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, ± 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 preceding, 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 ± 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, WJS, (Eur) -- Var. iwense (Rydb.) Boivin (C. iwense 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. -- sW Mack, sMan-sAlta, (ncUS, Eur).

Var. iwense 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 1½ 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-rMan-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. Brookside 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

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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: Ni-pawin and Prince Albert. -- cO, cE.

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 trifoliolate.
    - 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 trifoliolate ..... 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. Eupleurum  
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 Venus, 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-seEC, 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. -- sAk, 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 prominent 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 preceding 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. Tuberos 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 Côteau at Notre-Dame-de-Lourdes. -- NS-sMan, (eUS).

## 10. CRYPTOTAENIA DC.

HONEYWORT

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 -- Honeywort (Cerfeuil sauvage) -- Leaves trifoliolate, 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 preceding. Involucre typically of a single bract which is often lobed. Fruit slightly compressed laterally.

1. C. CARVI L. -- Caraway (Anis, Anis bastard) -- 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. PERIDERJDEIA 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; involucrel 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 ciliate. Involucels shorter than the pedicels. In the Far Eastern vicariant var. multinervis (Koidz.) Hiroë (including A. refracta F. Schmidt) the stem is puberulent above, the leaflets ciliate and the involu- cel 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-Parasnip -- Involucre conspicuous, of bracts mostly 2-3 cm long, their margins laciniate and their base ± 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 wetish 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 cocons, 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. CYMOPTEUS 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. Involucel simple and palmately lobed ..  
..... 2. L. foeniculaceum
    - cc. Involucel of several free and slender bractlets ..... 5. L. Sandbergii
  - bb. Glabrous.
    - d. Bractlets broadly oblanceolate ..... 1. L. Couë
    - 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. Couë (Watson) C. & R. (L. montanum C. & R.) -- Couë (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 coulées. -- 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 coulées. -- 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 cylindrical. 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 (Cigüe) -- 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.

FLORA  
OF THE PRAIRIE PROVINCES

Bernard Boivin

Part II  
(continued)

ADDITIONS AND CORRECTIONS

The following came to our attention too late or could not be confirmed until the corresponding text had been given its final form for printing.

Page 19 -- Aconitum delphinifolium DC. var. Chamissonianum (Rchb.) stat. n., A. Chamissonianum Rchb., Mon. gen. Acon. 80. 1820. The spelling Chamissonis was a lapsus calami.

Page 21 -- Anemone virginiana L. -- There has been much variation in the treatments of this species by the various authors dealing with our area. Rydberg 1917 and 1932 distinguished A. virginiana and A. riparia Fern. and reported both as occurring throughout our area. So did Scoggan 1957. But Breitung 1957 did not accept A. riparia as a distinct segregate. Gleason 1952 accepts the distinctiveness of the two entities, but he does not extend the range of either as far as our area and our specimens are apparently to be placed under A. cylindrica. Fernald 1950 would refer all our material to A. riparia and his treatment was accepted by Russell 1954, Moss 1959 and ourselves 1966 except that, dissatisfied with the quality of the morphological discontinuity, we reduced A. riparia to varietal rank. But having noticed that the large sepals typical of var. riparia are always lacking in our area, we have recently shifted to the treatment of page 21 above in which A. virginiana is recognized as the type occurring in our area while var. riparia is restricted to regions east of us.

None of these treatments is fully satisfactory.

It is true that our plants have the smaller anthers and narrower head of achenes of var. riparia. But it is also true that with about 100 collections at hand, our plants obviously lack the large white tepals of A. riparia. They are best placed in the following variety of their own.

A. virginiana L. var. cylindroidea var. n. Ad var. ripariam vergens antheris brevioribus et capite acheniorum angustiore, ± cylindrico. Sed floribus minoribus, sepalis ± 1 cm long et viridescentibus. Type: Boivin, Russell & Breitung 6733, Pike Lake, Sask., July 31, 1949 (DAO).

Ranges in Canada from southern Quebec west to northern British Columbia. Grades eastward into var. riparia and var. virginiana. Supposed differences in leaf shape have not proved worth retaining.

The name var. riparia (Fern.) Boivin 1966 for the larger flowered eastern plant should be replaced by the earlier and correct var. alba Wood 1861.

Page 29 -- Ranunculus cardiophyllus Hooker -- In 1968 there was at WTU no justifying specimen corresponding to a range extension to N.W.T. by Hitchcock 1964.

Page 30 -- Ranunculus pedatifidus Sm. var. leiocarpus (Trautv.) Fern.; R. affinis Br. -- The range has been extended to the Cypress Hills of Alberta. See De Vries 1968. The many Saskatchewan reports by Russell 1954, Benson 1954, Breitung 1957, etc. were based on collections since revised to R. cardiophyllus or its f. apetalus.

Page 31 -- Line 8 from the bottom. The petal size should read: 2.0-5.0 mm long.

Page 36 -- Add the following after T. venulosum:

Some of the reports of Thalictrum confine Fern. from Manitoba were apparently based on T. venulosum var. Turneri (MT; DAO, photo); while others (DAO), including those from Gillam, have been revised to T. venulosum var. venulosum. Our own report in Rhodora 46: 442, from Moose Factory was a lapsus calami as the said locality is in northern Ontario.

The Bourgeau sheet which we have referred to var. Lunellii has been variously treated in the past as T. dioicum, T. confine and T. occidentale.

For var. confine substitute var. monoficum (DC.) stat. n., T. purpurascens L. var. monoficum DC., Syst. I: 174. 1817; T. confine Fern., Rhodora 2: 232. 1900; T. venulosum Trel. var. confine (Fern) Boivin, Nat. Can. 93: 646. 1966.

Page 38 -- Nuphar polysepalum Eng. was also reported for Alberta by Hitchcock 1964, but no justifying sheet could be located at WTU in 1969.

Page 57 -- Insert the following after Brassica hirta.

la. B. NIGRA (L.) Koch -- Black Mustard (Moutarde noire) -- Siliques at first  $\pm$  divergent, soon becoming appressed in the manner of Sisymbrium officinale, but the style longer and the branches diverging mostly at  $\pm$  45°. Resembling B. Kaber and similarly  $\pm$  hispid, but the flowers smaller, the pod shorter with fewer nerves, and the beak shorter. Petals mostly 6-8 mm long (9-12 in B. Kaber). Silique glabrous, 1.0-2.5 cm long,  $\pm$  quadrangular from 4 prominent ribs, these being the 2 sutures and the two midnerves. Other nerves of the valves obscure and reticulate. Beak 1.5-3.0 mm long, seedless, thin and  $\pm$  quadrangular. From mid summer on. A rare weed of cultivated soils: Saskatoon--NF-SPM, NS-(PEI)-NB-O, S, US, Eur.

In our area we know only of a single collection at Saskatoon by C. Frankton in 1950 (DAO). Its inclusion by Moss 1959 in the Flora of Alberta was speculative. Reports by Groh 1948, 1950 and Frankton 1955 from Baldur, Man. and Revelstoke, B.C. were based on specimens (DAO) since revised to B. Kaber.



Page 57 -- To Brassica Kaber add the synonym: Sinapis arvensis L.

Page 58 -- Raphanus Raphanistrum L. -- The lone voucher for the Manitoba report by Scoggan 1957, repeated by Boivin 1966, was G.E. Swailes, Old Kildonan, Aug. 12, 1944 (WIN; DAO, photo). It has now been revised to Brassica Kaber, a species with smaller sepals and much shorter pedicels, only 3-6 mm long.

Page 63 -- Add the following genus and species:

18A. LUNARIA L.

Silicle very large and long stipitate.

1. L. ANNUA L. -- Honesty, Moonwort (Satinée, Monnaie du Pape) -- Fruit very flat and largest, mostly  $\frac{1}{4}$  cm long and  $\frac{1}{2}$  cm wide, borne on a stipe  $\frac{1}{2}$  cm long. Leaves scabrous, cordate, dentate, the lower opposite. Flowers fairly large and showy, the sepals more deeply tinted than the petals. Fruit very showy after shedding its seeds, the septum persistent and becoming silvery. (Late spring to early summer). Rarely reseeding itself in loose soils around flower gardens: Benito. -- Q-Man, BC, US, (Eur).

We must admit having been suspicious all along of the single report of this species as subsynchronous once in our area. We have recently had occasion to borrow the voucher specimen and we are now satisfied that at least the said specimen was correctly identified. It consists in two small pieces of inflorescence and the label reads: J. Bowles, Benito, garden escape, 1926 (WIN).

Page 65 -- Camelina Parodii Ibarra & La Porte -- For "cribbings" substitute "screenings".

Pages 66 and 69 -- D. exalta was reported for the Rockies in 1959, but we have not yet seen the justifying specimens. A Banff collection (DAO) identified D. ventosa was recently checked and proved to be correctly identified. The species may then be intercalated as follows. On page 66 change lines 33 and 34 to read:

ff. Pubescence of back of leaves entirely or primarily of much smaller stellate hairs.

- x. Only 2-4 cm high; pod ovate,  
3.5-5.0 mm wide ..... 5a. D. ventosa
- xx. Usually taller, mostly  $\frac{1}{2}$  dm  
high; pods narrower ..... 7 D. incerta

Insert the following on page 69.

5a. D. ventosa Gray var. ventosa -- Densely and finely stellate-pubescent throughout, including the pods. Low, 2-4(8) cm high and rather large-fruited. Forming small mats, the new rosettes borne at the end of short creeping shoots. Leaves obovate to oblanceolate, loosely marcescent. Pods few. Mid

summer. High alpine on gravel ridges: Banff -- swAlta, WUS -- Var. ruaxes (Payson & St. John) C.L. Hitchc. (D. exaltata Ekman) -- Pubescence mixed: largely of stellate hairs on the rosettes, largely of simple or forked hairs on the stem, inflorescence and pod. -- (Mack, Aka, swAlta-BC, US).

Because collected only rarely it is difficult at this stage to decide if var. ruaxes is a commonplace phenotype of no significance or a geographically restricted race.

Page 69 -- Draba aurea Vahl var. leiocarpa (Payson & St. John) C.L. Hitchc. -- The herbarium basis for the original Alberta report by Moss 1959 could not be retraced at ALTA or elsewhere, but we now know of a more recent (1963) collection from the Marmot Creek Basin (DAO) in the Kananaskis area.

Page 69 -- Draba oligosperma Hooker -- Exceptional specimens may be stellate-puberulent throughout, including the stem and silicles. This rare phenotype is known from our area but is apparently of sporadic distributions. In our key such plants would come out to D. stenopetala, but the latter bears coarser cilia and hairs, the latter being branched rather than stellate. In a more generalized key these hairier D. oligosperma would come out to the more eastern D. Peasei Fern. We have yet to study material of the latter and cannot pronounce on its distinctiveness.

Page 70 -- Draba cinerea Adams -- Typically the stem is unifoliate but the more northern specimens may be somewhat smaller and often leafless except for the rosette. Such specimens have been distinguished mainly as D. groenlandica E. Ekman on the basis of said characters and also of pubescence. The resulting classification is not very convincing and the two taxa are largely sympatric as can be gathered by the distribution maps of Forsild 1957. Accordingly the segregate was recognised neither by Polunin 1940 nor Boivin 1966.

Dr. G.A. Mulligan has recently brought to our attention that if the morphological emphasis is shifted almost entirely to the type of pubescence, a new picture emerges, which is far more convincing both morphologically and geographically. Var. cinerea as defined above on page 70 is found throughout the Arctic Islands southward to our regions where it is rather highly localized. We have checked specimens from Lake Athabaska and from the Athabaska Glacier. The more northern plants are often superficially quite similar to var. arctogena and herbarium sheets from the high arctic will often carry a mixture. Var. arctogena as defined below is restricted to the more northern parts of the Arctic Archipelago. Dr. Mulligan informs us that all the specimens he has examined from the more southern parts proved to belong to var. cinerea.

Var. arctogena (E. Ekman) stat. n, D. arctogena E. Ekman, Svensk Bot. Tidskr. 23: 489. 1930 -- Rosette leaves densely covered with mixed pubescence on both faces, partly of simple and somewhat longer hairs, partly of stellate hairs. The latter are simply stellate and 0.5-0.8 mm across -- (G)-nF.

The stellate hairs of var. cinerea are generally only half as large as those of var. arctogena.

Page 74 -- Arabis Holboëllii Horn. -- Rather frequently reported from Canada and the U.S.A., but we have yet to see a convincing specimen from outside Greenland. Many herbaria have been examined and their Canadian contents is usually a mixture of species, with A. retrofracta predominating. The most common other component is A. divaricarpa, especially its var. dacotica, such as in Thompson & Thompson 87, Marble Mts., B.C., 1938 (WTU). The smallish A. pendulocarpa Nelson is also involved at times.

A. Holboëllii is a Greenland endemic with a strongly secund inflorescence of rather broad, descending, and recurved-falcate siliques, 2.0-2.5 mm broad, that is as broad or broader than the broadest of A. divaricarpa. The herbage of A. Holboëllii is stellate-puberulent throughout, right up to the pedicels, in the manner of the narrow-fruited A. retrofracta var. retrofracta. And the pedicels are strongly reflexed at base as in A. Holboëllii, but like the pods they are descendent rather than pendent. The petals are white or nearly so.

Page 78 -- Braya glabella Rich.; B. humilis (C.A. Meyer) Rob. var. glabella (Rich.) Boivin -- There has been some confusion about the correct application of this name. We have recently examined an excellent series of recently collected Braya from the District of Mackenzie where B. glabella was originally collected and we are now satisfied that the latter belongs with B. purpurascens and not with B. humilis.

Hence the common northern phase of B. humilis from Greenland to Mackenzie, which we have termed var. glabella in 1966 and on page 78 above, should be properly designated as:

Braya humilis (C.A. Meyer) Rob. var. arctica (Böcher) stat. n., Torularia humilis (C.A. Meyer) O.E. Schulz ssp. arctica Böcher, Medd. Grøn. 147, 7:29, 1950.

Braya glabella Rich. has been reported for the Rockies by Moss 1959 and by Eastham 1947. The Alberta report was based on a Banff Park collection (ALTA) which seems closer to B. humilis var. americana. The same remark is likely to apply also to the B.C. report.

Page 78 -- Malcolmia africana (L.) Br. -- Despite reports from Swift Current by Russell 1944, Breitung 1959 and Boivin 1966, we have been unable to find substantiating specimens at CAN, DAO, GH, NY, REG, SASK, SASKP, SCS, etc. Noting that Russell omitted it from his later list of 1954, one may presume that Russell himself considered the original report to be erroneous. The inclusion of Malcolmia in our text is probably unjustified at this stage, even if it seems highly eligible as a potential invader.

Page 79 -- Halimolobos virgata (Nutt.) O.E. Schulz -- The range should be restricted to omit Yukon as there was no specimen at WTU in 1968 to match the range extension by Hitchcock 1964.

Page 79 -- Coronopus didymus (L.) Sm. -- No Banff collection could be found in 1967 at MTMG where Campbell's herbarium is preserved. But there was a sheet so identified and labelled "Robert Campbell, Wolseley, Sask., July" (MTMG). It carries a mixture of Musineon divaricatum and Geranium Robertianum L., but no Coronopus. Judging from their stage of development, the date of collecting is in the first half of May for the flowering Musineon and late May or early June for the rosettes of Geranium. The stated locality for Geranium Robertianum, a species not known to occur anywhere in our area, should not be held as any more reliable than the identification or time of collecting.

Page 83 -- Stellaria crispa C. & S. and S. obtusa Eng. -- We have recently had the privilege of studying two series of borrowed specimens. S. obtusa is now known to us from two Alberta localities: Blairmore (CAN) and Waterton (Calgary U.). And S. crispa from only one locality: Waterton (ALTA). Another Carbondale River collection (Calgary U.) has also been placed with S. crispa, but is not typical, being somewhat transitional to S. calycantha.

We have also noticed that the individual variations in leaf size are too great to provide a satisfactory diagnostic character. The two taxa are best distinguished on floral criteria as follows.

S. crispa -- Sepals 2.5-4.0 mm long, triangular-lanceolate, sharply acute, and strongly ribbed on back, the 3 longitudinal nerves being strongly prominent, especially towards the base. Capsule ellipsoid, (3.5)-4.0-(5.0) mm long. Seeds 0.8-1.0 mm wide, light brown to red brown. Stems usually erect and simple or nearly so. Leaves up to 3 cm long, the main ones usually over 1 cm.

S. obtusa -- Smaller throughout. Sepals at first 1.5-2.0 mm long, elongating to 2.5 mm, oblong to triangular oblong, rounded to acutish at tip, not ribbed, the 3 nerves obscure or finely outlined in paler green, but never rugose. Capsule 2.2-3.0 mm long, globose to ovoid. Seeds  $\pm$ 0.6 mm across, violet black.

Another source of confusion is worth notice. The petioles in S. crispa are sometimes so short as to be obscure, and such specimens should not be confused with S. calycantha. The leaves are usually much narrower in S. calycantha and irregularly ciliate towards the base with tenuous hairs, the longest of which are commonly  $\pm$ 0.5 mm long. Larger-leaved specimens precisely tend to have the longer cilia. While in S. crispa the cilia are mostly lacking or, if present, are stiff and stubby and only 0.1-0.2 mm long.

Most flowers are gathered in a terminal cymes in S. calycantha. But in S. crispa they are mostly axillary with some of them terminal.

Reduced petals, hidden behind the larger sepals are nearly always present in S. calycantha. They are always absent in

S. crispa.

Sepals and capsules have a broader range of variation in S. calycantha.

Page 87 -- Cerastium nutans Raf. var. brachypodum Eng. -- Delete Alberta from the recorded distribution. It had been reported by Rydberg 1917, 1932 and Moss 1959, but we found no justifying specimen at NY in 1965 while the one more recent collection, E.H. Moss 6986, Stony Plain, 1945 (ALTA) proved to be C. vulgatum.

Page 88 -- Sagina saginoides (L.) Karsten -- Line 13 from the bottom. After the word "peduncles", continue as follows: "or else the capsule is smaller, merely about as long as the acutish sepals. The fairly obvious rosette of longer leaves found in S. saginoides and S. nivalis is lacking in the similar species of Arenaria."

Page 96 -- An Alberta report by Macoun 1886 of Silene multicaulis Nutt., a synonym of the more western S. Douglasii Hooker, proved to be based on a specimen (MTMG) of S. Scouleri var. Macounii.

Page 97 -- Last two lines of the key. Change to read:

f. Seed wingless ..... 3.L. Drummondii  
ff. Seed winged ..... 7.L. triflora

Page 101 -- Claytonia parvifolia Moq. -- Our plant is the widespread var. parvifolia as contrasted with the coastal var. flagellaris (Bong.) R.J. Davis, the latter larger-flowered, the petals (10)-12-15 mm long.

Usually subdivided in two species on the basis of larger flowers and broader leaves, ovate and over 5 mm wide, for C. flagellaris Bong. The abundant material at hand, mostly from B.C., shows clearly that both characters vary independently and that there is here no morphological discontinuity, only continuous variation. Any segregate that stands on a somewhat arbitrary limit is likely to appear as an extreme of variation.

The bulk of the material at hand has narrow leaves and smaller flowers. Larger-leaved specimens are less common, yet quite frequent and are perhaps more abundant along the coast, but they also occur well in land; our only Alberta sheet is of the broad leaf type, 5-8 mm wide. Further, specimens collected after the first of August are nearly always of the broad leaf type, which implies that the variation in leaf width may be in part a stage of development.

Flower size varies quite a lot. Even in the same collection one may note differences by as much as 5 mm (e.g. 7-12 mm) in petal length. However, the larger-flowered specimens, with all or most flowers over 12 mm long, occur only along the coast and they may be retained as a weak geographical variety: var. flagellaris.

Page 101 -- Claytonia Chamissoi Led. or Montia Chamissoi

(Led.) Dur. & Jacks. was variously reported from Manitoba by Anderson 1946 and Hitchcock 1964, and also from Alberta by Hultén 1944 and Davis 1966, queried by Boivin 1967. No justifying specimens were cited and none could be located at GH in 1965, or S in 1968, or WTU in 1969, etc. The reports are held as unsubstantiated.

Page 106 -- Rumex fennicus Murb. 1899 -- This name should apparently be replaced by the earlier sesquipedalian R. pseudonatronatus Borbas 1880, according to A. Losina, Fl. URSS 5: 462. 1936 and K.H. Rechinger ex Tutin et alii, Fl. Eur. 1: 86. 1964.

Page 107 -- Rumex longifolius DC. -- A recently arrived weed which was incorrectly listed with the typography of a native in our Enumeration of 1967.

Page 107 -- Rumex domesticus Hartm. -- According to Frankton, ms. (see under Plantago lanceolata), the earlier reports by Breitung 1957 from Davidson and Wymark were based on sheets since revised to R. fennicus (= R. pseudonatronatus).

Page 108-9 -- Rumex Acetosa L. -- One parenthesis mark is missing in the distribution and PEI should be deleted as this record may have started as a mere lapsus calami in our Enumeration of 1967. The corrected distribution should read: (G, Mack)-Y-Aka, NF-SPM, NS, NB-BC, US, (SA), Eur, (Afr, Oc).

Page 112 -- Polygonum erectum L. -- The Point du Chien (MTMG) collection mentioned by Scoggan 1957 has been revised to P. achoreum.

Page 112 -- Polygonum achoreum Blake -- A still earlier collection is Macoun, Point du Chien, Aug. 1, 1872 (MTMG). The 1880 collection was by Macoun in the Cypress Hills (OK). Another early collection is J. Fowler, Brandon, July 7, 1887 (OK; DAO). The existence of such early collections makes one wonder if P. achoreum might not have been native in our area. Unfortunately none of the early collections carries any habitat data.

There is no doubt that P. achoreum is today essentially a common weed of roadsides, railways, farmyards, and other man-disturbed habitats. And its country of origin is still to be determined.

Page 115 -- Polygonum lapathifolium L. -- The range extension to Alaska should be held as unconfirmed as our entry was based on collections now revised to P. lapathifolium var. O'Neillii (Brenkle) stat. n., Persicaria O'Neillii Brenkle, Phytologia 2: 405-6, 1948, which differs from our variety by its somewhat bigger achene, ±2.5 mm wide, substipitate glandulosity, and resembles P. pensylvanicum L. by its darker and reddish perianth, its nerves not so conspicuous and their dichotomous branches not recurved. In P. lapathifolium and P. scabrum the nerves of the perianth are conspicuous and divided at the tip in two recurved branches suggesting an anchor. As var. O'Neillii stands about halfway between P. lapathifolium and P. pensylvanicum, it seems more logical to attach it to the transcontinental P. lapathifolium from which it could readily

have derived than to the geographically removed P. pennsylvanicum of eastern distribution.

Page 117 -- Polygonum Fagopyrum L. -- The range should be extended to include Edmonton in Alberta where it is now known to have been collected in 1942 (SASK) as a fleeting adventive.

Page 124 -- Atriplex Nuttallii Watson -- Add to the synonymy A. buxifolia Rydb., a name which has seen some use because of the treatment proposed in a recent but unpublished thesis. A. Nuttallii, when proposed by Watson, A Revision of the North American Chenopodiaceae, Proc. Am. Ac. Arts Sc. 2: 82-126. 1874, was clearly distinguished from A. canescens (Pursh) Nutt. and the basionym of the latter, Calligonum canescens Pursh, was cited page 120 under A. canescens, while on page 116 under A. Nuttallii we find only one questionable synonym (= A. Gordonii) and a series of floristic synonyms (or so-called "sensu" names). It is not justifiable to treat A. Nuttallii as a superfluous (hence illegitimate) name because of the presence of any floristic synonym.

Page 125 -- A study of the Atriplex patula complex has been recently undertaken by C. Frankton and I.J. Bassett. Preliminary results suggest that it may prove possible to distinguish a European introduction, A. patula, against a native A. subspicata (Nutt.) Rydb. (= A. patula var. subspicata (Nutt.) Watson = A. carnosa Nelson), the latter a coarser and more stiffly erect plant, its fruits bigger, more coarsely lobed and in more closely set glomerules.

Page 126 -- Eurotia lanata (Pursh) Moq. -- The range should be extended to southwestern Yukon on the basis of J.A. Neilson 1151, Mt. Wallace, Kluane L., south facing slopes, July 29, 1967 (DAO).

Page 127 -- Line 5. For "Bud-Seed" read "Bug-Seed".

Page 130 -- Line 13 from the bottom. Change the liminary sentence to read: Calyx and corolla of fused parts.

Page 134 -- Add the following colour form: Dodecatheon pulchellum (Raf.) Merr. f. Breitungii Boivin -- Flowers white, including the connectives. But the anthers may be pinkish. McKague. -- S.

F. n., floribus albis. Type: A.J. Breitung, McKague, Sask., low moist meadows, albino, June 26, 1938 (DAO).

Page 135 -- Lysimachia thyrsoflora L. -- The range was extended to Yukon by Gleason 1952, but we found no corresponding specimen at NY in 1965 and the distribution should therefore be amended to read: Mack, Aka, NS-BC, US, Eur.

Page 144 -- Oenothera perennis L. -- Presumably native on the shores of Lake of the Woods, Dawson, 1873 (MTMG), but more likely introduced at Teulon, A. Simpson, 1934 (MPM). These would seem to be the only collections definitely known to come from our area.

Page 146 -- Line 3. Delete the synonym and substitute: var. alpina.

Page 160 -- The end of the key to Group A to be revised

as follows:

hh. Stem not maculate.

1. No involucre, but the involucels present; all or most pedicels not longer than the fruit; perennials ..... 19. Lomatium
- ii. All or most pedicels much longer than the fruit; annual or biennial weeds.
  - j. Pedicels very uneven, the shorter ones shorter than the fruit; reduced involucre and involucels present ..... 11. Carum
  - jj. Pedicels nearly isomeguth and many times longer than the fruit; neither involucre nor involucels present ..... 15. Anethum

Page 149 -- Line 11 from the bottom. For "rhomboidea" read: occidentalis.

Page 164 -- Line 14. Change "the main ones" to read "the main leaves".

Page 166 -- Cicuta maculata L. var. angustifolia Hooker -- Change the description of the fruit to read: Fruit 2.5-3.0 mm long, not quite as wide as long.

Page 167 -- Perideridia Gairdneri (H. & A.) Mathias -- Following a lead from a 1966 manuscript by T.I. Chuan, we find possible to distinguish our northern plants as var. montana (Blank.) stat. n., Carum montanum Blank., Mont. Agric. Coll. Stud. 1: 91. 1905, by their usually larger petals showing 1-3 pairs of lateral nerves and tuberous roots usually borne in a cluster, while the typical phase from coastal California shows somewhat smaller petals, usually 1 mm long or slightly less, with the nervation reduced to its midnerve, and the stem usually arising from a single tuber.

Perideridia oregana (Watson) Mathias (Carum oreganum Watson) was reported by Macoun 1890 for our area in the Hand Hills, and also from Victoria. The Hand Hills collection (CAN) has been revised to P. Gairdneri. The Victoria collection has not been located yet, but should probably be similarly revised as P. oregana reaches its northern limit along the southern boundary of the state of Washington.

Page 169 -- Cymopterus terebinthinus (Hooker) T. & G. var. foeniculaceus (T. & G.) Cronq. (Pterysia terebinthina (Hooker) C. & R. var. foeniculacea (T. & G.) Mathias) -- Reported by Macoun 1883 and Henry 1915, queried by Boivin 1967, for the interprovincial boundary on the basis of a Dawson collection at the Kootenay Pass. We have failed to find such a specimen at MTMG and we know of no other collection. On the basis of general similarity, one can speculate that Dawson's plant probably belonged to Lomatium dissectum.

Page 169 -- Lomatium Cots. Add the following vernacular name: Racine blanche.



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PROVANCHERIA

1. Dédicace: L'abbé L. Provancher, 1820-1892.— L. Cinq-Mars.  
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Mise au point sur les Violettes (*Viola* spp.) du Québec.  
— L. Cinq-Mars.
  2. Flora of the Prairie Provinces. Part 1. — B. Boivin.
  3. Flora of the Prairie Provinces. Part 2. — B. Boivin.
  4. Flora of the Prairie Provinces. Part 3. — B. Boivin.
  5. Flora of the Prairie Provinces. Part 4. — B. Boivin.
  6. Énumération des plantes du Canada . — B. Boivin.
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