

PROVANCHERIA

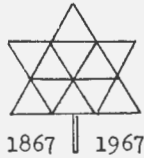
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Mémoires de l'Herbier Louis-Marie
Faculté d'Agriculture, Université Laval

FLORA
OF THE
PRAIRIE PROVINCES

by

BERNARD BOIVIN



Part I

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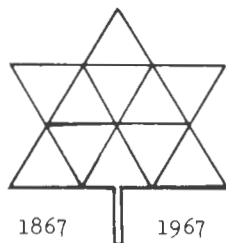
FLORA
OF THE
PRAIRIE PROVINCES

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

by

BERNARD BOIVIN

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Part I

Pteroids, Ferns, Conifers and
Woody Dicotyledons

Omnis vera cognitio
cognitione specierum innitiatur

Linné

PREFACE

We are pleased to present herewith in this condensed form a survey of the flora of Manitoba, Saskatchewan and Alberta as we know it. It is in a form which we hope will be especially adapted to use by the college student, yet remains convenient, in form and presentation, for use not only by the educated layman who may wish a key to the nature around him, but also by biologists, agronomists, botanists and other naturalists who may have the need for a handy guide to the vegetation of our area.

ENGLISH POPULAR NAMES have been restricted to those that appear to be vernacular and they are underlined only if they are known to be vernacular in Canada. FRENCH POPULAR NAMES follow in (brackets) and are underlined only if known to be vernacular in North America.

NATIVE AND INTRODUCED plants are distinguished as follows: names underlined represent plants native in our area; names in CAPITALS represent plants introduced in our area.

SYNONYMY. Synonyms have been kept to the minimum necessary to establish the relation between this volume and the more important floras having a bearing in our region. The main ones considered are as follows: H.B. SPOTTON, A. COSENS and T.J. IVEY, Wild Plants of Canada, 1918; M.L. FERNALD, Gray's Manual of Botany 1950; H.A. GLEASON, New Britton and Brown Illustrated Flora, 3 vols, 1952; C.L. HITCHCOCK, A. CRONQUIST, M. OWNBEY, J.W. THOMPSON, Vascular Plants of the Pacific Northwest, 5 vols (4 published to-date) 1955-64; A.C. BUDD & K.F. BEST, Wild Plants of the Canadian Prairies, 1964; H.J. SCOGGAN, Flora of Manitoba, 1957; R.C. RUSSELL, G.F. LEDINGHAM, R.T. COUPLAND, An Annotated List of the Plants of Saskatchewan, 1954; A.J. BREITUNG, Annotated Catalogue of the Vascular Flora of Saskatchewan, 1957; E.H. MOSS, Flora of Alberta, 1959.

Two kinds of synonyms have been distinguished. True synonyms, such as Astragalus triphyllus Pursh in the synonymy of A. gilviflorus Sheldon, are followed by the correct author's name. Other synonyms, such as Astragalus hypoglottis AA. in the synonymy of A. danicus Retz., represent names based on misidentification of specimens or misinterpretation of types; note that the author's name has therefore been replaced by the abbreviation AA. All synonyms are underlined and encased in (brackets).

The local DISTRIBUTION of each taxon is followed by its general distribution in an abbreviated form. The geographical sequence used conforms to the list of abbreviations below. Two geographical abbreviations are connected by a hyphen when a Canadian distribution is continuous across the intervening provinces or territories, while a comma separating geographical units indicates a discontinuous Canadian distribution. Thus Q-BC indicates that a plant is known to occur in Quebec, Ontario, Manitoba, Saskatchewan, Alberta and British Columbia. Conversely Q-Man, Alta-BC indicates a plant with a similar distribution, but lacking in Saskatchewan.

A distribution is enclosed in (brackets) if we have not checked it personally but are quoting other botanists. No brackets are used when we have been able to confirm the distribution given herewith. Partially confirmed distributions are accordingly given partially outside, partially inside brackets. Prior to 1963 our recording of verified distributions was unfortunately somewhat spotty, hence some of the confirmed distributions will fall short of our actual herbarium studies and annotations.

A brief review of 22 major families and other groups of plants occurs at the beginning of the Herbaceous Dicots. This review may be especially useful to the beginner. It may also serve as an outline for a practical course in Plant Classification at the elementary level.

In so far as we have been able to check them, we have included in this text only such taxa as we have been able to recognize as discrete biological entities. All others have been relegated to synonymy, along with all minor morphological segregates that seemed of no particular significance. We have acted on the basis that first and foremost a species should be morphologically discontinuous from its closest relatives. And this discontinuity should be such as to be readily recognized by a good amateur or biologist (ecologist, forester, agronomist, etc.), given the usual equipment and a reasonable amount of previous experience or training. One should not need to send for a specialist for every other Carex or Crataegus. Taxonomy is not an esoteric science, but an everyday tool of biologists, amateurs and just plain interested and intellectually curious people. We consider that the classification of Vascular Plants should remain within reach of such people and that the species should be the natural unit of knowledge. May we hope that the result of our efforts does not fall too far short of our objective.



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September 1966*

* A few additions and minor revisions have been incorporated to this text until late spring and summer 1967.

THANKS

Our field work in the Prairie Provinces cover 8 seasons from 1946 (with the National Museum) to 1960 (with the Department of Agriculture) and we have had an opportunity to examine or borrow a large proportion of the relevant material preserved in institutional collections. The general western collections at the Department of Agriculture (DAG) and at the National Museum (CAN) are rather complete and have been extensively reviewed. The general but less extensive collections at the Faculty of Agriculture at Laval (QFA) has also been reviewed nearly in full. Another extensive and important collection is preserved at the Gray Herbarium (HUH) but has been examined in part only. We have borrowed large blocks from some of the local herbaria, namely from the University of Saskatchewan, (SASK), the University of Regina, (REG), the Experimental Farm at Swift Current (SCS) and the Research Station at Saskatoon (SASKP). We have also leafed through part of the collections at the University of ALBERTA (ALTA), the University of Manitoba (WIN) and the Experimental Farm at Brandon. At one time or another we have received selected loans from a large number of institutions, including every one of the above. To all the institutions who have thus placed their facilities at our disposal, our most grateful thanks for their unflinching cooperation. We wish to extend similar thanks to the many colleagues who have helped us with information and suggestions and similarly to the numerous amateurs who have kept sending in a steady stream of information and of duplicates of their more important discoveries. Many of these amateurs have also published important papers and have thus made a major contribution of their own. Such are: A.J. Breitung (McKague, Cypress Hills, Waterton), Dr. G.H. Turner (Fort Saskatchewan), J.H. Hudson (Mortlach), and J.P. Bernard (Otterburne). The latter is now my assistant and deserves special thanks for his substantial contribution to the preparation of this text, collaborating on the preparation of the glossary, helping to check the distributions and, generally speaking, shouldering a large proportion of the tasks involved in preparing this manuscript for publication.

ABBREVIATIONS

AA. Authors, American Author.	K Keewatin District
sphalm. By mistake; abbreviation of the latin sphalmate.	Mack Mackenzie District
m Meter, about 4 inches longer than a yard.	Y Yukon
dm Decimeter; about 4 inches.	Aka Alaska
cm Centimeter; about 2/5 inch.	L Labrador
mm Millimeter; about 1/25 inch.	NF Newfoundland
ssp. Subspecies	SPM Saint-Pierre & Miquelon
var. Variety	NS Nova Scotia
f. Form	PEI Prince Edward Island
cv. Cultivar	NB New Brunswick
n North	Q Quebec
s South	O Ontario
e East	Man Manitoba
w West	S Saskatchewan
ne Northeast	Alta Alberta
nw Northwest	BC British Columbia
se Southeast	US United States of America
sw Southwest	CA Central America, (including Mexico and the West Indies)
c Central	SA South America
G Greenland	Eur Eurasia
F Franklin District	Afr Africa
	Oc Oceania

SEQUENCE OF FAMILIES AND GENERA

The sequences of FAMILIES is adapted from the Bull. Soc. Bot. Fr. 103: 490-505. 1956. And the sequence of GENERA within a family is adapted from Dalla Torre & Harms, Genera Siphonogamarum 1900-1907 for the Conifers and Flowering Plants, from E.B. Copeland, Genera Filicum 1947, for the Ferns.

At least as far as the families are concerned, the basic principle of the sequence is the following evolutionary hypothesis.

Evolution does not proceed by the creation or production of brand new structures -- evolution proceeds by fixation, modification, specialization, differentiation or reduction of preexisting structures. Structures which appear to be new, those which constitute a progress, those which give a species, or other taxon, a special advantage in the struggle for life, which enable a species to occupy a previously empty niche or to displace an earlier occupant, such structures are always evolved step by step from preexisting structures.

This evolution step by step, or microbematic (=little steps) evolution, is familiar to our generation by many well known instances such as the creation of new horticultural varieties or the appearance of new and resistant races of pests and diseases following the wide application of a chemical or biological controls.

In practice this evolutionary concept leads to the following observations in so far as the Vascular Plants are concerned.

- 1- Free structures are more primitive than fused structures.
 - 2- Similar structures are more primitive than differentiated structures.
 - 3- The type with numerous parts is more primitive than one with fewer parts or with parts fixed in number, which in turn is more primitive than the type without the same parts, provided this absence is the result of reduction.
 - 4- Alternate or spiral parts is a more primitive condition than opposite or verticillate, as the latter seems to result from some internodes failing to develop.
 - 5- Open venation is more primitive than reticulate venation.
 - 6- Indefinite and indeterminate growth is more primitive than definite or determinate growth.
 - 7- The terminal or solitary flower is more primitive than the inflorescence and the open inflorescence is more primitive than a closed inflorescence, such as a capitulum, cyathium, catkin, etc., which has come to function more or less as a single flower.
 - 8- The free prothallium (alternation of generations) is a more primitive type than the type where the spores develop and produce a seed without leaving the mother-plant.
 - 9- Dichotomous branching is more primitive than sympodial or monopodial or verticillate branching.
 - 10- The type with scattered and similar sporophylls is more primitive than the type with sporophylls borne in a spike, or sexually differentiated, etc.
 - 11- The type with the fronds all similar is more primitive than the type with the fronds differentiated into sterile and fertile ones.
 - 12- Radial symmetry is generally more primitive than the dorsiventral or bilateral or zygomorphic type.
 - 13- The perennial plant is more primitive than the biennial or the annual.
 - 14- The woody plant is generally more primitive than its herbaceous relative.
 - 15- The terrestrial and autonomous type is more primitive than its aquatic, or epiphytic, or saprophytic, or climbing, or parasitic, or symbiotic relative.
- Finally, evolution tends to become irreversible as a type becomes further and further reduced, more and more specialized.

KEYS TO GENERA AND SPECIES

Keys are a modern feature of floras, but their development is a gradual one. In floras of two centuries ago there were no keys, but the species of a genus were often arranged in a graded sequence so that the successive diagnostic names could be used somewhat like an unindented key. Synoptical diagrams of the classification of a whole flora were often offered as a help to the user. Larger genera were often subdivided by means of sub-headings. The latter were easy to locate in the text as they

were usually quite symmetrical visually and may be further identified by use of various symbols such as asterisks, daggers, dashes, etc. As genera became larger, more elaborate system of subheadings were developed. And when these subheadings were brought together in a synoptic table at the beginning of a genus, a key was born. As keys were further developed, they tended to become dichotomous. And when ease in identification became the primary objective of a key, the natural key which gave a synoptical view of a genus tended to give way to the artificial key in which diagnostic characters are selected solely for their ease of use and efficiency in identification.

We have further developed and refined our keys along the lines of current trends. Our keys are purely artificial and built strictly as an aid to identification; more convenient characters are given the preference over more fundamental ones that might better illustrate the essential differences between taxa. Keys are strictly dichotomous and indented, with the pairs of indentations identified by the same letter in the margin. This is the type of structure which produces the easiest keys to use. The number of words and concepts used in each indentation has been kept low on purpose so that the reader may keep the contents of the first indentation clearly in mind while he reads the second indentation. Keys that are overloaded with ifs and whens or too many characters may be more accurate because they may take care of all the contingencies, but the gain in accuracy is all too often at the expense of comprehension.

Visual symmetry is a valuable feature of a good key; it enables the eye to discover quickly and follow easily a particular path of identification. The visual symmetry is here provided primarily by the use of indentations and identifying letters. This has freed us from the need for verbal symmetry and we have therefore eliminated some of the repetitiveness usually found in the second member of a pair of indentations. The resulting brevity will facilitate the task of the mind trying to grasp simultaneously the contents of a pair of indentations. We have also been able to emphasize the diagnostic differences in our keys at the expense of verbal symmetry. Further we have often emphasized the direction of the differences between two taxa or two groups of taxa; it is thus quite often possible to state in only one or two words the essential nature of the difference between two entities.

As we progressed in the preparation of this text we noticed that it was possible to grasp an overall view of a key as long as its terms were not too numerous. This has led us to try to subdivide each larger genus into groups of mostly 6-10 species each. When a large key is thus broken in smaller units, it is possible to retain a overall view of the key to a much larger number of species or genera.

For the sake of brevity the characters used in a key are most often not repeated in descriptions of species, genera and larger groups. Further brevity has been achieved quite often by merely stating how a particular taxon differs from a closely

related one, thus obviating the need to repeat such characters as they may have in common. While a standard sequence is generally followed in describing the successive parts of a plant, more important features are often stated first, especially if they have strong diagnostic value, and especially if these characters were not used in the key.

FLORA OF THE PRAIRIE PROVINCES
Embranchement: TRACHEOPHYTA

Plants with vascular tissues and, usually, recognizable root, stem and leaves.

- a. Reproduction by spores borne on leaves or sporophylls.
 - b. Sporangia borne dorsally on peltate sporophylls. Branches, leaves and sporophylls verticillate Division 2. Equisophyta p. 14
 - bb. No peltate sporophylls. Branches, leaves and sporophylls usually alternate.
 - c. Sporangia ventral, leaves usually small and simple Division 1. Lycophyta p. 9
 - cc. Sporangia dorsal or naked on specialized branches; leaves (=fronds) usually large and variously divided. Sub-division 1. Pterophytina p. 18
- aa. Reproduction by seeds borne in cones or flowers.
 - d. Seeds naked, borne in cones; woody plants with leaves usually persistent and mostly needle-like Sub-division 2. Gymnophytina p. 32
 - dd. Seeds wrapped in a carpel, borne in flowers, leaves various Sub-division 3. Angiophytina p. 39

Division 1. LYCOPHYTA

Sporangia solitary and subaxillary on the ventral side of a bract or leaf (=sporophyll).

- a. Submerged tufted aquatics from a fleshy bilobed corm Class 2. Isopsida p. 14
- aa. Normally terrestrial herbs with clearly distinct stem (and branches) Class 1. Lycopsida p. 9

Class 1. LYCOPSIDA

Growing point terminal. Foliar appendages differentiated into leaves and sporophylls, the latter usually disposed into clearly recognizable spikes.

- a. Spike cylindrical; spores very small and quite numerous 1. Lycopodiaceae
- aa. Spike quadrangular, the sporophylls being disposed in 4 vertical rows; some of the spores much larger and only 4 to a sporangium 2. Selaginellaceae

Order 1. LYCOPODIALES

Single family

1. LYCOPODIACEAE (CLUB-MOSS FAMILY)

Sporangia, spores and prothallia not sexually differentiated. Sporangia and leaves without ligules.

1. LYCOPODIUM L.

Herbs dichotomously divided. Leaves small and simple, disposed on 4 ranks or more, persistent.

- a. Bearing rings of bulblets. No spike 1. L. Selago
- aa. No bulbets. Sporophylls in a terminal spike.
 - b. No rhizome. Terminal spike barely differentiated from the foliage 2. L. inundatum
 - bb. Elongated rhizomes present. Spikes strongly differentiated from the foliage.
 - c. Spike borne on a long peduncle.
 - d. Leaves in about 8 rows and with a long terminal seta 4. L. clavatum
 - dd. Branchlets flattened; leaves partly adnate and in 4 rows 8. L. complanatum
 - cc. Spikes sessile or nearly so.
 - e. Leaves in 6 or more rows, the free portion of each leaf 3 mm long or more.
 - f. Erect shoot with a strictly dichotomous branching; branches few 3. L. annotinum
 - ff. Erect shoot with a distinct main stem; branches numerous 5. L. obscurum
 - ee. Leaves in 4-(5) rows, much adnate, the free portion not more than 3 mm long.
 - g. Leaves of the various rows quite similar 6. L. sabinifolium
 - gg. Leaves strongly differentiated, those of the dorsal row trowel-shaped 7. L. alpinum

1. L. Selago L. var. Selago -- Rat's Tail (Sélagine, Herbe aux porcs) -- No rhizome, but tufted. Strictly dichotomous with all branches reaching the same level. Rings of bulblets, sporophylls and leaves in alternating groups along the branches. Alpine and subarctic habitats, usually half buried in Sphagnum. -- G, K-Aka, L-SPM, NS, NB-BC, US, (CA, SA), Eur -- F. appressum (Desv.) Gelert -- Leaves erect and tightly appressed to the stem. Hudson Bay region. -- G-Aka, L-SPM, NS, Q-nMan, swAlta-seBC, (US), Eur.

The widely distributed var. Selago has the leaves \pm 1 mm wide, or slightly more, and straight. Around the Pacific Ocean it grades into, and is largely replaced by, the more delicate var. Miyoshianum Makino with leaves \pm 0.05 mm wide, \pm incurved

beyond the middle, and mostly spreading to descending. Reports of *L. porophilum* Lloyd & Und. from Western Canada by Rydberg 1932, Macoun 1890, and others are likely to be based on various forms of *L. Selago*. However, we have not yet met with any specimen so named from Alberta. See Boivin 1966. Reports by Macoun 1890 of *L. lucidulum* Mx. from Laggan and B.C. have not been traced yet but are held as highly dubious and likely to be based on variants of *L. Selago*.

2. *L. inundatum* L. var. *inundatum* -- No rhizome, but producing a new bulb at the end of the season. Dichotomously divided into a creeping sterile shoot and an erect fertile one. Spike terminal, barely distinct. Sporophylls slightly longer than the leaves. Wet spots subject to spring flooding, especially in bogs. Lake Windrum. -- Aka, L-SPM, NS-3, nS, BC, US, Eur.

3. *L. annotinum* L. (var. *acrifolium* Fern.) -- Long superficial leafy rhizome present. Erect shoot dichotomously divided into a few erect branches. Leaves spreading to descending, usually serrulate. Spike solitary and sessile. Dense coniferous woods. -- K-Aka, L-SPM, NS-BC, US, Eur -- *F. pungens* (Desv.) M.P. Pors. (var. *alpestre* Hartm.) -- Erect shoots in denser tufts. Leaves strongly ascending to appressed, those of the fertile branches shorter, less than 5 mm long. Open, alpine or subarctic habitats. -- G-Aka, L-SPM, NS-BC, US, Eur.

Var. *acrifolium* is sporadic in its distribution and appears to be a morphological extreme with entire leaves. *F. pungens* appears to be an ecological variation and is geographically restricted to the same extent that its habitat is also restricted.

4. *L. clavatum* L. var. *clavatum* (var. *megastachyon* Fern. & Bissell) -- Clubmoss, Staghorn-Moss (*Courants verts*) -- Superficial leafy rhizome present. Leaf ending in a long conspicuous seta, these gathered in white to rusty tufts at the end of shoots. Spike long-peduncled, the peduncle bracteolate and often branched. Dry woods, usually coniferous woods. -- Aka, L-SPM, NS-BC, US, Eur. -- *F. monostachyon* (Desv.) Clute -- Shorter spike on a short peduncle, the latter usually shorter than the spike. Leaves shorter and more strongly incurved. More open and subalpine to subarctic habitats. -- G, K-Aka, L-NF, Q-(O)-Man-BC, (US), Eur.

The setae are commonly deciduous around the 5th or 6th year. On the Pacific slope the typical variety is partly replaced by a var. *integerrimum* with setae deciduous the very first year. The latter has also been reported from Wisconsin, but we have not yet been able to confirm this report. *F. monostachyon* appears to be an ecological variant essentially comparable to the *f. pungens* of the previous species. Other variations based on the size and number of spikes per peduncle do not seem to be in any way significant.

5. *L. obscurum* L. (f. *exsertum* Vict., var. *dendroideum* (Mx.) D.C. Eaton) -- Ground-Spruce, Ground-Pine (*Petits Pins*) -- Rhizome deeply buried. Erect shoots very branchy and looking like little trees, with a solitary or a few terminal sessile spi-

kes. Semi-open coniferous woods. -- (K)-Mack-Aka, L-SPM, NS-BC, US, (Eur).

A barely distinct form of sunny places is often called var. dendroideum, but a better name would seem to be f. exsertum as it hardly rates as a variety.

6. L. sabinifolium W. var. sitchense (Rupr.) Fern. (L. sitchense Rupr.) -- Ground-Fir -- Rhizome nearly superficial. Leaves partly adnate, this species being thus intermediate between the previous numbers with free leaves and the following ones strongly adnate. Sterile branches strongly ascending and flattened, but with those of the ventral and dorsal rows quite alike. Spike usually solitary, sessile. Acid soils from lake Hasbala westward. -- Aka, nS-BC, US, (Eur).

Our variety has dimorphic erect branches, the fertile ones being 2-3 times longer (exclusive of the sessile spike) than the sterile ones. The more eastern typical variety has subequal branches, but the spike is usually pedunculate. This morphological distinction is at variance with the usual treatment in current manuals and all specimens and reports of var. sabinifolium from Howard and elsewhere in our area have been revised accordingly. See Boivin 1966.

7. L. alpinum L. -- Similar to the following. Leaves of the ventral row strongly differentiated, shaped like a small trowel. Spike solitary and sessile. Light woods near timberline; Rockies -- G, K-Aka, L, Q, wAlta-BC, (US), Eur.

8. L. complanatum L. var. complanatum -- Ground-Cedar -- Rhizome deeply buried. Branches strongly flattened, much paler below, elongating each year, the annual growth being termed an innovation. The innovations separated by constrictions. The lower branches with (2)-3-4-(5) innovations. Leaves strongly adnate, those of the lower rank much smaller. Spikes long peduncled, mostly solitary. Dry woods, usually coniferous, and dry semi-open places. -- G, K-Aka, L-SPM, NS-BC, US, Eur. -- Var. Habereri (House) Boivin (var. Gartonis Boivin; L. tristachyum AA.) -- Usually longer and with more open branching. Most branches innovating but only once. Spikes usually geminate. Rhizome near the surface. Coniferous woods on light soils. -- sMack, sQ-nS, neUS, (Eur).

In some herbaria many specimens of L. complanatum have recently been revised to various hybrid combinations. We find these hybrids to be unconvincing on morphological ground and also because too many of them were collected way outside the range of one of the putative parents. Nearly all these so-called hybrids appear to fall within the normal range of variation of L. complanatum or its var. Habereri.

Order 2. SELAGINELLALES

Single family

2. SELAGINELLACEAE (SPIKEMOSS FAMILY)

Like small Club-Mosses, but with the spores sexually differentiated, the megaspore larger and 4 together in a sporangium.

1. SELAGINELLA Beauvois SPIKEMOSS

Small herbs, weakly rooted. Branching dichotomous. Spikes terminal and sessile.

- a. Leaves merely acute, not bristle-tipped 1. S. selaginoides
- aa. Leaves bristle-tipped.
 - b. Glaucous, loosely tufted 4. S. Wallacei
 - bb. Green, densely creeping.
 - c. Setae about 0.5 mm long 2. S. rupestris
 - cc. Setae 1.0 mm long or more 3. S. densa

1. S. selaginoides (L.) Link -- Very filmy and easily confused with a Hepatic, which it resembles. Two-toned. The sterile shoots dark green and creeping; the fertile one erect and straw-green. Leaves remotely dentate. Sporophylls loosely spreading. Creeping among the mosses in slightly disturbed places in bogs. -- G, K-Aka, L-SPM, NS, NB-BC, US, Eur.

2. S. rupestris (L.) Spring -- Small perennial resembling a small Lycopodium. Sterile branches about 1 cm high; the fertile ones (2)-3-(4) cm high. Leaves small and closely imbricated, ending in a seta 1 mm long or less. Forms a loose carpet on rocks or in dry Pine woods. -- G, NS, NB-neAlta, US, Eur.

Reports from southwestern Manitoba proved to be based on S. densa.

3. S. densa Rydb. var. densa -- A prairie species quite similar to the preceding and often confused with it. Sterile branches about 4 mm high, the fertile ones 1.5-2.5 cm high. Terminal setae 1 mm long or more, forming conspicuous tufts at the end of branches. Sporophylls ciliate to the tip. Forming compact flabelliform carpets on dry ground. Very common prairie species, but usually hidden and inconspicuous. -- swMan-seBC, US -- Var. scopulorum (Maxon) Tryon (var. Standleyi (Maxon) Tryon; S. scopulorum (Maxon) -- Sporophylls eciliate above the middle. Dry alpine habitats. -- (se Aka), swAlta-BC, US, (CA).

4. S. Wallacei Hier. -- Foliage somewhat glaucous. Similar to the previous two and often confused with them. Much larger and more loosely tufted and branched, the main shoots up to 10 cm long. Leaves and sporophylls minutely ciliate towards the apex, but eciliate or nearly so towards the base. Setae short, inconspicuous, less than 0.5 mm long. Dry, rocky mountain slopes: Waterton. -- swAlta-BC, US.

Class 2. ISOPSIDA

A single order, family and genus.

Order 3. ISOETALES -- 3. ISOËTACEAE (QUILLWORT FAMILY)

1. ISOËTES L.

QUILLWORT

Tufted aquatic from a bilobed corm. All leaves bear a ventral sporangium with a small ligule above the sporangium. Spores of two kinds, the female ones much larger and termed "megaspores".

- a. Megaspores covered with spinulose projections about as high as the equatorial and commissural ridges...
 1. I. echinospora
 aa. Smaller and merely covered with tubercules which are about as high as wide and much lower than the ridges 2. I. Bolanderi

1. I. echinospora Durieu var. Braunii (Durieu) Eng. (S. muricata AA.) -- Leaves soft, filiform, arched, entire, up to 15 cm long, bulbous at base. The bulbous part is hollowed out and contains a sporangium. Megaspores spinulose, about 1/2 a millimeter across. A bottom dweller in shallow waters of lakes. -- G, K-Aka, L-SPM, NS-BC, US.

Northeastward it gives way to var. Savilei Bolvin, a smaller plant with smaller megaspores, about 1/3 mm across, varying from 300 to 400 μ . Our American varieties form the ssp. muricata (Durieu) Löve & Löve, characterized by the presence of stomata. These will be made conspicuous by the action of iodine as the guard cells accumulate starch. Stomata are absent in ssp. echinospora.

2. I. Bolanderi Eng. var. Bolanderi -- Leaves often longer, up to 25 cm long. Megaspores merely tuberculate and smaller, about 1/3 mm across. Alpine lakes in Waterton. -- swAlta-(BC), US.

In the southwestern USA occurs a var. pygmaea Clute much smaller, 2.5 cm high or less, and with megaspores almost smooth.

Division 2. EQUISOPHYTA

A single class, order, family and genus.

Class 3. EQUISOPSIDA -- Order 4. EQUISETALES

4. EQUISETACEAE (HORSETAIL FAMILY)

1. EQUISETUM L.

HORSETAIL

Herbs, easily coming apart at the nodes. Leaves verticillate, small and fused together into a sheath at each node. Branches verticillate and alternating with the leaves. Sporophylls peltate and verticillate in a terminal spike. Sporangia dorsal.

- a. Stems all green and simple.

Isoëtes

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- b. Stems wall paper-thin and easily crushed..
..... 9. E. fluviatile
- bb. Stem stiff with thick wall and smaller
central cavity.
 - c. Small plants; sheath with 3 teeth
only 4. E. scirpoides
 - cc. Larger; teeth much more numerous.
 - d. Teeth persistent; stem up to
2.5 mm thick 3. E. variegatum
 - dd. Teeth deciduous; stem usually much
larger.
 - e. Stems annual; sheath with a
ring of brown dots 1. E. laevigatum
 - ee. Stems biennial; sheath soon
developping two black rings... 2. E. hyemale
- aa. Stems branched, at least the sterile ones;
fertile stems sometimes yellow and simple.
 - f. Branches ramified; sheath two-toned, green at
base, brown at top..... 7. E. sylvaticum
 - ff. Branches normally simple; sheath green only.
 - g. Lowermost internode on each branch
longer than the corresponding sheath
on the stem 5. E. arvense
 - gg. Lowermost internode on each branch as
long as or shorter than the correspond-
ing sheath on the stem.
 - h. Sheath of the branches 3-toothed..6. E. pratense
 - hh. With (4)-5-(6) teeth.
 - i. Stem-sheaths with 6-8 teeth...8. E. palustre
 - ii. With 10-30 teeth9. E. fluviatile

1. E. laevigatum Braun (E. hyemale L. var. intermedium A.A. Eaton; E. kansanum Schaffner; E. intermedium (A.A. Eaton) Rydb.) -- (Préle) -- About 1 mm high, often producing tufts of short stems. Stem simple, pale green, not overwintering. Sheath slightly constricted at base, about 2-3 times longer than wide at base and slightly flaring. Sporesis mostly in mid-summer. Open places, often hilly and sandy. -- Q-BC, US, (CA).

Quite easily recognized by its pale green colour and the ring on the sheath reduced to a row of brown dots. New shoots will produce a spike the very first year and sporesis takes place around the middle of summer. The stems do not persist but are regularly winter-killed. The base of an old stem will often generate a tuft of very thin stems which are usually sterile and may vary from straight to flexuous, thus resembling E. variegatum in habit. Yet these thin stems should be readily recognized by the unique type of sheath of E. laevigatum. The base of an old stem will sometimes persist into a second summer; it will then develop sets of rings that may somewhat resemble those of E. hyemale. Most of our personal collections of E. laevigatum will illustrate its usual dimorphism in stem size and shape.

In our field experience this species and the next two are

quite sharply distinct and never hybridize. However, in the herbarium, the distinction is not always so obvious and a fair proportion of specimens will seem to be more or less intermediate. These atypical specimens are variously treated as varieties or species or as interspecific hybrids. Mostly they will be found filed under one or the other of the following names or formulae.

E. hyemale X laevigatum = E. hyemale var. intermedium A.A. Eaton = E. Ferrissii Clute. We have examined quite a few specimens identified by Hauke to E. Ferrissii and we are not satisfied that they show morphological evidence for their hybrid status; nearly all specimens seemed to fall well within the normal range of variation of E. laevigatum and have been so revised. According to the map published, the range of E. Ferrissii extends a long way beyond the range of one of the putative parents, certainly not a feature to be normally expected in a hybrid.

E. laevigatum X variegatum = E. variegatum var. Nelsonii A.A. Eaton = E. Nelsonii (A.A. Eaton) Schaffner. Under those names one finds mostly small specimens of E. laevigatum. E. Nelsonii is treated as a hybrid by Hauke 1963 and, as in the case of E. Ferrissii, his distribution map shows E. Nelsonii extending well beyond the range of one of its putative parents. The morphological evidence of hybridity is not convincing.

E. hyemale X variegatum = E. hyemale var. Jesupii (A.A. Eaton) V. Vict. = E. trachyodon A.A. Specimens filed under those names are usually small individuals of E. hyemale. These seem to be sporadic in the range of the species, being perhaps more frequent northward. As in the two cases previous, the morphological evidence for hybridity is not convincing.

2. E. hyemale L. var. affine (Eng.) A.A. Eaton (var. elatum (Eng.) A.A. Eaton, var. pseudohyemale (Farw.) Morton, var. robustum (A.Br.) A.A. Eaton, E. affine Eng.; E. prealtum Raf.) -- Scouring Rush (Prêle des tourneurs) -- Stem dark green, commonly 1 m high, simple, overwintering. Sheath cylindrical, short, up to 1 1/2 times as long as large, soon developing two black rings separated by a gray zone. Sporesis sometimes in the fall of the first year, most often in the spring of the second year. Humid and sandy places, most often on embankments. -- Mack-Aka, (HF), NS, NB-BC, US, (Eur)

The internodes are ridged longitudinally and in our american var. affine the ridges are crested by a single row of minute and inconspicuous siliceous tubercles. In the eurAsian var. hyemale the tubercles form a double row on the crest of each ridge. This difference is not always very clear, but is a valid one if the two varieties are treated as populations.

The stems of this species are very dark green and, like E. laevigatum, they are dimorphic although not in the same manner. First year stems are lighter in colour and usually sterile, but they may produce toward the middle of the summer a spike which will achieve sporesis in the fall. The second year the stems will have appreciably darkened and most of them will produce a spike which will mature before the end of spring. Generally the

stem will be frost-killed during the second winter, but an occasion it may survive for a third season and will then produce short fertile branches (=f. polystachyum Prager). This branching and production of more than one spike may also appear during the second summer on stems that may have suffered during the first winter some frost damage affecting only the summit of the stem. Our collection no. 13 611 from Pend-d'Oreille Lake in Idaho was meant to illustrate the stem dimorphism of this species.

Such individuals as may be more luxuriant, being taller and coarser, are often named var. californicum Milde or var. elatum or var. robustum. These forms are occasional in the range of the species and hardly deserve taxonomic rank, even if they seem to be somewhat more frequent southward.

3. E. variegatum Schleicher -- Similar to the preceding, but generally smaller. Stems simple, annual, up to 4 dm high, up to 2.5 mm thick. Sheath with a single brown or black ring and persistent teeth. Shores and wet coniferous woods. -- G-Aka, L-NF, (SPM), NS, NB-BC, US, Eur.

As with the first two species, extreme forms have received names. Var. alaskanum A.A. Eaton will designate the more vigorous plants while var. anceps Milde, or better f. anceps (Milde) Braun, will refer to those with more delicate stems.

4. E. scirpoides Mx. -- Smallest and forming a dark, dense, tangled carpet on the forest floor. Stems only 5-12 cm long, dark green, simple, flexuous and without a central cavity. Sheath with only 3 teeth. Mostly coniferous woods. -- G-Aka, L-SPM, NS-BC, US, Eur.

5. E. arvense L. (var. boreale (Bong.) Led.) -- Horsetail (Queue de renard) -- Stems of two kinds, the fertile ones simple, very early, yellow and soon disappearing. The sterile ones appearing a little later, with simple solid branches. Sheaths of the branches with 3-4 lanceolate teeth 1 mm long or more. Everywhere, especially in wet places. -- G, K-Aka, L-NF-(SPM), NS-BC, US, Eur. Afr.

A most plastic species with scores of named forms and varieties. The most popular one is var. boreale in which the branches are essentially trigonous while they are tetragonous in var. arvense. The first is mostly found in shaded places and the second occurs mainly in more sunny habitats. Apparently these varieties are only minor ecological forms.

6. E. pratense Ehrh. -- Meadow-Horsetail -- Stems of two kinds, the fertile ones very rare, appearing in early summer, pale green, branched or soon branching. Sterile stems with simple branches spreading. Sheaths of the branches with 3 deltoid teeth less than 1 mm long. Dense woods near water. -- Mack-Aka, NF, NS, NB-BC, US, Eur.

7. E. sylvaticum L. var. multiramsum (Fern.) Wherry (var. pauciramsum AA.) -- Bottle-Brush -- Branches flexuous and ramified. Stem finely pubescent. Shoots of two kinds, appearing at the same time, the fertile ones with the longest branches uppermost, the sterile ones with the longest branches lowermost. Sheaths of the stem with large russet teeth fused in 3 or 4 groups.

Spores in late spring. Woods, especially coniferous woods. -- G, K-Aka, L-SPM, NS-BC, US.

Typically var. multiramum has smooth branches while the eurasian var. sylvaticum is minutely glandular-scabrous along the ridges of the branches. As pointed out by Fassett 1944 and as we have been able to check in the field and in the herbarium, the distinction is a statistical one and is valid only if the two varieties are treated as populations on a continental scale. It is not difficult to find in the range of one variety, especially in the northern part of the range, a specimen that could pass as typical of the other variety.

In Ungava and eastward one may find another variety, var. pauciramum Milde, with much reduced branching. Many authors do not distinguish this entity, in which case the correct name for var. multiramum becomes var. pauciramum because the latter antedates the former by nearly a century. Hence all reports of var. pauciramum west and south of Ungava and Newfoundland should be interpreted as applying to var. multiramum.

8. E. palustre L. var. simplicissimum Braun -- Bog-Nut -- Sterile and fertile shoots rather alike and normally branched, the branches rather coarse and nearly as thick as the stem. Lowest branches internode very short, with a central cavity and with sheath bearing (4)-5-(6) teeth. Shores of larger rivers. -- Mack-Aka, L-NF, NB-BC, US.

The eurasian var. palustre bears branches with their middle sheaths cut into teeth only (0.5)-0.8-1.2-(1.5) mm long. Our american phase is weakly differentiated by a number of statistical differences of which the strongest is found in the length of the teeth of the middle sheaths of the branches; these are (1.0)-1.5-2.5-(3.0) mm long in american plants. The latter was first distinguished as var. americanum Vict. 1927 but there are three earlier names available of which var. simplicissimum Braun is the earliest and correct name as pointed out by Boivin 1951.

9. E. fluviatile L. (E. limosum L.) -- Pipes (Pipes) -- Stem with the largest central cavity and the thinnest walls, thus very easily flattened. Very variable, simple to much branched. Sterile stems long attenuate at tip, otherwise similar to the fertile ones. Stem sheaths short, with numerous small and strongly blackened teeth. Branches hollow. Wet spots and shallows. -- K-Aka, L-SPM, NS-BC, US, Eur.

Division 3. PTEROPHYTA

Reproducing by seeds or by spores borne in marginal or dorsal sporangia. Leaf (or frond) usually well developed and rather large.

Sub-division 1. PTEROPHYTINA

Herbs with rather large fronds which are usually much divided. Venation usually more or less dichotomous. Sporangia borne on the back of fronds or at the margin of specialized shoots. A single class.

Class 4. PTEROPSIDA

- a. Frond dichotomously divided into a leafy branch and a fertile branch; sporangia not clustered in sori, but more or less scattered, rather large and individually noticeable and usually sessile. Order 5. Ophioglossales
- aa. Frond usually pinnately divided; sporangia small, submicroscopic, usually stipitate and aggregated in discrete sori Order 6. Filicales p. 21

Order 5. OPHIOGLOSSALES

Sporangia marginal, scattered, often sessile or nearly so. Frond divided in such a way as to look like a stem with a terminal inoprescence and a single cauline or basal leaf.

5. OPHIOGLOSSACEAE (ADDER'S TONGUE FAMILY)

A single genus with us.

1. BOTRYCHIUM Swartz

Fertile segment a terminal panicle. Sterile segment ± divided.

- a. Sterile segment triangular, peduncled and inserted near the base of scape.
- b. Sterile segment ternately compound... 1. B. multifidum
- bb. Sterile segment simple to trifoliate ... 4. B. simplex
- aa. Sterile segment sessile to short-peduncled, inserted toward the middle or upper part of the stipe.
- c. Sterile segment 1-4 dm wide 7. B. virginianum
- cc. Sterile segment smaller.
- d. Sterile segment ± lanceolate.
- e. Pinnae broadly flabelliform..... 2. B. Lunaria
- ee. Pinnae ovate or obovate.
- f. Pinnae obovate, entire 4. B. simplex
- ff. Pinnae ovate, pinnatifid ... 3. B. boreale
- dd. Sterile segment not so elongate, deltoid to triangular-lanceolate.
- g. Sterile blade ± deltoid..... 6. B. lanceolatum
- gg. Sterile blade ± triangular, about twice as long as broad 5. B. matricariifolium

1. B. multifidum (Gmelin) Rupr. var. multifidum -- Sterile segment 1 dm wide or less ± bipinnatipartite, broadly deltoid, inserted near the base of the stipe. Last year's blade often overwintering, the plant thus appearing bifoliate. Sporesis in late summer. Sandy sterile prairies. -- Mack, (L)-NF, NO-BC, US, Eur -- Var. intermedium (D.C. Eaton) Farw. (B. silaifolium Presl; B. ternatum Sw. var. intermedium D.C. Eaton) -- Larger and coarser. Blade up to 2.5 dm wide and ± tripinnatipartite. -- (Aka), L-NF, NO, (NB)-Q-BC, US.

2. B. Lunaria (L.) Sw. -- Moonwort (Herbe à la lune) -- The lanceolate limb simply pinnate, the pinnae broadly flabelliform. Insertion near the middle of the stipe. Open to semi-open places on sandy soils or dry bogs. -- G, K-Aka, L-SFM, NS, Q-BC, US, (SA), Eur, (Oc).

More luxuriant specimens with slightly larger spores have been segregated variously as a form, variety or species (B. min-ganense Vict.). This uncommon extreme appears to be sporadic in its distribution and its taxonomic significance is not obvious. The last monographer of the group, Clausen 1938, reports it from all three of our provinces, but the Saskatchewan report actually originated from Boss Hill Creek in southwestern Manitoba.

3. B. boreale Midle var. obtusilobum (Rupr.) Brown -- Much like the preceding, the limb somewhat larger, the pinnae ovate and pinnatifid. Grassy mountain slopes, below or above treeline. Often looking like a very lush B. Lunaria. -- Y-Aka, swAlta-BC, (US).

The eurasian var. boreale (including var. crassinervium (Rupr.) Christ.) has the sterile limb shorter and less deeply cut, the pinnae more clearly obovate or even flabelliform.

4. B. simplex E. Hitch. var. simplex -- Smallest and least divided. Up to 12 cm high. Limb 1-2 cm long, simple or trilobed to trifoliate, petiolate, inserted near the base. Sterile, open places: North Battleford -- NF, NS, NB-O, S, BC, US, Eur -- Var. tenebrosum (A.A. Eaton) Clausen -- Limb more elongate and more divided into 3-7 obovate pinnae. Peduncle 1-3 cm long, inserted towards the middle. Often looking like an intermediate to B. Lunaria, but the pinnae not flabelliform. -- Aka, NB-O, S-Alta, US, Eur.

A Macoun collection from Silver City (MTMG; DAO, photo) was originally cited by Burgess 1887 under B. matricariifolium. It was later revised to B. simplex by G.E. Davenport and cited accordingly by Macoun 1890. Upon examination, this collection proved to be made of immature specimens of B. Lunaria. This was the basis for all subsequent reports of B. simplex and B. matricariifolium for Alberta, but our own reports are based on more recent collections from Rich Valley (ALTA; DAO, photo) for B. simplex var. tenebrosum and Wilderness Park (DAO) for B. matricariifolium. The var. tenebrosum collection is not very uniform.

5. B. matricariifolium Braun (var. hesperium (Maxon & Clausen) Boivin; B. ramosum AA.) -- Middling in size and form. Sterile segment inserted above the middle, generally short pedunculate, ± bipinnatifid and ± triangular (that is about twice as long as large), the ultimate segments commonly obovate. Moist prairies and shores. -- (NF)-SPM, NS-BC, US, Eur.

6. B. lanceolatum (Gmelin) Rupr. (var. angustisegmentum Pease & Moore) -- Much like the preceding, but the sterile segment larger, sessile and inserted near the base of the panicle. Limb deltoid (that is nearly as wide as long), its ultimate segments tending to lanceolate. Moist prairies. -- G, (Y-Aka), L-(NF)-SPM, NS-Q(O), swS-swAlta-BC, US, Eur.

Usually grows with B. matricariifolium and often giving the

impression (perhaps fully justified) of being only a later maturing growth phase of *B. matricariifolium*. There is 2-3 weeks difference in the sporesis time of the two entities.

7. *B. virginianum* (L.) Sw. (var. *europaeum* Ångström) -- Rattlesnake-Fern. -- Largest and most divided, 2-5 dm high, the stipe puberulent near the base. Sterile segment (1)-2-3-(4) dm wide, sessile or nearly so, inserted near the middle, tripinnatipartite to quadripinnatifid. Rich woods. -- K-Mack, Aka, L-NF, NS-BC, US, (SA), Eur -- *F. anomalum* Cody -- Lower segment partly modified and bearing some sporangia along with the normal green tissue. McKague. -- G-O, S.

Plants of more sunny places have a smaller, less divided and more leathery limb, along with slightly larger sporangia. These are often segregated as var. *europaeum*, undoubtedly a mere ecological form.

Order 6. FILICALEE

Sporangia submicroscopic, generally stipitate and borne dorsally on normal or specialized fronds.

- a. Sporangia disposed in a continuous manner along the limbless divisions of the rachis, not aggregated into sori 6. Osmundaceae p. 21
- aa. Sporangia disposed in clusters termed sori.
 - b. Frond looking like a 4-leaved clover 11. Marsileaceae p. 31
 - bb. Frond looking more like a typical Fern.
 - c. Frond simple, pinnatipartite.. 10. Polypodiaceae p. 30
 - cc. Frond compound, at least at base.
 - d. Sori marginal and protected by the more or less revolute margin; pinnulae most often discrete and petiolulate 7. Pteridaceae p. 22
 - dd. Sori more or less removed from the flat or revolute margin; limb never divided into entire, discrete and petiolulate leaflets.
 - e. Indusium lacking or attached by a point only 8. Aspidiaceae p. 24
 - ee. Indusium placed laterally and attached by its whole length.
 - f. Fronds evergreen, 1.5 dm long or less... 9. Aspleniaceae p. 30
 - ff. Fronds not evergreen, much larger 8. Athyrium p. 29

6. OSMUNDACEAE (FLOWERING FERN FAMILY)

Sporangia not aggregated in sori, but disposed continuously along some branches of the rachis.

1. OSMUNDA L.

FLOWERING FERN

The fertile pinnae devoid of leafy tissue.

1. O. Claytoniana L. var. Claytoniana -- Interrupted Fern -- A rather large frond, pinnate, the pinnae pinnatifid. Some fronds are sterile, others are interrupted towards the middle by 2 to 4 pairs of fertile pinnae. Wet and marshy places. -- L-SPM, NS-seMan, US.

Younger fronds of var. Claytoniana exhibit a barely tinted pubescence, merely light brown, while the himalayan var. vestita (Wall.) Milde has russet pubescence.

7. PTERIDACEAE

(BRACKEN FAMILY)

The fertile fronds commonly made of distinct leaflets, more or less entire and petiolulate. Sori marginal, protected by the revolute margin of the limb, or by an indusium, or both. Indusium, if present, often more or less continuous along the margin.

- a. Leaflets strongly asymmetrical and bearing sori along one edge only 5. Adiantum
- aa. Bearing sori along both sides.
 - b. Frond 3-10 dm high 1. Pteridium
 - bb. Frond smaller, 2.5 dm high or less.
 - c. Stipe dark, brown to black.
 - d. Segments deeply dissected 2. Cheilanthes
 - dd. Segments entire 3. Pellaea
 - cc. Stipe pale, green to pale green ... 4. Cryptogramma

1. PTERIDIUM Gleditsch

BRACKEN

Scales lacking. Fronds all alike, with deeply divided segments and a continuous marginal sorus.

1. P. aquilinum (L.) Kuhn var. latiusculum (Desv.) Underw. (Pteris aquilina AA.) -- Bracken, Brake -- Large coarse fern with a more or less deltoid limb, not tufted, but with a deeply buried elongate rhizome. Limb tripinnatifid to tripinnate, glabrous or pubescent along the margin and the midnerve below. Light and sandy soils. -- NF-SPM, NS-(PEI-NB)-Q-(O)-sMan, swAlta, US, (CA, Eur) -- Var. champlainense Boivin (var. pubescens AA.) -- Similar but not deltoid and more pubescent. Limb rather ovate and puberulent over the whole of the under surface. -- Q-seMan, US -- Var. pubescens Underw. -- Larger and more pubescent. Frond commonly 1 mm high or more, its growth protracted, the growing tip remaining active a good part of the summer. Limb ovate, pubescent on both surfaces more so below. Waterton. -- (Aka), swAlta-BC, US, (CA).

Our varieties belong to the largely boreal ssp. aquilinum in which the ultimate segments are not wing-decurrent on the lower side or are equally wing-decurrent on both sides. In the mainly austral ssp. caudatum (L.) Bonaparte, the ultimate segments are decurrent on the lower side only, or at least more strongly so on the lower than on the upper side.

2. CHEILANTHES Swartz LIP-FERN

Margins revolute mostly towards the tips of the lobes of pinnules. Fronds not dimorphous.

1. C. Feei Moore -- A small tufted fern, extremely pubescent. Stipe woolly, brown. Limb \pm tripinnate, gray-tomentose above, densely woolly below. Limestone cliffs: Rockies. -- swAlta-BC, US.

3. PELLAEA Link CLIFF-BRAKE

Stipe dark colored. Fronds slightly dimorphic, the fertile ones with the margin of the limb continuously revolute all around the pinnule.

1. P. glabella Mett. var. simplex Butters (P. atropurpurea (L.) Link var. simplex (Butters) Morton; P. Suksdorfiana Butters) -- Rock-Brake -- Stipe brownish, black and shiny. Limb pinnately divided into discrete, petiolulate, entire leaflets. Rhizome and base of stipe densely scaly. Scales made of linear cells, these 10-15 times as long as wide. Cracks of calcareous rocks. -- swAlta-BC, (wUS) -- Var. nana (Rich) Cody (P. glabella Mett. var. occidentalis (E. Nelson) Butters) -- Usually smaller but the main characters detectable only with a strong hand-lens or binocular with power about X20: scales with cells oblong-lanceolate and only 3-5 times as long as wide. Lower pinnae often trilobed or trifoliate. -- swMack, Man-Alta, US.

Reports of P. atropurpurea from northern Saskatchewan are based on specimens (BM, CAN, DA) which appear to be quite typical of var. nana as to pubescence of stipe and rachis, size and division of the frond, shape of cells of scales, etc.

4. CRYPTOGRAMMA Br. ROCK-BRAKE

Stipe pale. Fronds strongly dimorphous, the fertile ones similar to Pellaea minus the dark stipe and rachis.

a. Fronds tufted and coriaceous 1. C. crispa
aa. Fronds spaced along the rhizome and very thin. 2. C. Stelleri

1. C. crispa (L.) Br. var. acrostichoides (Br.) C.B. Clarke -- Mountain-Parsley, Parsley-Fern -- Densely tufted and green, the fertile fronds twice larger and divided into entire, linear, petiolulate leaflets. Limb thickish, that of the fertile fronds strongly revolute. Crevices of dry precambrian and other acidic rocks. -- Mack-Aka, (L, C)-O-BC, US, (Eur).

The eurasian var. crispa has thinner fronds in a lighter green and the basal scales are mostly of a uniform brown colour; the latter are mostly with a paler central zone in our american variety. Reports of this species for Baffin Island are rated as improbable; those for Labrador and Quebec have yet to be verified or confirmed.

2. C. Stelleri (S.G. Gmelin) Prantl -- Similar but not tufted, the fronds arising singly from an elongate rhizome. Limb

of the sterile frond very filmy. Shaded limestone cliffs. -- Y-Aka, (L)-NF, NS, NB-O, swAlta-BC, US, Eur.

The Porter Lake, Sask., reports are not substantiated by any specimen that we know of in Saskatchewan herbaria or elsewhere.

5. ADIANTUM L.

No indusium, but the edge of the leaflets is folded over in a very good imitation of an indusium, the sorus borne under the folded over portion. Revolute margin discontinuous, cut up into 3-6 segments per leaflet.

1. *A. pedatum* L. var. *aleuticum* Rupr. -- The frond cut in a most unusual manner. Petiole and rachises jet-black and shiny. Petiole bifurcate at summit; each primary branch is recurved and bears, on one side, 3-6 secondary branches, each of which is pinnately divided into numerous, petiolulate, asymmetrical leaflets. Damp woods and rocky subalpine slopes, rare. -- Aka, NF, Q, swAlta-BC, US, (Eur).

In the typical eastern phase the limb is spread out horizontally. In our variety the frond is somewhat reduced and its primary segments are divergent to nearly erect. This distinction cannot always be applied satisfactorily and at times appears to be merely ecological.

8. ASFIDIACEAE (SHIELD-FERN FAMILY)

Family rather polymorphic, of miscellaneous Fern types. Sori commonly round or roundish. Indusia absent or more often present; if present, nearly always attached by a single point. *Athyrium* is an atypical genus with the sori elongate and the indusia attached lengthwise.

- a. Fronds strongly dimorphous, the fertile ones with the limb reduced to a mere envelope for the sori 1. Onoclea
- aa. Fronds all alike or near similar with a normal limb well developed.
 - b. Not tufted, but the rhizome long stoloniferous, sori mostly devoid of indusia.
 - c. Lowest pinnae with a well developed petiole.
 - d. Indusium absent; limb essentially bipinnate 5. Carpogymnia
 - dd. Indusia present; limb tripinnate to quadripinnatipartite 7. Cystopteris
 - cc. All pinnae sessile or practically .. so 6. Thelypteris
 - bb. Tufted.
 - e. Sori without indusia 8. Athyrium
 - ee. Indusia present.
 - f. Sori elongate; indusia attached lengthwise 8. Athyrium

- ff. Sori roundish; indusia attached by a point.
- g. Indusium placed under the sorus.. 2. Woodsia
- gg. Indusium covering the sorus.
 - h. Indusium hoodlike and attached laterally 7. Cystopteris
 - hh. Indusium flattish and attached in the center of the sorus.
 - i. Indusium peltate 3. Polystichum
 - ii. Indusium reniform-cordate, attached at the sinus 4. Dryopteris

1. ONOCLEA L.

Fronds strongly dimorphic, the fertile one much contracted, much less divided, strongly enveloping the sori, and brownish or blackish rather than green.

- a. Frond oblanceolate 1. O. Struthiopteris
- aa. Deltoid and smaller 2. O. sensibilis

1. O. Struthiopteris (L.) Hoffm. var. pennsylvanica (W.) Boivin (Matteuccia Struthiopteris (L.) Tod. var. pennsylvanica (W.) Morton; Pteretis nodulosa (Mx.) Nieuw.) -- Fiddle-Heads-- Our largest fern, commonly 1 m or more high. Frond pinnate, the pinnae pinnatifid. The fertile frond dark, much simpler and only half as long. Damp woods. -- Mack, Aka, (NF), NS-BC, US.

Scales from the base of the stipe are uniformly brown in our variety, but show a blackish-brown central band in the typical eurasian phase.

Often placed in a segregate genus justified primarily by the simple type of nervation of this first species as contrasted with the anastomosed nerves of the next. As shown by Boivin 1961, the type of nervation is merely a reflection of the degree of expansion of the ultimate segments.

2. O. sensibilis L. -- Limb rather triangular and nearly simple, pinnate at base, pinnatifid above, the segments not cut but merely undulate at margin. Wet and marshy places, often on shores. -- L-SPM, NS-seMan, US, Eur.

2. WOODSIA Br.

Indusium neither covering nor protecting the sorus, but reduced to few laciniae more or less hidden under the sorus or seemingly mixed with the sporangia.

- a. Stipe articulate, with a well defined abscission point.
 - b. Frond glabrous.
 - c. Stipe chaffy 2. W. alpina
 - cc. Not chaffy above the articulation ... 3. W. glabella
 - bb. Frond densely chaffy and pubescent below. 1. W. ilvensis

aa. Stipe not articulate, the old fronds breaking off rather irregularly 4. W. oregana

1. W. ilvensis Br. -- Our chaffiest and most pubescent species. All parts of the frond abundantly covered with chaff and long hairs, especially so on the under surface of the limb. Hairs and chaff at first white, soon becoming rusty and quite conspicuous. Stipes articulate and breaking off in age at the articulation point, leaving behind a tuft of stubs of nearly equal length. Very common on dry non calcareous cliffs. -- G-Aka, L-NF, NS, NB-BC, US, Eur.

2. W. alpina (Bolton) S.F. Gray -- Similar to the following, the stipe darker, bright brown, and chaff below the limb. Pinnae slightly larger and slightly more divided. Shaded cliffs: Lake Todd. -- (G)-F-(K-Mack)-Y-Aka, (L)-NF, NS, (NB)-Q-Man, (BC, US), Eur.

3. W. glabella Br. -- Limb narrow and up to 2 dm long, being composed of numerous small deltoid pinnae that are nearly all of the same size. Limb glabrous and not chaffy. Stipe pale green, glabrous, not chaffy except below the articulation. Shaded, moist, calcareous or dolomitic cliffs. -- G-Aka, L-NF, NS, NB-BC, US, Eur.

4. W. oregana D.C. Eaton var. oregana -- Fronds 1-2 cm long, densely tufted. Stipes not articulate, the old ones breaking off rather irregularly, leaving behind a cluster of very uneven stubs, some of them often half as long as the remaining fronds. Limb lanceolate, pinnate and neither pubescent nor glandular, nor chaffy. Or sometimes the stipe and the limb slightly glandular, especially towards the insertion point of the pinnae. All sorts of rocky cliffs. -- Q-Q, nWS-BC, US -- F. Cathcartiana (Rob.) Boivin -- Neither pubescent nor chaffy, but abundantly and finely glandular throughout: Boisé Coteau. -- Q-Q, swS, BC, US -- Var. lyalli (Hooker) Boivin (W. scopulina D.C. Eaton) -- Not chaffy, but abundantly pubescent and glandular throughout. -- Y-(Aka), Q-Q, nWS-swAlta, gBC, US -- Var. squammosa Boivin -- Stipe chaffy and also lightly pubescent and glandular. Limb usually neither pubescent nor glandular, but sparsely chaffy, especially dorsally. Amisk Lake. -- wO, ecS, US.

3. POLYSTICHUM Roth

Evergreen fronds with round and peltate indusia.

1. P. Lonchitis (L.) Roth -- Horehound, Holly-Fern (Tripe de roche) -- Frond pinnate, narrowly oblanceolate. Pinnae lanceolate, serrate, with a single lobe near the base on the distal side. Shaded mountain cliffs and rocky slopes. -- G, (Y)-Aka, (L)-NF, NS, (NB)-Q-Q, swAlta-BC, US, Eur.

4. DRYOPTERIS Ad.

SHIELD FERN

Indusium reniform and attached from the bottom of the sinus.

a. Fronds marcescent, 3 dm long or less 4. D. fragrans

WOODSIA

- aa. Fronds longer.
- b. Limb bipinnate 1. D. austriaca
- bb. The limb less divided, pinnate or bipinnatifid to bipinnatifid.
- c. Fronds dimorphous, pinnae up to 6 cm long 3. D. cristata
- cc. Fronds all alike, larger, the main pinnae much longer 2. D. Filix-Mas

1. D. austriaca (Jacq.) Woynar (var. dilatata (Hoffm.) Schinz & Thell., var. spinulosa (Müller) Fiori; D. dilatata (Hoffm.) Gray; D. spinulosa (Müller) Watt, var. americana (Fischer) Fern.; Aspidium spinulosum (Müller) Sw., var. dilatatum (Hoffm.) Link, var. intermedium (Mühl.) D.C. Eaton) -- Wood-Fern, Florist's Fern -- A large common wood fern with very much dissected fronds, used by florists as background foliage for bouquets. Up to 1 m high, the limb bipinnate and the pinnulae pinnatifid to pinnatifid. Fronds not dimorphous, but overwintering under the snow. Showy in moist woods. - G, K-(Mack-Y)-Aka, L-NF-(SPM), NS-BC, US, Eur, (Afr).

Usually divided in a series of segregates variously treated as varieties or species. We derive no intellectual satisfaction from their recognition, there is too much arbitrariness in the identification of many specimens and the various phenotypes appear to be more or less sporadic in their occurrence, with most names used having European type localities.

2. D. Filix-Mas (L.) Schott -- Very scaly throughout and the scales mostly filiform, often present even in the sinuses of the marginal teeth. Similar to the following, but not dimorphous and larger; the main pinnae 7-15 cm long. Frond 4-10 dm long, the limb 12-30 cm wide and usually oblanceolate. Mid summer. Wet woods and cliffs near lakes and rivers: Waterton. - G, NF, NS, G-C, Alta-BC, US, Eur.

3. D. cristata (L.) Gray var. cristata (Aspidium cristatum (L.) Sw.) -- Fronds slightly dimorphous, the fertile ones slightly longer and narrower with the pinnae broader and ascending. Frond 5-6 dm high, the limb oblong-lanceolate to ovate-lanceolate. Indusia rather small, not fully covering the mature sori. Wet or boggy woods. -- NF-(SPM), NS-BC, US, Eur.

Grades eastward into a var. Clintoniana (D.C. Eaton) Und., with somewhat larger and non dimorphic fronds.

4. D. fragrans (L.) Schott (var. remotiuscula Kom.; Aspidium fragrans (L.) Sw.) -- A conspicuous cliff species with a tuft of green fronds arising from a much larger tuft of pendant old dead darkened fronds. Limb discolor, dark green above, bluish to rusty below. Indusia largest, persistent and imbricated, covering the lower face of the limb almost entirely. Dry rocky and steep habitats. -- G-Aka, L-NF, NS, NB-BC, US, Eur.

Larger plants from more southern and usually shaded cliffs are frequently distinguished as var. remotiuscula; probably little more than an ecological form.

5. CARPOGYMNIA Løve & Løve

Not tufted. Limb more or less ternately divided. Indusium absent.

1. C. Dryopteris (L.) Løve & Løve, var. Dryopteris (Dryopteris disjuncta AA.; Gymnocarpium Dryopteris (L.) Newm.; Phegopteris Dryopteris (L.) Fée) -- Oak-Fern -- A delicate, much divided, deltoid frond occurring scattered on the forest floor. Forms large colonies. Stipe black below. Limb 0.5-2.0 dm large, bipinnate and often somewhat ternately disposed in three planes. Rachis and limb glabrous or nearly so. Largest pinnulae pinnatipartite. Rich forests, especially coniferous ones. -- G, K-Aka, L-NF, NS-BC, US, Eur -- Var. disjuncta (Led.) Boivin -- Frond larger, 2-3 dm wide. Largest pinnulae pinnatisect at the base. Waterton. -- Alta-BC, nwUS -- Var. pumila (DC.) Boivin (G. Robertianum Hoffm.; Dryopteris Robertiana (Hoffm.) Christensen; Phegopteris Robertiana Hoffm.) A. Br.) -- Abundantly and finely glandular, especially along the rachis. Limb 2.5 dm wide or less, often less clearly ternate, often more triangular than deltoid. Sheltered calcareous rocks. -- Mack-Aka, NF, NB-BC, US, Eur.

Var. disjuncta (Led.) stat. n., Polypodium Dryopteris L. var. disjunctum Led., Fl. Ross. 4: 509. 1853.

Var. pumila (DC.) stat. n., Polypodium Dryopteris L. var. pumilum DC., Fl. Fr., ed. 3, 2: 565. 1815. This is a weak variety or possibly only an ecological form of shaded calcareous cliffs; intermediate specimens have been variously treated now as a form, now as interspecific hybrids.

6. THELYPTERIS Schmidel

Technically much like Carpogymnia long stoloniferous and not tufted. Indusia absent or present. Limb pilose along the nerves, often ciliate.

a. Limb pinnate, lanceolate 1. T. palustris
aa. Limb broadly triangular, nearly simple.... 2. T. Phegopteris

1. T. palustris Schott var. pubescens (Lawson) Fern. (Aspidium Thelypteris AA.; Dryopteris Thelypteris (L.) Gray var. pubescens (Lawson) Nakai) -- Marsh-Fern -- Slightly dimorphous, the fertile fronds appearing more open because of the revolute margin of the limb. Limb lanceolate, pinnate, the pinnae pinnatifid, more or less pilose, especially along the main nerves. Indusia present. Marshes. -- (NF)-SPM, NS-O(Man, US).

2. T. Phegopteris (L.) Slosson (Dryopteris Phegopteris (L.) Christensen; Phegopteris polypodioides Fée) -- Beach-Fern. -- Limb broadly triangular and nearly simple. At least the lower two segments discontinuous from the rest, thus the limb is pinnate at base, pinnatipartite above. Ciliate and pilose along the nerves. No indusium. Wet woods. Unaccountably rare: lake Todd, lake Axis and Assineau. -- G, Y-Aka, L-SPM, NS-BC, US, Eur.

With only one known collection per province, we admit to being puzzled by this high degree of sporadism.

7. CYSTOPTERIS Bernh., FERN-BLADDER

Indusium hood-shaped, attached laterally and enveloping the sorus from the side. The indusium is early deciduous and this genus in thus not always easy to recognize.

- a. Limb \pm lanceolate, longer than its stipe.... 1. C. fragilis
 aa. Limb \pm deltoid, much shorter than its stipe... 2. C. montana

1. C. fragilis (L.) Bernh. var. fragilis (Filix fragilis (L.) Gilib.) -- Our only common and widely distributed species in the prairie regions. Easily and often confused with other species. Highly variable and not readily defined. Limb thin and wilting rapidly, much dissected, glabrous. Fronds up to 4 dm long, but variable in size and many sizes often present in the same tuft. Limb pinnate, the pinnae pinnatipartite, the secondary segments \pm pinnatifid and serrate. Wooded slopes. -- G-Aka, L-NF, NS, NB-BC, US, CA, Eur, (Afr). -- Var. Huteri (Hausman) Luerssen -- Frond and rachis finely glandular. Rockies. -- (swAlta).

Typically, the spores are covered by spinules readily distinguished with a good microscope. A sporadic form in which the spores are merely rugose has been distinguished as a species, but the rank of form would seem to be more realistic: f. Dickena (Sim) stat. n., C. Dickeana Sim, Gard. Journ. 303. 1848.

2. C. montana (Lam.) Bernh. -- Rather similar to Carpogymnia Dryopteris, but each nerve ending above into an elongate, white fovea. And more dissected, tripinnate, the ultimate segments coarsely lobed to pinnatifid. Slightly scaly-pubescent along the rachises. Damp calcareous habitats. -- G, Mack-Aka, L-NF, Q-O, Alta-BC, US, Eur.

Cystopteris bulbifera (L.) Bernh. has often been reported for south-eastern Manitoba, yet we have found no corresponding specimen in CAN, HUH, MTMG, etc. The only possible justification for its occurrence in our area might be a collection by M.W. Hutchinson without locality but bearing the note "Eastern Manitoba, 1944," (MPM; DAO, photo). This generalized distribution is likely to be a verbatim repeat of the entry for the species in the list of Lowe 1943, rather than a place of collection. And the specimen itself is presumably of unknown origin.

8. ATHYRIUM Roth

Sori obviously elongate. Indusia present, elongate, attached laterally and by their whole length. An atypical genus with mostly the technical characters of the Aspleniaceae. One atypical species lacks indusia.

- a. Sori and indusia elongate or recurved ... 1. A. Filix-femina
 aa. Sori orbicular, indusia lacking 2. A. distentifolium

1. A. Filix-femina (L.) Roth var. Filix-femina (var. Michauxii (Sprengel) Farw.; Asplenium Filix-femina (L.) Bernh.) -- Lady-Fern (Fougère femelle) -- A rather large and much dissected

fern, quite similar to Dryopteris austriaca and readily confused with it when sterile. But the sori about twice as long as broad and the indusia lanceolate. Ultimate nerves not reaching the tip, but usually ending slightly to the side of it (excurrent into spinulose tips in Dryopteris austriaca). Limb bipinnate, the pinnulae deeply lobed. Wet woods. -- G, L-NF-(SPM), NS-Man, US, Eur -- Var sitchense Rupr. (var. cyclosorum (Rupr.) T. Moore) -- Mostly larger, usually 7-15 dm high. Indusia rather short, mostly suborbicular, or deltoid or reniform. -- Mack-Aka, wAlta-BC, (wUS).

The segregation of our plants as an american variety or species is not tenable on a morphological basis. And var. sitchense itself is a rather weak variety.

2. A. distentifolium Tausch var. americanum (Butters) Boivin (A. alpestre (Hoppe) Rylands var. americanum Butters) -- Bipinnate to tripinnatifid frond with small, round, naked sori. Frond 3-6 dm high, ± oblanceolate. Pinnulae lanceolate, 1-2 cm long. Usually one of the marginal lobes is strongly recurved and partly covers the adjacent sorus. Wet cliffs and talus slopes at or below timberline: Waterton. -- (G, Aka, L)-NF, seQ, Alta-BC, wUS.

Var. americanum is based on a series of tendencies and not on a simple morphological discontinuity; its frond is usually narrower, the pinnulae often more remote and the smaller sori usually show no trace of indusia.

9. ASPLENIACEAE (SPLEENWORT FAMILY)

Sori elongate. Indusia similarly elongate and attached laterally by their whole length.

1. ASPLENIUM L. SPLEENWORT

Evergreen ferns, the limb quite dissected.

1. A. viride Hudson -- Small delicate fern, the fronds about 1 dm long, the limb linear, pinnate, the numerous small pinnae subopposite.

Stipe blackish below, with a few hair-like scales. Quite similar to Woodsia glabella, but the latter has the stipe pale green, articulate and coarsely scaly. Limestone cliffs. -- (G), swMack-(Y)-Aka, NS,NB-O, swAlta-BC, (US), Eur.

10. POLYPODIACEAE (POLYPODY FAMILY)

Frond simple, the sori dorsal, rounded and without indusium.

POLYPODIUM L.

Rhizome elongate, the fronds not tufted, coriaceous.

1. P. vulgare L. var. virgianum (L.) Eaton -- Polypody (Tripe de roche) -- Frond simple but pinnatifid; lobes linear to oblong-lanceolate, not narrowed at base, finely serrate, obtuse or acute at tip. Sori rather coarse, in two parallel rows on the back of each lobe. Abrupt places, mostly acid and rocky,

sometimes forming a dense carpet over rocky outcrops. Precambrian regions. -- sMack-Aka, NF-SPM, NS-eBC, US. -- Var. *columbianum* Gilbert -- Pinnae slightly narrowed near the base, oblong lanceolate to obovate, more or less rounded at tip. Waterton. -- Alta-sBC.

11. MARSILEACEAE

Fronds dimorphous, the sterile one digitately divided, the fertile one tightly enroled into a pea-sized structure called sporocarp.

1. MARSILEA L.

Sterile fronds divided into 4 terminal leaflets.

1. *M. mucronata* Braun (*M. vestita* AA.) -- Looking just about like a four-leaved Clover. Stems elongate, creeping, rooting in the mud, with tufts of rusty hairs at the nodes. Sterile fronds in small fascicles at each node. Stipes inserted directly at the node and bearing only one sporocarp each. Muddy shores and shallow waters. -- S-BC, US.

Sub-division 2. GYMNOPHYTINA

CONIFERS

Plants reproducing by seeds borne on the ventral face of open scales. A single class with us.

Class. 5. PINOPIIDA

Seeds two together on a scale. Scales disposed in cones. Resinous woody plants, mostly with persistent leaves. Only one order.

Order 7. CONIFERALES

- a. Leaves alternate or in fascicles.
 - b. Cone reduced to a single ovule; fruit a one-seeded berry12. Taxaceae p. 32
 - bb. Cone many-seeded and more or less woody13. Pinaceae p. 32
- aa. Leaves opposite or verticillate14. Cupressaceae p. 36

12. TAXACEAE

(YEW FAMILY)

Single genus

1. TAXUS L.

YEW

Much like a small Fir or Spruce in general appearance, but the cones reduced to two stamens or a single ovule. Fruit a fleshy one-seeded berry.

- a. Trailing shrub; needle with a straight tip...1. T. canadensis
- aa. Small tree; needle with tip bent backwards...2. T. brevifolia

1. T. canadensis Marsh. -- Ground-Spruce (Buis de sapin) -- Like a trailing Spruce on the forest floor. Central trunk lacking; branches trailing at base, ascending at tip. Needleless linear, 1-2 cm long, subpetiolate, more or less disposed in two ranks, flat, abruptly acuminate into a straight sharp tip. Berry red. Scattered in moist coniferous woods, rare: York Factory, Indian Bay. -- NF-(SPM), NS-Man, US.

The York Factory record (CAN; DAO, photo) is a long way from the rest of the range and has never been confirmed. It is now considered questionable as to location; its specific identification has been repeatedly confirmed.

2. T. brevifolia Nutt, -- A tree, erect and with a good central trunk. Otherwise quite similar to the preceding and not readily distinguished in the herbarium except that the tip of each needle is deflexed backwards at an angle of about 30 degrees. Scattered in moist coniferous woods: Waterton -- (Aka), Alta-BC, US.

13. PINACEAE

(PINE FAMILY)

Needles in fascicles or spirally arranged. Scales spirally arranged in the cone.

- a. Needleless deciduous, alternate on the leading shoots, in tufts of 10-20 on the short side-shoots 2. Larix

- aa. Needles persistent.
 b. Needles all in fascicles 1. Pinus
 bb. Needles all alternate.
 c. Needles obviously flattened
 d. Needles sessile..... 5. Abies
 dd. Needles neatly short-petioled... 4. Pseudotsuga
 cc. Needles squarish 3. Picea

1. PINUS L.

PINE

Needles all in fascicles, tightly wrapped together at the base. Scales of the cone rather thick-woody.

- a. Needles in 5's.
 b. Needles very finely and remotely serrulate 1. P. Strobus
 bb. Needles entire.
 c. Cone purple 3. P. albicaulis
 cc. Cone green or almost entirely so ... 2. P. flexilis
 aa. Needles in 2's.
 d. Needles usually 10-15 cm long 4. P. resinosa
 dd. Needles usually 3-5 cm 5. P. divaricata

1. P. strobus L. -- White Pine (Pin blanc) -- A very tall tree, usually overtopping the forest. Needles in 5's, minutely and remotely denticulate, straight and soft, commonly 5 cm long. Young twigs tomentose. Cones commonly 8-10 cm long. Seeds with a long wing. Scattered in the forest or in dense stands in the dryer sites, especially over nearly bare rock. Southeast. -- NF-(SPM), NS-seMan, US-- Var. monticola (Douglas) Nutt. (P. monticola Douglas) -- Barely distinct. Cones usually longer, at least 10 cm long. Young twigs often less densely pubescent. Rockies. -- Alta-BC, US.

In the field the Eastern and Western White Pine seem almost identical. In the herbarium they are indistinguishable in the absence of cones.

2. P. flexilis James -- Limber Pine -- Needles in 5's but entire, stiffer and falcate. A more middle size, tree with the young twigs becoming glabrous. Cones essentially green, at least 8 cm long. Seeds nearly wingless. Usually as scattered trees among taller species on dry rocky slopes. -- swAlta-BC, US.

3. P. albicaulis Eng. -- A small to depressed alpine or subalpine tree with a smooth bark much like that of Abies. Otherwise quite like P. flexilis. Cones purple and smaller, remaining closed. Open slopes and rocky ridges. Rockies.-- swAlta-BC, US.

4. P. resinosa Aiton -- Red Pine (Pin Rouge) -- Needles very long and in 2's, somewhat stiff, usually 10-15 cm long, usually forming big tufts at the end of branches. Bark breaking up in large brownish plates. Cones 4-6 cm long. Dry light soils. Southeast. -- NF, NS-seMan, US.

5. P. divaricata (Aiton) Dumont var. divaricata (P. Banksiana Lamb.) -- Jack Pine (Cyprés) -- Needles shortest, stiff,

in 2's, falcate, mostly 3-5 cm long. Cones persistent, about 4 cm long, ascending, incurved, not spiny. A very common conifer on well drained soils, especially on sand, often in pure formations. General north of the prairies. -- sMack, NS-Alta, US -- Var. latifolia (Eng.) Boivin (P. contorta Douglas var. latifolia Eng.; P. Murrayana AA.) -- Lodgepole Pine (Cypres) -- Cones straight, more or less reflexed, each scale with a strong dorsal protuberance ending in a small spine. Western Alberta and Cypress Hills. -- Mack-Aka, S-BC, US-- X Var. Musci Boivin -- A polymorphic population intermediate between var. latifolia and the type, presumably of hybrid origin. Cones usually straight, variously divergent and more or less spiny. From lakes Primrose and Hasbala westward across central Alberta. -- Mack, S-Alta.

Pinus divaricata (Aiton) Dumont -- Validated by a reference to an earlier name validly published in the Hortus Kewensis. Antedated by one year P. Banksiana Lamb. in current use.

The report of Pinus ponderosa Douglas for Alberta is based in part on R.G.H. Cormack, Carbondale River, near Lynn Creek Cabin, about 10 miles from B.C. Border, rocky-sandy shore, July 22, 1955 (ALTA; DAO, photo). According to T.C. Brayshaw (verbatim) who visited the spot recently, the original cluster of saplings is now reduced to a single rapidly growing tree. This unique individual is some 40 miles from the nearest member of its species and its habitat is unusual to say the least. Local tradition has it that it was originally seeded in and there seems to be no reason to doubt that this is in no way a spontaneous occurrence. There is also at CAN a specimen labelled Dawson, Missouri River, Alta, June 30, 1881. But the Missouri River is now entirely on the U.S. side of the boundary.

2. LARIX Adanson

LARCH

Needles deciduous, pale green and turning yellow in the fall. Branches of two kinds, the leading ones with numerous alternate leaves, the lateral one stubby and ending in a tuft of leaves. Cones erect, persistent.

- a. Twigs tomentose, the tomentum persistent2. L. Lyallii
- aa. Twigs glabrous, or pubescent when young only.
 - b. Needles almost 1-2 cm long; scales glabrous 1. L. laricina
 - bb. Needles about 3 cm; scales puberulent dorsally 3. L. occidentalis

1. L. laricina (DuRoi) K. Koch -- Tamarack (Epinette rouge) -- A bog species with pale green and very sparse foliage. Twigs glabrous. Needles rounded above, keeled below. Cones 1.5 cm long or less, at first pink or purple, maturing pale green to straw-coloured. Bracts very short and hidden between the glabrous scales. Common in bogs. -- K-Aka, L-SPM, NS-BC, US.

2. L. Lyallii Parl. -- A small tree with densely tomentose branchlets, the tomentum persisting many years after the leaves have fallen off. Branchlets ± drooping. Leaves squarish, that

is keeled above and below, with all four faces deeply concave. Cones 3-5 cm long, the very long bracts protruding between the scales, their tips reflexed. High alpine and forming small bluffs above the general timberline. Rockies. -- Alta-BC, (US).

3. L. occidentalis Nutt. -- A very tall tree with brittle branchlets, at first puberulent, soon glabrous. Leaves about 3 cm long, convex above, keeled below. Cones of middle size. Bracts with long tips protruding between the scales, the latter densely puberulent dorsally. Low montane on wetter soils. Crow's Nest and Kananaskis. -- Alta-BC, US.

3. PICEA Link

SPRUCE

Trees with the cones pendent at maturity. Needles squarish, densely and spirally disposed on the branches. Leaves, when falling off, leaving behind strongly protuberent and decurrent stubs. Cones with small bracts hidden between the scales.

- a. Cones lanceolate, 3-6 cm long; twigs glabrous to puberulent 1. P. glauca
- aa. Cones ovoid, 1.5-2.5 cm long; twigs puberulent 2. P. mariana

1. P. glauca (Moench) Voss. var. glauca (P. canadensis Miller) -- White Spruce (Epinette blanche) -- Twigs glabrous. Needles squarish, sessile, 1.0-1.5 cm long. Cones annual, drooping, pale green. Scales broadly rounded and entire at tip. A straight and common timber species, prefers poor and somewhat acid soils. -- (K)-Mack-Aka, L-NF-(SPM), NS-BC, US -- Var. albertiana (S. Brown) Sarg. (var. Porsildii Raup) -- Variable and more or less intermediate between var. glauca and var. Engelmannii. Twigs glabrous to puberulent. Needles 1.0-2.0 cm long. Scales variable, often varying within the same cone, commonly rounded or obtuse and finely eroded at summit. Cypress Hills and western Alberta. -- (K-Mack)-Y-(Aka), S-BC, (US) -- Var. Engelmannii (Parry) Boivin (P. Engelmannii Parry) -- Twigs puberulent. Needles mostly 1.5-2.0 cm long. Scales truncate to obtuse and erose at tip. A montane to subalpine type in western Alberta. -- Alta-BC, US.

Var. albertiana is somewhat variable and essentially intermediate to the other two varieties. Often it gives the impression of being a hybrid population, but it ranges much beyond the area of overlap of the other two phenotypes.

Older trees will on occasion retain a smooth bark covered with resin-filled blisters reminiscent of Abies. This variation is fairly frequent within the range of var. albertiana and it has been named var. Porsildii.

2. P. mariana (Miller) BSP. -- Black Spruce (Epinette noire) -- A smaller tree with smaller and purple persistent cones. Twigs glandular puberulent. Needles about 1 cm long. Cones commonly persisting through the second season. A common species of poorer and wetter soils, especially in bogs. General north of the prairies. -- (K)-Mack-Aka, L-NF-(SPM), NS-BC, US.

A report of Picea rubra Dietr. by Johnstone 1939 is based on a collection, J. Jeffrey, Oxford House, Sept. 19, 1850 (E; DAO, photo), now revised to P. mariana.

4. PSEUDOTSUGA Carr.

Cones pendant at the tip of the branchlets. Needles flat, short-petioled. Scales very long, very conspicuous, trifid at tip.

1. P. Menziesii (Mirbel) Franco -- (P. taxifolia (Poiret) Britton) -- B.C. Fir, Douglas Fir (Pin Douglas, Pin de la Colombie) -- A giant tree westward, but of more reasonable size with us. Needles with a short but well defined petiole. Bracts about twice as long as the scales. Local at low altitudes in the Rockies, mostly on rocky or gravelly ground. -- swAlta-BC-- F. Alexidis Boivin -- Low, depressed and straggling. Alpine habitats at high altitude in Waterton--swAlta.

Rocky Mountain specimens will often exhibit shorter cones and leaves and may be distinguished as var. glauca (Beissner) Franco. However the range of morphological overlap with the typical variety is too wide and the distinction is not a practical one, unless one is willing to use the place of collection as a primary character for the majority of the specimens.

5. ABIES Miller

FIR

Cones erect, the scales deciduous and leaving behind the persistent, stiffly erect axis. Needles flat and sessile; when falling off leaving behind a smooth, round and non-protuberating scar.

1. A. balsamea (L.) Miller var. balsamea -- Balsam, Balsam Fir (Sapin) -- Bark smooth, with numerous blisters containing a clear resin called balsam. Leaves flat, those of the lower branches usually forming a two-ranked spray and with few, if any, short lines of glaucous stomata above. Main branches commonly in verticils of about 6. Cones purple violet, turning blackish. Fresh woods. --sK, L-NF, NS-seBC, US-- Var. fallax (Eng.) Boivin (A. lasiocarpa (Hooker) Endl.) -- Needles more glaucous, those of the lower part of the foliage with 6-12 glaucous lines of stomata, of which 4-8 lines will run most of the length of the needle. Western Alberta. -- (swMack)- sY-Aka, wAlta-BC, US.

14. CUPRESSACEAE

(CYPRESS FAMILY)

Evergreen trees, usually similar to the Pinaceae, but with the leaves and cone scales opposite or verticillate.

a. Trees; cone woody 1. Thuja
aa. Low shrubs; fruit a bluish berry 2. Juniperus

1. THUJA L.

ARBOR-VITAE

Cone with opposite woody scales. Trees with more or less flattened twigs of small, closely imbricated, adnate, scaly leaves.

- a. All shoots strongly flattened; dorsal and ventral leaves of the lateral shoots broadly obtuse at summit 1. T. occidentalis
 aa. Main leading shoots cylindrical; all leaves * acute at summit 2. T. plicata

1. T. occidentalis L. -- Cedar (Cèdre) -- A small tree. Foliage compact, of strongly flattened sprays. Leaves opposite, in 4 ranks, those of the dorsal rank with a well defined gland, brown or clear green. Cone small, about 1 cm long, of a few opposite woody scales. Wet places and limestone outcrops. South-eastern Manitoba. -- NS-Man, US.

2. T. plicata D. Don -- Cedar (Cèdre) -- A giant tree westward, much smaller with us. Closely resembling the preceding but the leading terminal shoots not flattened; all leaves more or less acute and the glands indistinct, being of the same color as the rest of the leaf. Moist woods. Rare and local in the Rockies. -- seAka, Alta-BC, US.

2. JUNIPERUS L.

JUNIPER

Cone maturing into a bluish berry. Depressed or creeping shrubs with opposite or verticillate leaves.

- a. Leaves verticillate in 3's 1. J. communis
 aa. Leaves opposite.
 b. Creeping shrub 2. J. horizontalis
 bb. Small tree 3. J. scopulorum

1. J. communis L. var. depressa Pursh (var. saxatilis AA.; J. sibirica AA.) -- Ground Juniper (Genève, Buis) -- Needles verticillate in 3's. A low shrub, the branches decumbent, ascending at tip, forming round patches. Leaves 7-15 mm long, straight or incurved at base, strongly carinate, with a ventral glaucous band of stomata. Stomatal zone usually less than half as wide as the leaf. Leaf tips spinescent, with a mucro about 0.5 mm long. Local in sandy soil, dry woods or rocky slopes. -- K-Aka, L-NF-(SPM), NS-BC, US -- Var. saxatilis Pallas (var. montana Aiton) -- Branches more closely creeping. Needles smaller, 4-10 mm long, merely acute or short acuminate, the glaucous zone wider, usually at least half as wide as the leaf. Rocky places in alpine and subarctic habitats. -- G, K-Y-(Aka), L-NF-(SPM), NS-PEI, Q-nMan, swAlta-BC, US, Eur.

Some 8 or 10 collections from the upper Mackenzie basin were reported by Raup 1936 as var. montana. We have examined about half of these specimens and revised them all to var. depressa.

2. J. horizontalis Moench (Sabina horizontalis (Moench) Rydb.) -- Creeping Juniper (Savinier) -- A creeping shrub with small opposite leaves, usually forming a compact and elastic carpet. Green or glaucous. Leaves variable, 1-2-(6) mm long, closely imbricated, adnate to nearly free, more or less acute and ending in a slightly mucronulate tip. Eroded dunes and

hillsides, also on rocky exposures. -- K-Aka, (L)-NF-SPM, NS-BC, US.

2 X -- J. Fassettii Boivin (J. scopulorum Sarg. var. patens Fassett) -- Hybrid of J. horizontalis X scopulorum. Commonly 1 m high, a diffusely branched shrub, sometimes partly decumbent. Leaves acute to mucronulate. Local in the Rockies. -- swAlta-BC, US.

3. J. scopulorum Sarg. -- A small tree, commonly 2-3 m high, with a well defined central trunk. Otherwise barely distinguishable from J. horizontalis. Leaves acute at tip, rarely mucronulate. Hillsides, especially near watercourses. Rockies, rare. -- swAlta-BC, US.

Sub-division 3. ANGIOPHYTINA FLOWERING PLANTS

Plants with flowers. Ovules borne in closed chambers formed of carpels.

- a. Leaves with nervation commonly pinnate or reticulate. Flowers variable, commonly 5-merous, almost never 3-merous. Trees, shrubs or herbs, often with a taproot6. Dicopsida
- aa. Leaves with parallel nerves. Flowers commonly trimerous, often much reduced. Herbs without a taproot 7. Monopsida part IV

Class 6. DICOPSIDA

DICOTS

Flowers commonly 5-merous, or 2-merous, or 4-merous, or the floral parts in variable number, sometimes much reduced in number, almost never 3-merous. Trees, shrubs or herbs, often with a taproot. Vascular tissues forming a cylinder around a central pith. Bark present, more or less developed.

- a. Stem woody, perennial, increasing in diameter through a cambium located between the wood and the bark 1. Lignidae
- aa. Stem herbaceous, annual, or perennial, the bark poorly developed 2. Herbidae part II

Sub-class 1. LIGNIDAE

WOODY DICOTS

Plants perennial, commonly woody, the bark usually well developed. Sometimes herbaceous.

The Lignidae also include a variety of herbaceous groups. These are not included in the key below, but will be found in the key to the Herbidae.

- a. Leaves and buds opposite or verticillate.
 - b. Leaves simple Group 1, p. 39
 - bb. Leaves compound Group 2, p. 41
- aa. Leaves and buds alternate, or sometimes alternate on the leading shoot, but fasciculate on the short shoots.
 - c. Leaves compound Group 3, p. 41
 - cc. Leaves simple
 - d. Climbing vines Group 4, p. 42
 - dd. Not climbing
 - e. Leaves entire Group 5, p. 42
 - ee. Leaves denticulate to more or less deeply lobed Group 6, p. 43

Group 1

Leaves opposite or verticillate, simple.

- a. Small and only semi-woody shrubs, 3 dm high or less Group 1-A
- aa. Taller and obviously woody.

- b. Leaves entire Group 1-B
 bb. Dentate to lobed Group 1-C

Group 1-A

Small semi-shrubs with opposite or verticillate leaves.

- a. Leaves opposite and crowded or strongly overlapping.
 b. Peduncle bearing 3 bracts ... 43. Diapensiaceae, p. 171
 bb. No bracts 39. Ericaceae, p. 150
 aa. Internodes well developed; leaves all or in part verticillate or subverticillate.
 c. Leaves dentate 41. Pyrolaceae, p. 163
 cc. Leaves entire.
 d. Leaves mostly basal or near basal, the stem rather scapose with a verticill of leafy bracts subtending the inflorescence Eriogonum, part II
 dd. Stem leafy, no basal leaves.
 e. All leaves opposite or verticillate 27. Cornaceae, p. 137
 ee. Leaves part alternate, part verticillate in fls. .. 44. Empetraceae, p. 172

Group 1-B

Trees or shrubs with opposite and entire leaves. At least 3 dm high.

- a. Densely stellate-pubescent, at least on the lower leaf surfaces 49. Elaeagnaceae, p. 176
 aa. Leaves glabrous or with a different pubescence.
 b. Flowers and fruits geminate Lonicera, p. 190
 bb. Each flower its own peduncle.
 c. Flowers all or mostly in axillary clusters Symphoricarpos, p. 139
 cc. Inflorescence terminal.
 d. Leaves strongly revolute or very small 39. Ericaceae, p. 150
 dd. Leaves flat, large.
 e. Inflorescence a compound corymb or panicle.
 f. Leaves nearly deltoid and more or less truncate or subcordate at base.. Syringa, p. 179
 ff. Narrower and cuneate to rounded at base...27. Cornaceae, p. 137
 ee. Inflorescence a bractless raceme..... 26. Hydrangeaceae, p. 130

Group 1-C

Trees or shrubs with the leaves variously toothed or lobed.

- a. Leaves palmately lobed.

LIGNIDAE

110

- b. Petals white; fruit a berry Viburnum, p. 168
- bb. Petals inconspicuous, fruit a samara..
..... 58. Aceraceae, p. 195
- aa. Leaves dentate or serrulate.
 - c. Spinescent, the lateral branches ending
in a sharp point 4b. Rhamnaceae, p. 175
 - cc. Not spinescent.
 - d. Inflorescence a terminal raceme of
opposite flowers 26. Hydrangeaceae, p. 136
 - dd. Flowers 55. Caprifoliaceae, p. 167

Group 2

Leaves compound, opposite or verticillate.

- a. Shrub climbing by its twining petioles... Clematis, part II
- aa. Not climbing.
 - b. Trees producing samaras.
 - c. Leaflets coarsely few-toothed....
..... 50. Aceraceae, p. 195
 - cc. Leaflets finely serrate 51. Ulmaceae, p. 174
 - bb. Shrubs producing berries.... 55. Caprifoliaceae, p. 167

Group 3

Leaves alternate, compound.

- a. Climbing vine with large digitate leaves ..
..... 57. Vitaceae, p. 177
- aa. Not climbing.
 - b. Semi-woody and only 1-3 ft high; leaves
more or less ternately divided.
 - c. Leaves biternately pectinate Fraxinea, p. 17
 - cc. Leaf divided in 3-7 leaflets.
 - d. Leaflets entire or coarsely and
irregularly few-toothed
..... 59. Anacardiaceae, p. 197
 - dd. Leaflets serrate or 3-toothed
at apex 15. Rosaceae, p. 45
 - bb. Taller and obviously woody.
 - e. Leaflets coarsely toothed, each
tooth ending in a spine Berberis, part II
 - cc. Leaflet margin not spiny.
 - f. Petiole without stipule
..... 53. Anacardiaceae, p. 197
 - cf. Petiole with a pair of free
or partially abate stipules.
 - g. Leaflets variously
toothed 15. Rosaceae, p. 45
 - gg. Leaflets entire.
 - h. Leaflets 5-7 Potentilla, p. 66
 - hh. Leaflets much more
numerous 16. Leguminosae, p. 71

Group 4

Climbers with simple alternate leaves.

- a. Leaf peltate, pentagonal..... 65. Menispermaceae, part II
- aa. Not peltate.
 - b. Climbing by twining stems.
 - c. Leaves serrulate 45. Celastraceae, p. 172
 - cc. Leaves entire or lobed..... 93. Scianaceae, part III
 - bb. Climbing by tendrils 50. Vitaceae, p. 177

Group 5

Leaves alternate, simple and entire. Non-climbers.

- a. Abundantly stellate-pubescent, especially on the lower surface of leaves 49. Elaeagnaceae, p. 176
- aa. Pubescence, if present, not stellate.
 - b. Densely spiny-branched Sarcobatus, part II
 - bb. Not spiny.
 - c. Semi-shrubby, with numerous herbaceous shoots from a woody base; nearly all leaves not developing any wintering bud.
 - d. Creeping shrub with single terminal long peduncled flower Dryas, p. 66
 - dd. Inflorescence more elaborate.
 - e. Flowers in glomerules 78. Chenopodiaceae, part II
 - ee. Flowers in involucreted heads..... Artemisia, part III
 - cc. Shrubs or trees. Main leaves usually developing an axillary winter bud.
 - f. Small lanate leaves 1.0-3.5 mm long 29. Cistaceae, p. 139
 - ff. Leaves larger.
 - g. Leaves part alternate, part verticillate..... 44. Empetraceae, p. 172
 - gg. Leaves all alternate or tufted Group 5-A

Group 5-A

Remainder of group 5 with alternate or tufted leaves, neither very small nor stellate. Clearly woody shrubs or trees; not spiny.

- a. Leaves persistent, coriaceous, often revolute.
 - b. Ovary superior 39. Ericaceae, p. 150
 - bb. Ovary inferior 40. Vacciniaceae, p. 165
- aa. Leaves deciduous.
 - c. Bud covered by a single hooded scale.. 17. Calicaceae, p. 105
 - cc. Buds with 2 or more scales (or naked).

- d. Leaves mostly tufted, with one large leaf and 2 or more very small ones in each tuft Lycium, part III
- de. Leaves all or mostly alternate, not tufted.
 - c. Small stipules present, persisting all summer Cotoneaster, p. 48
 - ee. No stipules.
 - f. Inflorescence a terminal corymb 27. Cornaceae, p. 137
 - ff. Flowers axillary or racemose.
 - g. Flowers solitary or in bracted racemes
..... 40. Vacciniaceae, p. 165
 - gg. Flowers in axillary cluster of 2-5 flowers.
 - h. Clusters borne on the new shoot, in the axil of a leaf
..... 48. Rhamnaceae, p. 175
 - hh. Borne on the older and leafless wood, at last year's nodes...
..... Rhododendron, p. 160

Group 6

Leaves alternate, simple, not entire. Non-climbers.

- a. Leaves lobed to deeply dissected.
 - b. Leaf pectinately divided Artemisia part III
 - bb. Cut into coarser lobes.
 - c. Leaf lyrate 21. Fagaceae, p. 130
 - cc. Leaf palmately lobed.
 - d. Carpels free; flowers corymbose to solitary 15. Rosaceae, p. 45
 - dd. Ovary compound; flowers racemose to solitary 25. Crossulariaceae, p. 133
- aa. Leaves merely toothed or serrate.
 - e. Variously spiny.
 - f. Leaf fascicles subtended by spines usually three-pronged Berberis, part II
 - ff. Well armed with spinescent short lateral branches.
 - g. Leaves subopposite towards the end of the branches 48. Rhamnaceae, p. 175
 - gg. Leaves alternate 15. Rosaceae, p. 45
 - ee. Not spiny Group 6-A

Group 6-A

Remainder of group 6, spineless and the leaves merely serrate or dentate.

- a. Low shrubs, less than 2 dm high.
 - b. Flower solitary on a long peduncle and conspicuously overtopping the foliage Dryas p. 66
 - bb. Not solitary, or at least overtopped by the foliage.
 - c. Ovary inferior 40. Vacciniaceae p. 165
 - cc. Ovary superior.
 - d. Bud covered by a single scale Salix p. 108
 - dd. Bud showing more than one scale.
 - e. Petals free; flowers in a terminal corymb Chimaphila p. 168
 - ee. Fused; inflorescence nearly always different 39. Ericaceae p. 153
- aa. Taller shrubs and trees.
 - f. Leaves strongly asymmetrical at base.
 - g. Leaf with 3 conspicuous main nerves 35. Tiliaceae p. 151
 - gg. Leaf with a single main nerve ..22. Ulmaceae p. 131
 - ff. Leaves not particularly asymmetrical at the base.
 - h. Flowers with showy petals, not in catkins.
 - i. Petals hooded Ceanothus p. 176
 - ii. Petals flat 15. Rosaceae p. 45
 - hh. Flowers in catkins, lacking petals.
 - j. Inflorescence compound, a spike or raceme of catkins.
 - k. Leaves oblanceolate, toothed near the top only... 18. Myricaceae, p. 124
 - kk. Leaves broader and more toothed 19. Betulaceae, p. 124
 - jj. Catkins not in compound inflorescences.
 - l. Leaves all alternate, with a bud produced in each axil.
 - m. Leaves evenly and singly serrate or crenate.... 17. Salicaceae, p. 105
 - mm. Denticulation very uneven and more or less double.. 20. Corylaceae, p. 129
 - ll. Leaves alternate on the leading shoots, clustered on the short lateral shoots, the latter with a single terminal bud..... 19. Betulaceae, p. 124

Order 8. ROSALES

Flowers perfect and normally 5-merous. Sepals fused, but petals free. Carpels mostly free.

- a. Flowers regular, carpels mostly numerous 15. Rosaceae
- aa. Flowers papilionaceous, carpel solitary 16. Leguminosae, p.71

15. ROSACEAE (ROSE FAMILY)

Receptacle usually well developed, with the floral appendages peripheral. Flowers regular and conspicuous, with the stamens usually in multiples of 5. Carpels often very numerous, usually free. Stipules present, usually conspicuous.

We have been unable to substantiate any of the various reports of *Sanguisorba canadensis* L. in the interval between Quebec and British Columbia. No specimens at CAN, DAP, FNU, NY, M, KBT, etc.

- a. Leaves simple, entire to lobed; plants woody to semi-shrubby Group A
- aa. Leaves more deeply dissected.
 - b. Leaves simple, deeply divided into linear lobes.
 - c. Biennial herb 12. *Chamaerhodos*, p. 63
 - cc. Trailing semishrub 3. *Luotana*, p. 47
 - bb. Leaves compound Group A

Group A

Leaves entire to lobed.

- a. Flower solitary at the end of a very long peduncle; petals and calyx lobes about 8 14. *Dryas*, p. 66
- aa. Petals and calyx lobes about 5; flowers usually more numerous.
 - b. Low semi-herbaceous plants, less than 3 dm high 9. *Rubus*, p. 52
 - bb. Taller shrubs or trees.
 - c. Coarsely spiny.
 - d. Spines leafy the first year ... 17. *Prunus*, p. 70
 - dd. Spines leafless 8. *Crataegus*, p. 51
 - cc. Not spiny.
 - e. Leaves lobed.
 - f. Calyx stellate-pubescent... 1. *Rhus*, p. 42
 - ff. Pubescence not stellate 9. *Rubus*, p. 52
 - ee. Leaves entire, serrate or toothed.
 - e. Stipules lacking; fruit a group of dry follicles 2. *Spiraea*, p. 42
 - gg. Stipules present; fruit fleshy.
 - h. Fruit superior; carpel solitary 17. *Prunus*, p. 70
 - hh. Ovary inferior; carpels 2-5.
 - i. Leaves entire.. 5. *Cotoneaster*, p. 48
 - ii. Leaves serrate or dentate.
 - j. Ovary 1-locular; flowers racemose.. 7. *Amelanchier*, p. 50
 - jj. Ovary 2-5 locular; inflorescences various 6. *Eryng*, p. 48

Group B

Leaves compound.

- a. Calyx double, with an outer set of 5 lobes termed calyculae and an inner ring of 5 broader lobes forming the calyx proper.
 - b. Fruit fleshy; stemless plant with trifoliate leaves 10. Fragaria, p. 54
 - bb. Fruit not fleshy; leaves various.
 - c. Style short and more or less deciduous, not elongating in fruit 11. Potentilla, p. 55
 - cc. Style many times longer than the achene, strongly geniculate or plumose 13. Goum, p. 64
- aa. Calyx simple, of 5 lobes.
 - d. Stipules adnate to the petiole for most of their length; usually a very spiny shrub 16. Rosa, p. 67
 - dd. Stipules free or nearly so.
 - e. Ovary (and fruit) with a ring of hooked prickles 15. Agrimonia, p. 67
 - ee. No hooked prickles on fruit.
 - f. Herb with pinnate leaves 4. Sorbaria p. 47
 - ff. Shrubs or trees.
 - g. Shrubs, mostly with trifoliate leaves 9. Rubus, p. 52
 - gg. Small trees; leaves pinnate 6. Pyrus, p. 48

Tribe 1. SPIREAE

Fruit a group of follicles. Shrubs, sometimes only semi-shrubby.

1. PHYSOCARPUS Max.

MEWBARK

Follicles dehiscent along both sutures. Shrubs with stellate pubescent calyces.

1. P. malyaceus (Greene) Kuntze -- Shrub, 1-2 m. high, with exfoliating bark. Leaves ovate to cordate, mostly 3-lobed and $\frac{1}{2}$ doubly serrate. Flowers white in a stellate-tomentose terminal corymb. Waterton. -- Alta-BC, US.

2. SPIRAEA L.

MEADOW-SWEET

Follicles dehiscent along ventral suture only. Leaves without stipules. Semishrubs.

- a. Flowers in a narrow panicle 1. S. alba
- aa. Flowers in a corymb.
 - b. Flowers white 2. S. betulifolia
 - bb. Flowers pink 3. S. densiflora

1. S. alba Dulac var. alba (S. latifolia AA.; S. salicifolia AA.) -- Meadow-Sweet (Th. of Canada) -- Semishrub from a woody base, the numerous erect shoots biennial. Leaves \pm lanceolate. Flowers white. Inflorescence finely puberulent, terminating the stem on the first year, or the branches the second year. First half of the summer. Wet open places. -- Q-Alta, US, Eur -- Var. latifolia (Aiton) Boivin -- Inflorescence glabrous. Leaves broader, narrowly obovate to broadly obovate. Cypress River. -- (L)-W-SPN, MS-Man, US, Eur.

There is a gradual transition from var. alba to var. latifolia. It is noteworthy that in eastern Saskatchewan and adjacent Manitoba some intermediates occur although typical var. latifolia is absent from the region.

2. S. betulifolia Pallas var. lucida (Douglas) C.L. Hitchc. -- Semishrub with the numerous erect shoots usually annual and simple. Plant glabrous or merely ciliolate. Leaves ovate, serrate to coarsely toothed. Flowers white in terminal cymes. Sepals deltoid. Rocky slopes, open to slightly wooded. Mid-summer. Rockies and Cypress Hills. -- S-BC, US.

Capsules in our variety are glabrous or ciliolate on the surface. Merely barely distinct from the east Asian var. betulifolia, the latter having pubescent fruits and less coarsely serrated leaves.

3. S. densiflora Nutt. var. splendens (Blumh.) C.L. Hitchc. -- Similar to the preceding but the flowers pink in such numerous cymes. Leaves serrate to serrulate. Calyx lobes triangular. (Early summer) Subalpine meadows and swampy shores: Waterton. -- SW-Alta, US.

All the B.C. material examined is glabrous or merely ciliate on the leaves and bracts and belongs to typical var. densiflora, while all the Waterton specimens were lightly puberulent in the manner of var. splendens, mainly in the inflorescence, on the twigs and on the lower face of the leaves.

3. LUSTRINA Bongard

Follicles stipitate, deliscent ventrally and partly also dorsally. Semishrubs.

1. L. pectinata (Pursh) Kuntze -- Partridge-Foot -- Ectoferrin from its extensive woody rhizomes. Stems herbaceous, erect, 5-15 cm. tall. Leaves biternately cleft into narrow lobes, mostly gathered in a basal rosette. Flowers white, in a terminal raceme. Mid summer. Wet places and snowpatches, mostly around timberline. Rockies. -- SW-Saka, SW-Alta-BC, NW US.

4. SORBARIA Braun

As in Spirea but the leaves pinnate and stipulate.

1. S. SORBIFOLIA (L.) Braun -- Leaves pinnate, with persistent stipules about 1 cm long. Leaflets lanceolate, doubly serrate, ciliate. Flowers white, in a terminal panicle. Summer. Cultivated and usually escaped or persistent. -- NF, BC-O, Alta, US, Eur.

The mention of Clearwater Lake, Sask., by Breitung 1957, was discussed by W.J. Cody, Can. Field-Nat. 75: 121-7, 1962. The site was revisited in 1960; no local evidence of this plant was detected as the local climate did not seem very propitious to its spread.

Tribe 2. POMELAE

Ovary inferior; the fruit a pome. Shrubs or trees.

5. COTONEASTER

Much as in *Prataegis*, the fruit a small pome containing hard, bony, one-seeded carpels, but at flowering time each carpel contains 2 fertile ovules. Ours are non-spiny shrubs with entire leaves and black fruits.

- a. Young shoots and lower surface of young leaves yellowish tomentose, becoming merely pubescent at maturity 1. *C. acutifolia*
 aa. Tomentum white, denser, the leaves remaining tomentose below at maturity 2. *C. melanocarpa*

1. *C. ACUTIFOLIA* Turcz. -- (Cotonnière) -- A shrub with leaves and branches two-ranked and lvs. used in flat sprays. Leaves about 3-4 or less, ovate, dark green above, much paler below, entire, broadly acute at tip; young leaves covered below with a bitter yellow to rusty yellow tomentum which becomes much laxer at maturity. Short shoots with smaller leaves and a small corymb of flowers. Stipules brownish to blackish, with 1-2 lobes to the petiole, persisting all summer. Fruit black, usually solitary, with 2 nutlets. (Early summer?). Cultivated and sometimes said to spread into the neighborhood near: Fort Garry, Brandon, Pointe-St-Bas, Saskatoon and Edmonton. -- O-Alta, (Dur).

2. *C. MELANOCARPA* Lodd. -- Quite similar, but the tomentum denser, pure white, more persistent. A somewhat smaller shrub with the leaves broadly acute to rounded at tip and the fruit with 3-4 nutlets. (Early summer?). Long persistent after cultivation: Brandon. -- Man, Dur.

6. PYRUS

Small trees or shrubs with a small or large pome as a fruit. The carpels are imbedded in the flesh and have cartilaginous walls; they usually contain two seeds or pips. Flowers white, in umbels or corymbs.

- a. Leaf simple 1. *P. Malus*
 aa. Leaf pinnate.
 b. Basis, inflorescence and lower surface of leaflets more or less denate 2. *P. Aucuparia*
 bb. Leaflets glabrous or nearly so below; base glabrous to ciliate.
 c. Leaflets serrate only 1/4 to 3/4 of

their length; rusty pubescence on new shoots and in the inflorescence ... 4. P. sitchensis
cc. Leaflets serrate to near the base; pubescence clear or white 3. P. americana

1. P. MALUS L. (Malus punila Miller) -- Apple-Tree (Pommier, Pommier sauvage) -- A small tree commonly planted for its fruit. Leaves broadly ovate, serrate, alternate on the leading shoots, tufted on the fragile short shoots. Flowers white to pinkish in showy clusters on the short shoots. Fruit, the well known APPLE. Mid spring. Planted and very long persistent, sometimes sprouting from discarded pips. -- NF-(SPM), NS-Man, (BC, US), Eur.

2. P. AUCUPARIA (L.) Gaertner (Sorbus Aucuparia L.) -- Rowan-Tree, Mountain-Ash (Cormier, Sorbier) -- A small tree planted for its showy flowers and persistent fruits which attract winter birds. Leaves part alternate, part clustered at the end of shoots, pinnately divided into 9-17 oblong to lanceolate leaflets, more or less villous-lanate below, especially along the midnerve, often nearly glabrous in age. Young twigs tomentose to white-villous. Inflorescence a wide corymb, white-villous, becoming nearly glabrous and pendent by mid summer. Late spring. Planted and sometimes reseeding itself in nearby bush. -- Aka, (L), NS-O, 3-BC, US, Eur.

A european var. glabrata Wimm. & Graebn. is glabrous or nearly so and its leaflets are narrower and more acute, forming a transition to our P. americana.

3. P. americana (Marsh.) DC. var. decora Sarg. (P. scopulina (Greene) Longyear; Sorbus decora (Sarg.) Schneider; S. scopulina Greene) -- Dogberry, Mountain-Ash (Maskouabina, Cormier) -- A shrub or small tree with alternate pinnate leaves, quite similar to the preceding and easily confused with it. Much less pubescent, only lightly villous and often quite glabrous. Outer bud scales ciliate and usually glabrous or nearly so dorsally. Young twigs lightly villous. Leaflets oblong to lanceolate. Inflorescence lightly villous, remaining erect at maturity. Early summer. Widely scattered in regions of coniferous forests, including the Cypress Hills. -- sG, seK-Aka, L-SPM, NS, NB-BC.

Sorbus decora and S. scopulina are commonly treated as different species separated by a wide distributional gap and a more tenuous morphological one. The distributional gap is non-existent and the morphological one not convincing. Certainly the leaflets of the average eastern specimen are not stubbier than those of the western ones. And if label indications are to be relied upon, the western shrub is 1-4 m high while the eastern one is mostly 2-3 m high with the odd sheltered individual reaching up to 6 m.

The more southern and eastern var. americana is commonly taller, has more elongate and more acuminate leaflets and a smaller pome.

Reports of Sorbus americana from Manitoba were based partly on specimens since revised to var. decora, partly on a specimen

from "M.A.C.", that is "Manitoba Agricultural College" and presumably planted as a sometimes ornamental.

Our interpretation of the name Sorbus americana Marsh. is at variance with a discussion of its application by Jones 1903. We are not satisfied that Sorbus americana W. "in montibus excel-sis caroliniae" should be interpreted in the sense of the more northern S. decora which does not occur in the Carolinas. More satisfactory would be the equivalence of S. americana W. and S. americana Marsh., the latter being the only species known to occur in the mountains of Carolina. Now Furch described his Sorbus americana with an unequivocal reference to S. americana W. and there seems to be no sound justification to deal with Furch's publication as if he had intended to present a new entity in no way related to earlier publications. The nomenclature adopted herewith is based on our contention that Sorbus americana remains the same nomenclatural entity from Marshall to Furch, regardless of successive taxonomic accretions and misapplications.

4. F. sitchensis (Roemer) Piper (F. occidentalis Watson; Sorbus occidentalis (Watson) Greene; S. sitchensis Roemer, var. Grayi (Wenzig) C.L. Hitchc.) -- Mountain-Ash -- Quite similar to the preceding, but lower and shrubby, 1-2 m high. Pubescence of the buds, young twigs and inflorescence partly or entirely rust-coloured. Leaflets oblong to lance-oblong, entire in the lower 1/3 or so, often less numerous, commonly 9 or 11 per leaf, rounded at tip. (Late spring?). Light woods: Rockies. -- SAKA, Alt. 20, n. 100.

Reaches as far north as Lake Bennett on the BC-Yukon boundary. There is no evidence that Dawson's collection from Lake Bennett comes from the Yukon side of the border. To include Yukon in the distribution of this species is not fully justified at this stage.

Specimens with less toothed leaflets, entire in the lower half, are often separated as F. occidentalis. The material examined showed neither morphological discontinuity nor geographical restriction for this phen. type.

7. ABLANCHIER Med.

JUNE-BERRY

Fruit a saskatoon, that is a small dark blue pome with the five carpels divided by false cartilaginous partitions into a total of 10 locules, each containing a seed. Otherwise much like Ferns except that the leaves are always simple. Ours have racemose inflorescences.

- a. Pedicels short, mostly less than 1 cm. 1. A. alnifolia
- aa. Longer, the lowest usually 1.5 cm or more.
 - b. Leaves floccose below at flowering time; obtuse or rounded at tip, mostly mucronulate 2. A. sanguinea
 - bb. Leaves glabrous or nearly so at flowering time, rounded or truncate at tip, mostly not mucronulate 3. A. florida

1. A. alrifolia Nutt. -- Saskatoon (Poire, Saskatons, Bois de flèche) -- A common colonial shrub, up to 3 m high, showy in spring with its racemes of white flowers and its white or yellowish tomentose folded leaves. Leaves ovate or oblong, serrate, often squarish, rounded or more often truncate at tip. Pedicels 5-17 (13) mm long. Petals 6-9 mm long. Sepals 2.5-3.0 mm long. Fruit dark bluish purple, edible, the well known saskatoon. First half of spring. Around bluffs, along watercourses, in small draws, etc. General. -- Mack-Aka, sw Q-BC, US -- F. alba Nielsen -- Fruits whitish at maturity. -- S-Alta, (US).

2. A. sanguinea (Pursh) DC. (A. humilis Wieg.) -- Indian-Fear (Petites Poires, Prairie) -- Generally similar to the preceding, the pedicels of more uneven length, the lowest usually 15 mm or more. Leaves white floccose below at flowering time, mostly obtuse or rounded and mucronulate at tip. Sepals 3-4 mm long. Petals 2-20 mm long. (Mid spring?). Openings and margins of woods. Southeastern Manitoba. -- sck, NF, NS-Man, US.

The taxonomy of this genus is currently quite controversial and A. sanguinea is one of the more controversial species, being sometimes divided into as much as seven phenotypes: A. amabilis Wieg., A. gaspensis (Wieg.) Fern. & Weath., A. humilis Wieg., A. huronensis Wieg., A. mucronata Nielsen, A. sanguinea (Pursh) DC. and A. Wiegandii Nielsen.

3. A. florida Lindley -- Also generally similar, also with long pedicels, the lower usually 15 mm long or more, but the leaves flatness or nearly so at flowering time, mostly broadly rounded or truncate at tip and often rather coarsely serrate. Sepals 3-5 mm long. Petals 11-15 mm long. Mid spring to early summer. Mostly in river valleys and rather local. Cypress Hills, Rockies and Northern Alberta. -- sMack, (sAka), S-BC, US.

8. CRATAEGUS L.

HAWTHORN

Shrubs with rather coarse woody spines. Fruit a middle size pome with 2-5 stone-hard pips, these being the mature carpels.

- a. Spines 1.5-2.5 cm long; fruit dark blue or purple black 3. C. Douglasii
- aa. Spines mostly much longer; fruit scarlet.
 - b. Larger teeth rather coarse, acute and acuminate; no ventral cavities 1. C. rotundifolia
 - bb. Teeth of the larger series low, obtuse, not acuminate; ventral cavities present 2. C. succulenta

1. C. rotundifolia Moench (C. chrysocarpa Ashe; C. columbiana AA.) -- Hawthorn (Cenelles) -- A large shrub, with the biggest woody thorns. Up to 4 meters high and stoloniferous, forming quite impenetrable clumps with numerous thorns 2-6 cm long and usually falcate. Leaves doubly serrate, with a purple black gland at the end of each tooth. Flowers white in showy corymbs. Fruit scarlet, often pruinose, obovoid, about 1 cm long or slightly

longer. Stones flat on the faces. Mid-spring. Inside bluffs, along ravines and near watercourses. General. -- (NF), NS-Alta, US.

The comment under *Anelanchier sanguinea* applies equally well here. About 1000 species of *Crataegus* have been described for North America and most known permutations of a limited number of morphological characteristics have been decorated with a binomial. Our concept of *C. rotundifolia* includes some 10-12 "species" of some other current floras. *C. columbiana* Howell may or may not be a distinct species; we have not yet seen adequate material from the Columbia basin. However such material from our area as was identified *C. columbiana* did not appear to be essentially different from *C. rotundifolia*.

2. *C. succulenta* Link (var. *occidentalis* (Britton) Palmer) -- quite similar but the teeth not so sharp, those of the larger series much lower. Stones with well marked depressions on the two lateral faces. Mid-spring. Oak bluffs. -- (US-IF)-US-Man, US.

We do not know the basis for the report of this species for southeastern Saskatchewan by Löve 1959.

3. *C. Douglasii* Lindley -- Black Hawthorn -- Also quite similar, but the spines shorter and the fruit darker. Fruit dark purple or blackish, with a well marked neck below the ring of sepals. Leaf teeth with a brown gland at tip. Late spring. Bois Coteau and Rockies. -- (Aka), WD, SWS-BC, US.

Disjunct east of the Rockies and occurring in the general area of the Bois Coteau and also west of lake Superior. Reports from southern Manitoba and eastern Ontario proved to be based on other species.

C. punctata Jacq. has been reported for Manitoba by Scoggan 1957 and for southern Saskatchewan by Löve 1959. The only Manitoba sheet (CAN) is dated Aug. 11, 1872, yet the specimen is only in flower, obviously the label data of this specimen is questionable. Further, the specimen itself is *C. succulenta*. We are not aware of the basis for the Saskatchewan report.

Tribe 3. RUBEAE

Carpels numerous, free and fleshy. Shrubs with short-lived stems.

9. RUBEUS L.

Fruit raspberry-like, edible, thimble-shaped, made up of numerous small, fleshy, adhering carpels. Shrub usually sterile the first year (=rimocane), becoming woody and flowering the second year (=floricane).

- a. Leaf simple.
 - b. Low, 1-3 dm high 1. *R. Chamaemorus*
 - bb. Much taller 5. *R. parviflorus*
- aa. Leaf compound.
 - c. Low, 1-3 dm high.
 - d. Leaves with 5 leaflets 4. *R. pedatus*
 - dd. Leaves trifoliate.

- e. No primocane; stem erect and
flowering the first year 2. R. arcticus
ec. Sterile trailing primocanes
present, flowering the second
year 3. R. pubescens
cc. Much taller 6. R. idaeus

1. R. chamaemorus L. -- Bake-Apple, Yellow rry (Montoué, Plaquehière) -- A low bog plant with large, reniform and palmately-lobed leaves. Dioecious, with the stems one or less buried in sphagnum. Erect herbaceous shoots with 2 or 3 leaves and a single white terminal flower. Floral parts in 4's, or 5's, or 6's. Fruit at first reddish, maturing nearly white. First half of summer. Picea mariana bogs. -- G-Aka, L-SM, NS-BC, US, Eur.

2. R. arcticus L. var. acaulis (Mx.) Boivin (n. acaulis Mx.) -- Dewberry, Ground-Raspberry (Mûres rouges) -- Another bog plant, this one quite herbaceous except for the buried woody base. Stem erect, up to 1.5 dm high, with a few trifoliate leaves and a single terminal flower, pink to dark rose. Leaflets obtuse or rounded at tip. Floral parts in 5's or 7's. Sepals 7.5-10.0 mm long. Petals 10-16 mm long. Late spring and early summer. Fruit edible, red. Bogs. -- K-Aka, L-SM, Q-BC, US.

In var. stellatus (Sm.) Boivin occurring from Northern B.C. to Alaska, some of the leaves are simple, being trilobed to tripartite, and the flowers are larger.

3. R. pubescens Raf. var. pubescens (R. triflorus Rich.) -- Dewberry, Florin (Catherineettes, Fraises à pied) -- Primocane long and trailing, dying back almost entirely in winter. Floricane bearing near the base a few erect flowering branches. Leaves trifoliate, the leaflets usually subacuminate. Calyx lobes 3.0-4.0-(5.0) mm long. Petals white, 4-7 mm long. Fruit bright red. Late spring and early summer. Moist rich woods. -- (K-Y), L-SM, NS-BC, US -- R. roseiflorus (Peck) House -- Flowers pink -- Q-C, S-Alta -- Var. paracaulis (Bailey) Boivin (R. arcticus AA.; R. paracaulis Bailey) -- Intermediate to R. arcticus and perhaps an inter-specific hybrid. Calyx lobes (L) 5-9-(10) mm. Petals pink, (L) 8-12-(14) mm long. Fruit dark red. Boggy woods. -- (Mack), L-AB, NS, Q-Alta.

4. R. pedatus Sm. -- Trailing stems with pedately 5-foliate leaves. Flower white, solitary. Fruit reddish and small, with only 1-3 fleshy carpels. First half of summer. Woods: western Alberta. -- (Y)-Aka, Alta-BC, US.

5. R. parviflorus Nutt. -- Thimbleberry -- A large semi-shrub with maple-like leaves and large white flowers that dry yellow. Up to 2 m high. Leaves large, palmately lobed and serrate. Flowers 3-5 cm across, in small snowy corymbs. Fruit a finely pubescent, hemispheric, red raspberry. Early to mid summer. Forest openings: Cypress Hills and western Alberta. -- Aka, WQ, Alta-BC, US, CA.

6. R. idaeus L. var. aculeatissimus Regel & Tiling (var. canadensis Rich., var. strigosus (Mx.) Max.; R. melanolasius Focke; R. strigosus Mx.) -- Raspberry (Franboisier, Kloock) -- Semishrub

with the stem abundantly armed with weak acicules. Usually about 1 m high. Leaves of two kinds, those of the primocane mostly 5-foliolate, those of the floricane mostly trifoliolate. Flowers white. The fruit is a red raspberry. First half of summer. Open and semi-open places in forested regions. --K-Aka, L-NF-(SPM), NS-BC, US, (CA, aEur) -- *F. tonsus* (Fern.) Boivin -- Unarmed or nearly so. Local. -- (NF), O, S, (US) -- *F. erythrochlamydeus* Boivin -- Petals red. Also local: Elbourne -- Y, S.

American plants are glandular-stipitate in the inflorescence while the eurasian var. *idaeus* is eglandular and its armature tends to be of short and small prickles, especially in the inflorescence. The latter is cultivated for its fruits and has been reported as a casual escape in eastern Canada.

Young leaves are finely white-tomentose below. Typically this tomentum erodes gradually during the summer until in the later part of the season the older leaves will have turned green and nearly glabrous below. In a minority of specimens (var. *peramoenus* (Greene) Fern. or *R. viburnifolius* (Greene) Rydb.) the young leaves will quickly become green below and eventually glabrous before they are fully grown. This variation is generally distributed but appears to be relatively more frequent west of Saskatchewan than eastward.

Many authors will distinguish a var. *canadensis* with stems glabrous between the acicules from a var. *strigosus* with stems more or less finely tomentose. Both types are common and equally widespread; their taxonomic value is not obvious except perhaps as very minor phenotypes.

Tribe 4. POTENTILLEAE

Carpels numerous, free and dry (=achenes). Nearly all herbs, most of them with a double calyx.

10. FRAGARIA L.

STRAWBERRY

Fruit a strawberry, that is a fleshy fruit in which the fleshy part is the enlarged receptacle. The numerous dry and small achenes are scattered on top of the fleshy receptacle. Small herbs, stemless, with rosettes of trifoliolate leaves and long superficial stolons that root at the nodes. Flowers in a corymb, borne on a scape.

- a. Fruit with an even surface 1. *F. vesca*
 aa. Fruit surface deeply pitted 2. *F. virginiana*

1. *F. vesca* L. var. *americana* Porter -- Squaw-Berry, Sow-Teat-Strawberry (Fraisier à Vaches, Fraisier des bois) -- Fruit glabrous or nearly so. Surface of the receptacle nearly even and the achenes standing above the surface. Apical tooth of the leaflet about as large as its neighbours and slightly overtopping them. Calyx-lobes commonly reflexed at maturity. Strawberry usually conical. Late spring to mid-summer. Fresh soils, open or wooded. -- Mack, (NF), NS, NB-BC, US -- Var. *crinita* (Rydb.) C. L. Hitchc. (var. *bracteata* (Heller) Davis) -- Fruit as above, but the calyx rather like the next species, that is somewhat appres-

sed and enveloping the base of the fruit. -- wAlta-BC, wUS.

2. *F. virginiana* Duch. (var. *terrae-novae* (Rydb.) Fern. & Wieg.; *F. canadensis* Mx.; *F. glauca* (Watson) Rydb.; *F. pauciflora* Rydb.) -- Wild Strawberry (Fraisier des champs) -- Quite similar to the preceding and only doubtfully distinguishable when in flower. Apical tooth of the leaflet only half as large as its neighbours. Surface of the ripe receptacle slightly hairy, deeply pitted, with each achene attached at the bottom of a pit and half or more buried into the flesh. Calyx-lobes normally more or less appressed around the base of the fruit. Strawberry commonly globose and much sweeter than in the preceding. First half of summer. Dry woods. -- K-Mack-(Y)-Aka, L-(NF-SPM), NS-(PEI)-NB-S-(Alta)-BC, US.

11. POTENTILLA L.

CINQUEFOIL

The basic type of the Potentilla with a double calyx and numerous, dry, free achenes. Leaves compound, petals usually yellow and flowers 5-merous.

- a. Shrub with entire leaves 1. *P. fruticosa*
- aa. Herbaceous or rarely with a shrubby base.
 - b. Stemless, flowers solitary on long scapes 25. *P. Anserina*
 - bb. Stem present.
 - c. Calyx and corolla purple 5. *P. palustris*
 - cc. Calyx green or whitish-tomentose; petals cream to yellow.
 - d. Leaves all or mostly pinnate.
 - e. Leaflets serrate to lobed Group 1
 - ee. Leaflets dissected more than halfway to the midrib Group 2
 - dd. Leaves trifoliate to digitate or subdigitate.
 - f. Leaves trifoliate Group 3
 - ff. Leaves with 5 or more leaflets, or some of the upper ones trifoliate Group 4

Group 1

Leaves pinnate, the upper sometimes trifoliate. Leaflets serrate to lobed.

- a. Leaflets green on both faces.
 - b. Glandular; stem leaves 0-2.
 - c. Tall, 3-3 dm high; the inflorescence compact 3. *P. arguta*
 - cc. Less than 4 dm high, the inflorescence quite open.
 - d. Leaflets glandular, serrate... 4. *P. glandulosa*
 - dd. Non glandular and coarsely toothed to narrowly lobed 14. *P. Drummondii*
 - bb. Non-glandular; with 4-7 stem leaves.... 11. *P. paradoxa*

- aa. Leaflets grayish to white-tomentose below.
 - e. Leaflets white-tomentose below 12. P. Hippiana
 - ee. Leaflets not tomentose, but grayish-pilose to hirsute below 6. P. pensylvanica

Group 2

Leaves pinnate, the upper sometimes trifoliate. Leaflets pinnatifid to pinnatipartite.

- a. Leaflets equally green on both faces 10. P. plattensis
- aa. Pale green to white below.
 - b. Pale green to grayish-pilose or glandular below 6. P. pensylvanica
 - bb. White-tomentose below.
 - c. Pectinatipartite and the margin revolute.
 - d. Upper stem leaves with stipules - ovate, coarsely toothed to semi-pectinate 7. P. bipinnatifida
 - dd. Stipules linear to lanceolate, entire 8. P. multifida
 - cc. Not quite so deeply and so narrowly dissected, the margin revolute or not.
 - e. Mid-summer flowering arctic and alpine species 18. P. nivea
 - ee. Spring flowering prairie species.
 - f. Early spring flowering; stems 1 dm long or less 16. P. concinna
 - ff. Late spring flowering; stems 1-2 dm long 9. P. saximontana

Group 3

Leaves all or mostly trifoliate.

- a. Leaflets cuneate, three-toothed at apex.
 - b. Inflorescence very lax with obvious white petals 2. P. tridentata
 - bb. Inflorescence congested; the yellow petals minute 24. P. Sibbaldii
- aa. Leaflets broader, not cuneate and more than three-toothed.
 - c. Leaflets densely and more or less whitish-tomentose below 18. P. nivea
 - cc. Green below.
 - d. Stem-leaf only one or none below the inflorescence 19. P. flabellifolia
 - dd. Stem quite leafy.
 - e. Petals broad, longer than the calyx tube 22. P. norvegica
 - ee. Petals narrow and inconspicuous, being shorter than the calyx tube 23. P. rivalis

Group 4

Leaves digitate, the upper ones sometimes trifoliate.

- a. Leaflets grayish to white-tomentose below.
 - b. Stems quite leafy; petals only 2-5 mm long 20. P. argentea
 - bb. Stem leaves 0-3 below the inflorescence; flowers larger.
 - c. Stems 1 dm long or less; flowering in early spring 16. P. concinna
 - cc. Usually taller and summer-flowering.
 - d. Leaflets 3-5; plants 2.5 dm high or less.
 - e. Leaflets pinnatipartite, with narrow lobes 17. P. quinquefolia
 - ee. Not so deeply divided, serrate to coarsely lobed 18. P. nivea
 - dd. Usually taller, the leaflets 5-9 per leaf 13. P. gracilis
 - aa. Leaflets less densely pubescent, green below.
 - f. Inflorescence a very leafy cyme; petals minute 23. P. rivalis
 - ff. Open corymb leafy at base only; flowers large.
 - g. Stem leaves 1-3 below the inflorescence.
 - h. Leaflets coarsely toothed (or lobed) to the base 13. P. gracilis
 - hh. Leaflets coarsely toothed above, entire at least in the lower third 15. P. diversifolia
 - gg. Stem leaves 4 or more 21. P. recta

1. P. fruticosa L. (Dasiphora fruticosa (L.) Rydb.) -- Buck-Brush, Gold-Withy -- Shrub with pinnate leaflets. Very branchy, up to 1 m high. Bark soon shedding. Leaflets 5-7, lanceolate, entire, revolute, thickish. Flowers yellow. Flowering all summer. All kinds of open or semi-open places, mostly on black soils and at edge of woods. -- (K)-Mack-Aka, L-SPM, NS, NB-BC, US, Eur.

2. P. tridentata Aiton (Sibbaldiopsis tridentata (Aiton) Rydb.) -- Tufted herb from a thin, woody rhizome, 1-2 dm high, with white flowers in a large open cyme. Leaves mostly basal, trifoliate. Leaflets cuneate, 3-toothed at tip. All summer. Sandy Pine woods and precambrian outcrops. -- G, K-Mack, L-SPM, NS-CAlta, US.

3. P. arguta Pursh var. arguta (Drymocallis agrimonioides (Pursh) Rydb.; D. arguta (Pursh) Rydb.) -- Stem stiff, 3-8 dm high, abundantly covered, along with the petioles and inflorescence, with long glandular and viscid hairs. Leaves pinnate, the leaflets green, coarsely serrate. Inflorescence compact, of more or less cream-coloured flowers. First half of summer. Occasional in open places on better soils. - Mack-Y, NB-BC, US --

Var. *Convallaria* (Rydb.) Th. Wolf -- Leaflets not only glandular, but also velvety pubescent on both faces, Rockies. -- Y-Aka, Alta-BC, US.

4. *P. glandulosa* Lindley var. *intermedia* (Rydb.) C.L. Hitchc. (ssp. *pseudorupestris* (Rydb.) Keck) -- Similar to the preceding and sometimes grading into var. *Convallaria*, but smaller, less leafy and the inflorescence open. Stems 1.0-2.5 dm high, with few or even no stem-leaves below the inflorescence. Pubescence glandular, usually also partly villous and non-glandular. Petals slightly longer than calyx lobes. First half of summer. Alpine slopes. Waterton. -- Alta-seBC, nwUS.

The more western var. *glandulosa* has smaller flowers, the petals no longer than the calyx lobes, and the pubescence usually uniformly glandular.

5. *P. palustris* (L.) Scop. (*Comarum palustre* L.) -- (Comaret) -- The petals purple and persistent; the calyx also purple, at least inside. Leaves pinnate with 5-(7) approximate leaflets. Leaflets glabrous to silky, \pm lanceolate, 3-7 cm long, serrate, paler beneath. Early summer. Marshes and bogs. -- (G), K-Aka, L-SPM, NS-BC, US, Eur -- Var. *parvifolia* (Raf.) Fern. & Long -- Leaflets smaller and broader, 1-3 cm long, ovate or obovate to narrowly oblong. Arctic and subarctic marshes. -- G, K-Aka, L-(NF, NS), Q-Man, BC, US.

6. *P. pensylvanica* L. var. *pensylvanica* (var. *glabrata* (Hooker) Watson, var. *pectinata* Lep.; *P. glabrella* Rydb.; *P. pectinata* Raf., [nom. ill.]; *P. platyloba* Rydb.) -- Leaves pinnate, pale green to grayish pilose below. Tufted perennial, the stems 2-6 dm high, decumbent at base or erect. Stems and petioles light tomentose to strigose or short pilose. Leaflets oblanceolate, lobed to pectinatipartite, glabrous or glandular to silky above, paler and usually glandular and grayish silky below. Early to mid summer. Hillsides, prairies and steppes. -- Mack-Aka, Q-BC, US, Eur -- Var. *atrovirens* (Rydb.) Th. Wolf (var. *arida* Boivin, var. *strigosa* AA.; *P. strigosa* AA.) -- Petioles hirsute, the pubescence \pm spreading and the hairs up to 1-3 mm long. Steppes. -- (Y-Aka), Q-BC, US, CA, Eur -- Var. *litoralis* (Rydb.) Boivin (var. *pectinata* AA.; *P. pectinata* AA.) -- Leaflets approximate and rather few, usually 5-7, often giving the leaf a rather pentagonal outline. -- K-(Mack, L)-NF, NS, Q-Man-(nwS)-Alta, (US).

A rather variable and much divided type, gradually more variable westward. Many variations appear to be almost but not quite sympatric, hence of limited, if any, interest. At one time or another we have tried to recognize quite a few variants but we admit to much intellectual dissatisfaction with most of them. We are herewith recognizing only 3 types: the main var. *pensylvanica*, common in all sorts of grassy and open habitats, mainly on prairies; a var. *atrovirens* more coarsely and more stiffly pubescent, the common type on drier prairies and steppes, becoming quite local, yet widespread, outside the main area of steppe; a var. *litoralis* which occurs primarily along the east coast, but also inland especially around the larger bodies of water, and

sporadically westward across the northern part of the range as far west as Alberta.

P. pectinata Raf. is illegitimate because it included when published the earlier *P. pensylvanica*. The two are therefore nomenclaturally synonymous and it is quite incorrect to apply them to different taxa. Var. *litoralis* is the earliest name available for what has been incorrectly called var. *pectinata*.

7. *P. bipinnatifida* Douglas (*P. pensylvanica* L. var. *bipinnatifida* (Douglas) T. & G.) -- Leaflets narrowly pectinate-partite, white-tomentose below. Stem tomentose, 2-5 dm high. Leaves pinnate, the basal ones with 5-7 leaflets, the cauline with 3-5 leaflets, green and silky above. Lobes slightly revolute at margin. Middle and upper leaves with \pm ovate stipules, coarsely toothed to semi-pectinate, white-tomentose dorsally. Calyx densely silky-tomentose dorsally. Bractlets about as long as the calyx lobes. First half of summer. Dry prairies and open Pine woods. -- Mack, WO-seBC, US.

Native in our area; introduced west of us at McBride, B.C. Perhaps also introduced at Schreiber east of us. Reports from still further east are probably incorrect.

8. *P. multifida* L. -- Similar. Stem strigose, 1-4 dm high. Basal leaves with 7 leaflets, the stem leaves with 5-7. Stipules of the stem leaves entire, linear to lanceolate, not white below except in the inflorescence. Leaflets finely pectinate, strongly revolute. Calyx silky dorsally. Bractlets smaller, much shorter than the calyx lobes. First half of summer. Open rocky places and bare gravels. -- K-Aka, Q-neBC, Eur.

9. *P. saximontana* Rydb. (*P. Macounii* Rydb.; *P. rubripes* Rydb.) -- Tufted perennial, decumbent to loosely ascending, the stems 1-2 dm long. Basal leaves pinnate, about 1 dm long. Leaflets green above, whitish-tomentose below, the lobes oblong-lanceolate. Flowers few. Late spring. Hillsides along the southern border. -- swMan-seAlta, US.

Known from Dalny, Carievale, Pickthall and the Cypress Hills.

10. *P. plattensis* Nutt. -- Very finely divided and equally green on both faces. Stems spreading, 1-2 dm long, diffusely branched. Basal leaves almost as long as the stems, pinnate, with numerous leaflets, the main ones with 5-9 lobes. Late spring and early summer. Alkaline soils. -- swMan-Alta, US.

More compact alpine forms have been called *P. ovina* J.M. Macoun.

11. *P. paradoxa* Nutt. (*P. Nicolleii* (Watson) Sheldon) -- Leaflets of the upper pair long decurrent on the proximal side. Biennial or short-lived perennial. Leaves pinnate with 5-11 leaflets, pubescent but not glandular, green on both faces, crenate-serrate at margin. Flowers in a diffuse, cyme, numerous, small, the petals about 3 mm long, about equalling the calyx lobes. Mostly early summer. Shores of lakes and large rivers. -- O-seBC, US, (CA).

12. *P. Hippiana* Lehm. var. *Hippiana* -- White-tomentose throughout except on the upper surface of the leaflets which are green and silky to grayish. Leaves pinnate, the leaflets deeply

crenate-serrate. Calyx lobes silky dorsally, ending in a white hair tuft. Bractlets similar to the calyx lobes. Late spring to mid summer. Prairies and steppes. -- (NS), Q-BC, US -- Var. argyrea (Rydb.) Boivin (P. argyrea Rydb.) -- Leaflets nearly equally whitish-tomentose on both faces. Calyx as in var. Hippiana. Dry hills. -- sS-Alta, US -- Var. filicaulis (Nutt.) Boivin (F. effusa Douglas) -- Leaves white on both faces. Calyx lobes ending in a brownish, glabrous mucro. Bractlets much smaller, green and lightly tomentose, also ending in a brownish, glabrous mucro. Dry and eroded hills. -- sMan-sAlta, US.

Our three varieties are recognized primarily because they seem to have individualized ranges in our area. But we are not at all sure that they do represent biological units; they could be mere extremes of variation. From the specimens at hand, var. filicaulis seems to be the more common and more widespread variety south of us.

13. P. gracilis Douglas var. gracilis (var. filipes (Rydb.) Boivin, var. flabrata (Lehm.) C.L. Hitchc., var. Nuttallii (Lehm.) Sheldon, var. permollis (Rydb.) C.L. Hitchc., var. pulcherrima (Lehm.) Fern., var. rigida Watson; P. camporum Rydb.; P. Hippiana Lehm. var. pulcherrima (Lehm.) Watson; F. juncunda Nelson; P. Nuttallii Lehm.; P. pulcherrima Lehm.; P. rigida Nutt., [nom. ill.]; F. viridescens Rydb.) -- Cinquefoil -- Tufted perennial 2-7 dr. high. Basal leaves with 5-9 leaflets, all digitate or some of them subdigitate. Stem leaves mostly 2-3. Leaflets \pm obovate, serrate to pinnatifid, green and silky to white-tomentose below. Petals slightly longer than the calyx. Early to mid summer. A common prairie plant. -- Y-Aka, PEI, Q-BC, US -- Var. flabelliformis (Lehm.) Nutt. (var. ctenophora (Rydb.) Boivin; P. flabelliformis Lehm.) -- Leaflets more deeply divided, pectinatipartite to pectinate. Moist prairies. -- Aka, (Q), Man-BC, US.

Native east to the Great Lakes. probably introduced further east. Intermediate between the digitate and the pinnate series; subdigitate specimens are liable to be mistaken for P. Hippiana.

Fully as variable as the last species. Our earlier and more elaborate classificatory attempts proved unsatisfactory as one varietal range after another gradually filled out to the size of the collective range. However var. flabelliformis and the sympatric var. ctenophora still retain a somewhat restricted range and are therefore still maintained, but as a single taxon.

Var. pulcherrima is often used to designate the mostly larger plants with mostly subdigitate leaves and the leaflets mostly whiter below. It is sporadic throughout the range and does not seem to be well enough defined to warrant taxonomic recognition.

14. P. Drummondii Lehm. -- Leaves dimorphic, the stem leaves digitate, with 3-5 leaflets, the basal ones short pinnate, with 5-9 leaflets. Otherwise much like the next but tending to be taller and slightly more pubescent. Leaflets ciliate and glabrous or pilose dorsally. Stem and calyx \pm pilose. Summer. Low alpine or subalpine meadows. -- Aka, swAlta-BC, nwUS.

15. P. diversifolia Lehm. var. diversifolia (var. glaucophylla (Lehm.) Watson; P. glaucophylla Lehm.) -- Perennial 2-4

dm high, tufted, with little pubescence. Leaves digitate, few, rather large. Leaflets broadly oblanceolate, entire and cuneate at base, coarsely serrate above the middle, glabrous on both faces or slightly hirsute along the nerves below, paler beneath and often slightly glaucous. Early summer. Montane prairies. -- (Mack)-Y-Aka, swS-BC, US -- Var. perdissecta (Rydb.) C.L. Hitchc. (var. multisecta AA.) -- Intermediate to P. gracilis, the leaflets being deeply divided most of their length. Plants small, 1-2 dm high, and little pubescent as in var. diversifolia. -- sw Alta-(seBC, US).

Two Manitoba collections were listed by Bell 1881 as P. diversifolia and also later by Macoun 1883 as P. dissecta. More recently Scoggan 1957 has referred them to P. norvegica. We have examined the York Factory collection (QK; DAC, photo) and revised it to P. multifida.

16. P. concinna Rich. var. concinna (P. humifusa Nutt.) -- A small tufted perennial, quite conspicuous in early spring on dry eroded hillsides. Stems spreading, 1 dm long or less, barely overtopping the leaves. Basal leaves digitate, with 5 leaflets. Stem leaves much reduced. Leaflets obovate to cuneate, 1-3 cm long, coarsely serrate to pinnatifid, the lobes triangular to oblong, white-tomentose below. Early spring on rolling steppes. -- Man-Alta, US -- Var. dissecta (Watson) Boivin (var. divisa Rydb.) -- Leaves digitate or subdigitate, the leaflets more divided, pinnatifid to pinnatipartite. Lobes \pm lanceolate. -- swS-seAlta, (US).

In conformity with Rydberg's treatment of 1908 in the North American Flora, we presume that Watson's type material of var. dissecta is made up of two elements, one of which comes from Montana and belongs to var. dissecta as interpreted herewith. The other element comes from the headwaters of the Smoky River and belongs to the P. nivea group.

At the varietal rank, var. dissecta has priority over var. divisa.

17. P. quinquefolia Rydb. (P. Hookeriana AA.; P. nivea L. var. Hookeriana AA., var. pentaphylla Lehm.) -- A small tufted perennial, 1-3 dm high, with digitate leaves, all with 5 pectinate leaflets or some of them with only 3 leaflets, green above, white tomentose below. Early summer. Dry hills and sandy Pine woods. -- Y, Man-BC, US.

Not always clearly distinct from the following.

18. P. nivea L. var. nivea (var. incisa Turcz., var. lapponica C. & S., var. macrophylla Ser., ssp. Chamissonis (Hulten) Hiit., ssp. Hookeriana (Lehm.) Hiit.; P. Ledebouriana Pors.; P. uniflora Led.; P. Vahliana Lehm.) -- A low, densely tufted perennial, often forming cushions. Stems short, usually about 1 dm high, few flowered to single-flowered. Leaflets 3, rarely 5, green above, white-tomentose below, the pubescence otherwise quite variable in kind and density. Leaflet margin serrate to incised. Flowers relatively large and showy. Mid summer. Alpine and arctic or subarctic prairies. -- G-Aka, (L-WF), Q, nMan-nWS-swAlta-BC, US, Eur -- Var. villosa (Pallas) Regel & Tiling (P. villosa

Pallas, var. parviflora C.L. Hitchc.) -- A coarse and densely villous extreme of the preceding. Leaflets thick, veiny and densely villous above, coarsely serrate, the tomentum often yellow-tinted below. Bractlets most often ovate, varying to lanceolate. Rocky outcrops in the mountains: Mt. Signal. -- Y-Aka, Alta-BC, (US, Eur) -- Var. pulchella (Br.) Durand (P. pulchella Br.; P. rubricaulis Lehm.) -- Coarser, the leaves trifoliate or mostly short pinnate with 5 large leaflets which are coarsely and deeply few-lobed. Basal leaves with rather large brown stipules, often up to 2-5 cm long. Dry arctic gravels and sands. -- G-Mack-(Y-Aka), L-TN, nQ-nMan, (Eur).

Often subdivided into a series of some 12 microspecies or varieties. The morphological discontinuity is weak or non-existent in all cases and the geographical segregation does not always conform to published distributions or maps. At least the above 3 varieties appear to be sufficiently distinct to warrant taxonomic recognition.

19. P. flabellifolia Hooker var. flabellifolia -- Perennial, very loosely tufted, about 2 dm high, green throughout and nearly glabrous or slightly puberulent. Leaves ternate, with usually only 1 stem leaf. Leaflets obovate, incised, glabrous to ciliate to lightly villous along the nerves. Petals around 1 cm long. All summer. Moist alpine meadows. -- (Alta)-BC, WUS -- Var. emarginata (Pursh) Boivin (P. emarginata Pursh; P. hyperctica Malte var. elatior (Abram.) Fern.) -- More densely villous, the hairs forming white tufts at the end of the teeth. Usually smaller, about 1 dm high and more densely tufted. Often suggesting a green phase of P. nivea. -- G-K-(Mack-Y)-Aka, L, Q, swAlta-BC, (Eur).

20. P. ARGENTEA L. -- Perennial and often depressed, quite leafy and white-woolly throughout, except the upper face of the leaflets. Leaves digitate, \pm incised. Flowers numerous and small in a diffuse cyme. Petals 2-5 cm long, not exceeding the calyx. All summer. Roadsides, footpaths and other tramped places. -- NF-SPM, NS-S, BC, US, Eur.

21. P. RECTA L. var. SULPHUREA (Lam. & DC.) Peyr. -- An erect perennial, the leaves green, numerous, digitate, with 7 narrowly oblanceolate leaflets. Hirsute, the stem rather leafy. Flowers numerous. Petals exerted. Early summer. Ditches, railway embankments, etc. -- NF, NS-S, BC, US, (Eur) -- Var. OBSCURA (Nestler) Koch -- Leaflets only 5. Petals often paler: Caron, Edmonton. -- NS, Q-O, S-Alta, (Eur).

22. P. norvegica L. (P. monspeliensis L., var. norvegica (L.) Farw.) -- Mostly biennial. Green, trifoliate and long hirsute. Stem erect, quite leafy, covered with numerous long and stiff hairs, almost like acicules at times. Leaflets obovate, slightly paler below. Inflorescence very leafy. Petals slightly shorter than calyx. Early summer. Open places, especially wet ones, often weedy. -- (G, K)-Mack-Aka, L-SPM, NS-BC, US, (CA), Eur.

A rare extreme of variation, var. labradorica (Lehm.) Fern., with the stem glabrous or nearly so, is sporadic in North America.

It may possibly be somewhat more frequent in Ungava and Labrador.

23. *P. rivalis* Nutt. (var. *millegrana* (Eng.) Watson, var. *pentandra* (Eng.) Watson; *P. bienis* Greene; *P. millegrana* Eng.; *P. pentandra* Eng.) -- Annual or biennial, green and finely soft pubescent. Stem often decumbent, leaves trifoliate, the lower ones often 5-foliate. Leaflets obovate to oblanceolate, coarsely serrate. Cyme very leafy and very diffuse. Petals yellow, very small, about 1 mm long, wilting white. First half of summer. Wet places, especially shorelines, less often woody. -- WC-BC, US.

Stamens vary in number, usually in multiples of 5, even on the same plant, and *P. pentandra* with only 5 stamens is a purely arbitrary segregate. The number of leaflets is also variable, especially with the lower leaves and plants with all leaves trifoliate have been called *P. millegrana*.

24. *P. Sibbaldii* Haller f. *Sibbaldia procumbens* L.) -- Leaves green, the 3 leaflets cuneate and 3-toothed at apex. Sterile and matforming, the stems mostly less than 1 dm high. Petals very small, included. Early summer. High alpine prairies in the Rockies. -- G-Aka, L-NF, Q, Alta-BC, US, Eur.

We fail to detect any character of generic value between *Potentilla* and *Sibbaldia*. The latter, like the average *Potentilla*, has a caliculate calyx, yellow petals, stamens in variable number, usually 5 or a multiple of 5, and carpels similarly varying in number, mostly in multiples of 5. Key characters commonly used to separate *Sibbaldia* have been found to be quite unrealistic.

25. *P. Anserina* L. var. *Anserina* (Argentina *Anserina* (L.) Rydb.) -- Silverweed (Argentina, Richette) -- Stemless and spreading by long superficial stolons rooting at the nodes. Leaves tufted, lyrate-pinnate, up to 3 dm long. Leaflets of two sizes, the larger ± alternating with the smaller, green above, white tomentose below. Flower solitary on a long scape. Bractlets ± ovate and tomentose dorsally, often coarsely toothed. Late spring to mid summer. Open moist places. -- G, K-Aka, L-SFA, LS-BC, US, Eur. -- *P. sericea* (Hayne) Hayek (*P. pratincola* Boivin; *Argentina argentea* Rydb.) -- Leaflets grayish or whitish tomentose above. -- (G), Mack-Y, (NF, NS), Q-(C)-Man-BC, US, Eur. -- Var. *yukonensis* (Hultén) Boivin (*P. yukonensis* Hultén) -- Calyx with the bractlets usually entire, lanceolate, nearly glabrous and often slightly longer than the calyx lobes. Leaflets often broader, ± obovate, and more deeply incised. Shores of rivers and large lakes. -- Mack-Aka, Man-Alta, US -- Var. *groenlandica* Tratt. (*P. Eggerii* Wornsk. var. *groenlandica* (Tratt.) Pol.) -- Much smaller and essentially glabrous except for the lower faces of the leaflets. Leaves usually shorter, mostly less than 1 dm long. Leaflets 1-2 cm long, the smaller ones very small and few or even lacking. Arctic and subarctic shores. -- G-Mack, L-NF, Q-(C)-Man.

All these forms and varieties are linked by more or less numerous intermediates.

12. CHAMAERHODOS Bunge

As in *Potentilla*, but the calyx simple, being devoid of bractlets. Stamens only 5.

1. *G. erecta* (L.) Bunge var. *parviflora* (Nutt.) C. L. Hitchc. (*G. Nuttallii* (T. & G.) Fickering) -- Biennial, glandular and more or less pubescent. Stem solitary, usually simple, 1-4 dm high. Basal leaves triterminalifid, the lobes linear-oblong, 1 mm wide or less. Stem leaves gradually smaller and less divided. Petals white, about 2.5 mm long. Mid-spring to mid-summer. Arid hill-sides and rocky or sandy places. --SWY, Mar-30, US.

Barely distinguishable from the siberian var. *erecta*. The latter often has longer peduncles and the sepals are mostly somewhat narrower.

13. LEUM L.

AVENS

Like *Potentilla*, but the styles longer, persistent and elongating in fruit, becoming either plumose or hooked and catchy.

- a. Stem leaves 2, opposite 4. *G. triflorum*
 aa. Leaves alternate.
 b. Calyx lobes erect, generally purple tinted,
 petals yellow to purple, persistent 3. *G. rivale*
 bb. Lobes green, reflexed at anthesis, petals
 yellow, deciduous.
 c. Upper stem-leaves not quite trifoliate,
 merely tripartite; lower internode of
 the mature style 3.-4.5 mm long, finely
 glandular 2. *G. perincisurum*
 cc. Upper stem-leaves trifoliate; lower
 internode 5.-6.0 mm long, not
 glandular 1. *G. aleppicum*

1. *G. aleppicum* Jacq. (*G. macrophyllum* A.; *G. strictum* Aiton) -- Herb-Bonnet -- A perennial herb, solitary or in small tufts. Stem 5-7 dm high, stiffly hispid. Leaves lyrate, alternate. Petals ovate, sessile, yellow. Fruits forming a subglobose head 1-22 mm long, 1-20 mm wide. Style with a double bend, the lower internode persistent and maturing into a catchy hook. Lower internode not glandular, merely hirsute towards the base. First half of summer. Wet prairies and open Poplar bluffs. -- Mack, Aka, 18-30, US, (CA), Eur.

The American plants are often segregated as a New World variety or species under the name, *G. strictum*, which is an illegitimate name and nomenclatorially identical with the Eurasian *G. alexpicum*. A substitute name was prepared in 1944 and used extensively on herbarium sheets but was never actually published because the reputed distinctive characters proved to be too elusive.

All herbaria studied contained a variety of *G. aleppicum* and *G. perincisurum* sheets masquerading as *G. macrophyllum* A. This is not due to the lack of distinctiveness between the three species. But most current floras emphasize a rather weak and inconstant basal leaf difference, hence the current confusion.

Most obviously, in *G. macrophyllum* the upper stem leaves are trilobed (typical) or trifid (var. *Rudbergii* Farw.) and the lobes are squarish (typ.) to broadly obovate (var. *R.*). In our

two prairie species the leaves are always trifoliate (alg.) or divided almost to the base (perian.) and the lower much narrower. Taking into account this character and also leaf-shape, pubescence of the inflorescence, calyx and achene, etc., *G. macrophyllum* has been revised out of our area.

14. *G. aurantiacum* fries (*G. pulchrum* A.) -- Hybrid of *G. rivale*. Quite similar to *G. periale* and not readily distinguished from it. Leaflets somewhat broader and with more rounded teeth, as in *G. alpicum*. Local: Elbow River. -- Alta (50).

The Fernald 1901 report of *G. pulchrum* Fern. for Alberta is apparently based on Lacour 2417, Elbow River, 1907 (F. ; DA), photo), which is also the only known sheet of *G. perianthum* for our area. *G. pulchrum* is the hybrid *G. macrophyllum* X *G. rivale*; one of its parents is absent from our area.

15. *G. perincisum* Rydb. var. *perincisum* (*G. macrophyllum* W. var. *perincisum* (Rydb.) Boiv.) -- Generally similar to the preceding but usually smaller in all its parts, the achenes smaller and in a smaller head. Upper stem leaves not quite trifoliate, rarely tripartite. Fruiting head obovoid, 15-20 mm long, 13-14 mm wide. Lower internode of the style 1.0-(3.5) mm long, finely pubescent, not hirsute. Late spring and early summer. Wet prairies and open bush. -- Alta, 4-10, 18 -- Var. ~~perincisum~~ Boivin. -- Fruiting head slightly bigger, 15-17 mm wide, the lower internode about 1.5 mm long. Lower stem leaves usually less divided, with only 3-7 leaflets. Bois Coteau. -- sub.

Var. *intermedium* var. n. Folia caulinaris stipulis 1-2 mm, supra grosse denticatis vel superioribus lobis interris. Folia caulinaris inferiora radice 1-2 cm. Achenium stilo cupae inferioris (3.5)-4.5-(5.5) mm et superioris 1.5-2.0 mm. Cupae fructus superi posum, 10-12 mm long., 1.5-1.7 mm lat. Type: A.J. Brayton 4219, Cypress Hills Park, wet meadows, occasional, July 2, 1947 (DAC).

2X. *G. periale* Boivin -- Hybrid of *G. rivale* + *perincisum* var. *intermedium*. Upper stem leaves trifoliate. Calyx lobes reflexed, lightly purple-tinted dorsally. Petals golden yellow, purple-tinted, deciduous. Lower internode of the style glabrous. Wet meadows in the Cypress Hills. -- sub.

Hybr. n. Planta hybrida et intermedia inter parentes: *G. rivale* et *G. perincisum* var. *intermedium*. Foliis caulinaris superioris trifoliatum foliolis late obovatis, lobis. Lobi calycis reflexi, 1.5 mm long., versales paullus purpureo tincti. Petala aureo-lutea, paullus rubro tincta, obovata, subsessilia, decidua. Internodium superioris stili declinans, pubescent, 1.5-3.0 mm; internodium inferioris persistens, glabrum. Grana pollinis with boxen evanescit et inventa fuerunt tacecentia. Type: A.J. Brayton 5507, Cypress Hills Park, low meadow, July 9, 1947 (DA).

3. *G. rivale* L. -- Chocolate-toast (Herbe a la tache) -- Large nodding flower, showy mainly because of the persistent dark-red calyx. Erect perennial 5-10 dm high. Leaves lyrate, the upper smaller to simple. Calyx lobes erect at anthesis, often becoming reflexed in fruit. Petals marcescent, pale yellow with purple markings, unguiculate, flagelliform, included. Lower style inter-

node glabrous. First half of summer. Wet places. --sek, L-Srk, NS-BC, US, Mur.

4. *G. triflorum* Pursh var. *triflorum* (*Sieversia triflora* (Pursh) Br.) -- Three Sisters, Old Man's Whiskers -- One of the common and showy spring flowers: 3 purple flowers nodding on long peduncles. Leaves pinnate, mostly basal. Stem leaves 2, opposite. Calyx purple, persistent. Petals 10-14 mm long, yellow and purple. Fruiting heads also very showy because of the persistent plumose styles elongating to 2.5-3.0 cm. Mid spring. Prairies. -- sMack, O-BC, US -- *F. pallida* Fassett -- Flowers yellowish or greenish. Cypress Hills. -- soC, (US) -- Var. *ciliatum* (Pursh) Fassett -- Petals shorter, usually included or nearly so. Upper style internode usually deciduous. Waterton. -- (Alta)-BC, US.

We are not yet fully convinced of the value of var. *ciliatum*.

11. DRYAS L.

Petals more than 5, usually about 6-10, and the calyx lobes about as numerous. Low semishrubs with creeping woody stems forming carpets, large solitary terminal flowers and conspicuous fruiting heads because of the elongating plumose styles.

- a. Leaves entire or nearly so 3. *D. integrifolia*
- aa. Leaves crenate to tip.
 - b. Flowers yellow; leaves cuneate at base 1. *D. Drummondii*
 - bb. Flowers white; leaves truncate to cordate 2. *D. octopetala*

1. *D. Drummondii* Rich. -- Forming large loose carpets. Leaves elliptic, 1.5-3.0 cm long, coarsely crenate, cuneate at base, rounded at apex, green and glabrous or nearly so above, white-tomentose below. Calyx black-glandular, the lobes broadly triangular. First half of summer. Rocky slopes and gravel flats. -- Mack-Aka, snF, (wD), nwb-BC, (nwBC) -- *F. tomentosa* (Farr) Hultén -- Leaves grayish-tomentose above. -- (Mack, Aka), seQ, swAlta-seBC.

2. *D. octopetala* L. var. *Hookeriana* (Juz.) Breitung -- (Chêneau, Chênette) -- Forming small dense mats. Leaves oblong-lanceolate, coarsely crenate, truncate to subcordate at base, strongly rugose above, white-tomentose below with brown glands on the nerves as on the petioles. Calyx white-tomentose and black-hairy, the lobes lanceolate. Petals white. Mid summer. High alpine on rock outcrops. -- Mack-Aka, Alta-BC, nWS.

Leaves glandular and often black punctate on the upper face in our variety, while the more northern var. *octopetala* is glandular only on the lower face.

3. *D. integrifolia* Wahl (var. *sylvatica* Hultén) -- Leaves entire, triangular-lanceolate, truncate at base, smooth above, white-tomentose below. Calyx sparingly tomentose, the lobes narrowly lanceolate. Petals white. First half of summer. Forming a dense carpet in arctic or alpine prairies. -- J-Aka, L-NEF,

NB-nMan, swAlta-eBC, (Bur).

At lower altitudes, such as gravel flats of braided glacial outlets, this plant becomes naturally taller, the leaves larger and less revolute (= var. sylvatica). Undoubtedly an ecological form.

Tribe 5. POTERIEAE

Fruit structure as in the Roseae, but the pistils much reduced in number (less than 5) and maturing into achenes. Herbs.

15. AGREMONIA L.

AGREMONY

The fruit catchy, beset with an equatorial ring of hooked bristles. Carpels 2, enclosed by the non-fleshy hypanthium which presents itself like an inferior ovary.

1. A. striata Mx. -- Perennial herb with pinnate leaves of large leaflets alternating with very small ones. Flowers small, yellow, in an elongated spiciform raceme, with 3-cleft bracts. Fruit reflexed and deeply furrowed below the ring of bristles. Before mid-summer. Aspen groves. -- MF, NS-bC, US.

Tribe 6. ROSEAE

Receptacle very much enlarged with a bottle-shaped cavity lined by the numerous dry carpels. Styles free and more or less protruding through the mouth of the cavity. This inferior-like ovary matures into a fleshy pome-like fruit called a hip. Shrubs, nearly always very spiny.

16. ROSA L.

ROSE

Flower a typical Rose, with 5 large, and mostly pink, free petals, borne on usually very spiny shrubs. The genus is characterized by its hips, as described above. There are two main types of spines; acicules are straight, thin and abruptly passing into a thin flat base; prickles are stronger and gradually thickened into a conical base.

- a. Stems and branches uniformly covered throughout with acicules of very unequal size 1. R. acicularis
- aa. Gradually less spiny above.
 - b. Stem simple, flowering the first year, dying back to near the ground every year 4. R. arkansana
 - bb. Sterile the first year, flowering on plants 2 year or older and ± branched.
 - c. Branches and upper half of the stem unarmed. Stipules not glandular-ciliate 2. R. blanda
 - cc. Acicules or prickles present on the branches.
 - d. Small, few-flowered, weakly

- acicular, less than 5 dm
high 3. R. alcea
dd. Taller, at least some pairs
of prickles present.
e. Mostly flowering the second
year; prickles neither
flattened nor recurved 5. R. Woodsii
ee. Mostly flowering the third
year; main axis with numerous
strongly flattened prickles;
branches mostly with recurved
infrastipular prickles 6. R. terrans

1. R. acicularis Lindley var. ~~Roussiquiana~~ Crépin -- (Egland-
tier) -- A forest species densely and uniformly covered with
acicules on stem and branches. Mostly 1 m. high. Acicules
straight, the longest 5-10 times longer than the smallest ones.
Stipules glandular-ciliate. Peduncles glabrous and unarmed.
Early summer. Common throughout in nearly all kinds of forests.
--sek-Aka, Q-BC, US -- F. plena Lewis -- Double-flowered. Moose
Range. -- (S).

The eurasian var. acicularis is reputed to differ from our
plant by its glandular peduncles.

2. R. blanda Aiton var. blanda -- (Rosier sauvage, Egland-
tier) -- Unarmed or nearly so on the branches and upper part of
the stem, but densely acicular below. Stipules not glandular-
ciliate, but entire or serrate, each tooth with a large red gland
at tip. Flowering from the second year. Early summer, the first
to flower. Edge of woods, mostly near large rivers. -- Mack, NE-
Man, US. -- F. alba (Schuetze) Fern. -- Flowers white. Otterbur-
ne -- Man, (US).

Leaflets and stipules puberulent dorsally. In var. glabra
Crépin the herbage is entirely glabrous or nearly so. The latter
occurs mainly on the shores of the Great Lakes and of the larger
eastern rivers, but it has also been collected at Wigley on the
Mackenzie and may be expected to turn up eventually in the north-
ern part of our area.

In 1965 we could not find at NY any specimen than could be
tied to a report by Rydberg 1918, 1932 of R. subblanda Rydb.
(= R. blanda var. glabra) from Manitoba. This was not the only
case where a report by Rydberg could not be correlated with a
justifying specimen at NY.

3. R. alcea Greene -- Prairie Rose -- A small weak species
usually half hidden in the prairie vegetation. Stem rather thin,
1-5 dm high, branching little, with numerous weak acicules becom-
ing less dense above. Stipules glandular-ciliate. Flowers few,
often only one. Flowering for a few years, starting the second
one. First half of summer. Prairies and steppes, very common.
-- Man-Alta, (US).

4. R. arkansana Porter (var. suffulta (Greene) Cockerell;
R. suffulta Greene) -- Prairie-Rose -- Stem short, 1-5 dm, simple
and flowering the first summer, killed back by frost every winter.

Acicules abundant. Leaflets mostly 9. Flowers in a large terminal corymb, pink in bud, usually opening white. Last to flower; mid summer or a little earlier. Open places, mostly on sandy soil. -- Mack-BC, US -- *R. plena* Lewis -- Flowers double. Woodrow. -- (S).

There is some doubt as to the precise application of *R. arkanzana* and *R. Woodsii*. Hence some authors prefer to use *R. subulata* and *R. Fendleri* respectively.

5. *R. Woodsii* Lindley (*R. Fendleri* Crépín; *R. Macounii* Greene) -- Prairie-Rose -- Well armed with both acicules and prickles, less densely so above. The branches often bearing only infrastipular prickles. Stipules not glandular-ciliate. Fruit smallest, 3-10 mm across. First year shoot simple and sterile, branching and flowering the second year, often continuing to flower for a few years. Early summer. Edge of woods and prairies, common. -- (Mack-Aka, O-Man)-S-Alta-(BC, US, CA) -- *R. hispida* (Turner) Boivin -- Vary and fruit bristly. -- Alta, (US).

The typical form is glabrous and rare, but widespread. The more common phenotype is more or less pubescent and glandular, it is often distinguished as var. *Fendleri* (Crépín) Syd. Taller individuals may reach 2 m and may be named var. *ultramontana* (Watson) Jepson. Neither phenotype appears to be taxonomically significant.

Reports from east of Saskatchewan remain to be confirmed. All Ontario and Manitoba specimens at DAJ were revised to other species. The Val d'Or, Québec (CAJ; DAJ, photo) collection was an especially heavily acicular specimen of *R. blanda*.

6. *R. terrens* Lunell (*R. Woodsii* Lindley var. *terrens* (Lunell) Breitung) -- Much like the preceding but the first year shoot densely armed with acicules mixed with large flat prickles. Flowering very little the second year, but putting out long flagelliform branches armed with mostly recurved infrastipular prickles. Flowering abundantly in the early summer of the third year, the flowers mostly solitary and borne on short lateral branches. Usually dying after the third year. Mostly in the low bush along the water-courses in the dryer parts of the prairie. -- S, (US).

Macoun 1886 reports *Rosa nutkana* Presl from southwestern Alberta but this was never confirmed and the original specimen was not located. No Alberta collection could be found under that name at CAJ, M.E.G, etc., when we visited these herbaria. Presumably the original specimen has been revised to something else. There are a number of other similarly questionable reports in Macoun; most of them were ignored by later authors, but a few were repeated by others and some are still repeated in modern floras despite the apparent lack of herbarium justification.

Tribe 7. PRUNEAEE

Fruit a plum or a cherry, that is a fleshy fruit containing a single large seed.

17. PRUNUS L.

PLUM, CHERRY

Carpel solitary with a terminal style. Calyx with 5 lobes.
Shrubs or trees with white flowers.

- a. Flowers in elongated racemes 1. P. virginiana
 aa. Flowers solitary or in fascicles.
 b. Petiole densely pubescent ventrally 4. P. americana
 bb. Petiole glabrous.
 c. Leaves serrate from the middle,
 entire below 3. P. pumila
 cc. Leaves serrate throughout 2. P. pensylvanica

1. P. virginiana L. (var. melanocarpa (Nelson) Sarg.; P. melanocarpa (Nelson) Rydb.) -- Choke-Cherry (Cerasier) -- Densely colonial shrub 1-5 m high with long racemes of white flowers followed by racemes of edible fruits. Leaves obovate, serrate, of two sizes, those of the flowering shoots only half as large as those of the leading shoots. Petals white, about 3 mm long, suborbicular. Fruit a globular cherry about 8 mm across, at first red purple, becoming nearly black at maturity, edible, sweet and delicious, but with a heavy after-choke. Late spring. Open woods, margin of bluffs, hillsides, etc., and quite common. -- swMack, NF-SPM, NS-BC, US -- P. xanthocarpa Sarg. -- Fruit whitish or yellowish at maturity. -- NS-(Q), S, (US).

Usually divided into an eastern var. virginiana, a western var. melanocarpa and a Pacific Coast var. denissa (Nutt.) Torrey based respectively on size of shrub, colour of fruit and pubescence of lower face of leaves. The colour of the cherry darkens as it matures and the pubescent phase var. denissa (or better f. Deamii G.N. Jones) is a rare variant sporadic in our range and elsewhere, while the height of the shrub is quite commonly 2-3 meters throughout the range. The occurrence of the odd small tree in some sheltered and undisturbed spot does not alter substantially the size picture of this shrub. Small trees are rare and we do not remember seeing any taller than 6 m in the east, although there are reports of up to 15 m for the eastern phase.

2. P. pensylvanica L. f. var. pensylvanica -- Pin Cherry (Merisier) -- Varying from a stoloniferous shrub to a small tree up to 7-8 m high. Foliage glabrous and somewhat sticky when young. Leaves ovate to lanceolate, glabrous, glandular-serrate. Flowers white, numerous and showy, appearing with the leaves, in fascicles of 2-5 at the end of short or long shoots. Fruit a small clear-red cherry, edible, rather acid, 5-7 mm across. All spring. Open and semi-open habitats. -- swMack, L-SPM, NS-BC, US, -- Var. saximontana Rehder -- Leaves more or less pubescent and/or the inflorescence ± racemose. -- Waterton and Pigeon Lake. wAlta-BC, US.

Var. saximontana is a highly variable type and gives the impression of being a series of generation segregates and backcrosses from a possible hybrid of var. pensylvanica with the Pacific Coast var. mollis (Douglas) Boivin. The modern distribution of the 3 entities shows only a slight overlap of ranges

with var. saximontana occurring mainly from the Rocky Mountain Trench to the east slopes of the Cascades, essentially filling the distribution gap between the other two taxa. The opportunity for hybridizing is nil for var. gollis with var. pennsylvanica and only marginal for either with var. saximontana. There seems to be little doubt that the latter is now a population of its own and best treated as an intergrading variety rather than a complementation of hybrids.

3. P. purula L. (P. boreysi Bailey; P. nana DuRoi) -- Sand-Cherry (Rapumini n., Cerisier à sable) -- A low shrub, often circumbent or a willow when sterile. Decumbent or creeping, more rarely suberect when shaded, 5 dm high or less. Foliage glabrous. Leaves 3-7 cm long, narrowly ovate to oblanceolate, paler to subglauces below, cuneate at base. Flowers white, appearing with the leaves, on last year's wood. Fruit a cherry up to 1.5 cm across, globose, dark purple, edible, often, but not always, sweet and tasty, sometimes chokey. Late spring. Sandy soils. -- NB-west, NS.

Proposed segregates of P. purula appear to be mainly growth forms ecologically conditioned (P. nana) or stages of maturity (P. boreysi).

4. P. americana Marsh. var. americana -- Plum, Wild Plum (Quinier, Prunier sauvage) -- Large spicose shrub. Branches with numerous small thorns, leaf and glabrous, arise late in spring. Leaves ovate or obovate, abruptly acuminate, serrate. Teeth not crenulate but finely acuminate. Large white flowers appearing just before the leaves. Fruit 2-3 cm long, at first yellow, turning orange or red, edible, delicious. Mid spring. Open oak woods and margin of galerieforests. --swQ-seS, US, (CA) -- Var. nigra (Aiton) Moench (P. nigra Aiton) -- Leaves with rounded teeth ending in a large gland which becomes dark red later in the summer. -- NS, NB-west, NS.

The subdivision of P. americana into two species is not a convincing classification in our part of the range where the fruit colour appears to be a stage of maturity rather than a taxonomic character. We have not had the opportunity to observe this character in the east in a good crop year.

The difference in leaf serration is real and sharp, but its variability is weak, the two types have a rather broad area of overlap. The leaf shape difference is so weak and indefinite as to be hardly worth mentioning.

14. LEGUMINOSAE (PULSE FAMILY)

Corolla papilionaceous, of five petals, the calyx united; stamens usually 10, one of which is free while the others are fused together by their filaments. Carpel solitary. Mostly herbs with compound leaves.

- a. Plants climbing Group A
- aa. Non-climbing.
 - b. Leaflets entire. Group B
 - c. Leaves pinnate Group B

- cc. Leaves trifoliolate or digitate,
rarely simple Group C
- bb. Leaflets denticulate or serrate Group D

Group A

Herbs climbing by tendrils or by their twining stem.

- a. Stem twining; leaves trifoliolate.
 - b. Calyx subtended by 2 bracts 22. Phaseolus, p. 104
 - bb. Bractless 23. Amphicarpa, p. 104
- aa. Climbing by tendrils; leaves mostly with
an even number of leaflets.
 - c. Calyx lobes much longer than the tube,
much dilated and rather foliaceous... 21. Pisum, p. 104
 - cc. Calyx lobes narrow and shorter.
 - d. Keel abruptly bent upwards around
the upper third 20. Lathyrus, p. 102
 - dd. Keel straight, merely a little
incurved at the tip 19. Vicia, p. 101

Group B

Non-climbers, with pinnate leaves and entire leaflets.

- a. Shrubs.
 - b. Leaves even-pinnate 11. Caragana, p. 84
 - bb. Leaves odd-pinnate 9. Amorpha, p. 82
- aa. Herbs.
 - c. Stamens 5; flowers in compact terminal
cylindric racemes 10. Petalostemon, p. 83
 - cc. Stamens 10; racemes axillary and
usually loose.
 - d. Stemless 13. Oxytropis, p. 95
 - dd. Stem well developed.
 - e. Flowers in a lax, globose head,
or solitary.
 - f. Inflorescence subtended by
a bract, or the flower
solitary 7. Lotus, p. 80
 - ff. No bract under the head...
..... 15. Coronilla, p. 100
 - ee. Inflorescence elongate.
 - g. Fruit catchy, by hooked
prickles 14. Glycyrrhiza, p. 99
 - gg. Fruit not catchy.
 - h. The legume constricted
into a chain of articles
which disarticulate at
maturity 16. Medysarum, p. 100
 - hh. Legume obviously a
single unit.
 - i. Legume sulcate
dorsally or not

riable, mostly obovate, entire. Flowers 2 cm long, yellow, in a terminal raceme. Legume 5-12 cm long, mostly semi-circular. Second half of spring. Common, specially on light soils. -- Man-Alta-(BC), US.

The name is often credited to Nuttall ex Pursh, but this seems to be an unwarranted assumption as Pursh gives no credit to Nuttall, neither for the name, nor for the diagnosis.

2. LUPINUS L.

LUPINE

Calyx bilobed; leaf digitate; stamens 10, fused in a single group by their filaments; anthers dimorphic, alternately oblong and globular.

- a. Annual, less than 2 dm high 5. L. pusillus
 aa. Perennials, mostly taller.
 b. Legume 3-5 cm long; flowers mostly 12-16 mm long.
 c. Larger leaflets 6-10 cm long and acute at tip 1. L. polyphyllus
 cc. Shorter and rounded at tip 2. L. nootkatensis
 bb. Shorter, the legumes 1.5-2.5-(3.0) cm long and the flowers mostly 8-12 mm long.
 d. Leaflets glabrous to more or less strigose above 3. L. argenteus
 dd. Densely strigose to sericeous or velvety 4. L. sericeus

1. L. polyphyllus Lindley -- Leaflets longest and the lower and basal leaves with petioles 3-6 times longer than their leaflets. Mostly 5-10 dm high. Herbage glabrous to hirsute, the hairs usually yellowish but the leaflets always glabrous above. Flowers blue, in a single terminal raceme. First half of summer. Moist open sites in the mountains. -- Aka, NF-(SPM), NS-O, swAlta-BC, US, Eur.

Eastern reports are based on escapes from cultivation, not natural disjunctions.

2. L. nootkatensis Donn -- Generally smaller than the first and only 2-6 dm high, the petioles less than twice as long as the leaflets, the latter oblanceolate and rounded at tip. Herbage densely long villous. Early summer. Lush wet meadows towards timberline. -- sAka, (NF), wNS, swAlta-BC.

Reports for the U.S.A. are questionable. All U.S. specimens so-called that we have examined proved to belong to other species. Eastern Canadian occurrences represent escapes from cultivation.

3. L. argenteus Pursh var. argenteus (f. albiflorus Boivin, var. argophyllus AA., var. Macounii (Rydb.) Davis) -- Tufted perennial 3-5 dm high. Petioles about as long as the leaflets. Leaflets 6-9, narrowly oblanceolate to obovate, usually conduplicate, less pubescent above than below. Flowers normally blue, in a terminal raceme. Standard usually glabrous dorsally. Legume yellowish-silky. Early to mid summer. Table-

lands and hillsides. -- swMan-sAlta, US.

Adventive at Melita, indigenous from Rockglen westward.

A white-flowered form is sporadic. The type of the species was such an albino. Three other varieties of lower stature or smaller flowers also occur in the western U.S.A.

Usually subdivided in an endless series of minor segregates of doubtful value. The following L. sericeus may be distinguished as a pubescence extreme.

L. parviflorus Nutt. has recently been reported by Dunn 1967 as widespread across western Canada, a distribution map showing 2 localities in southern Saskatchewan. Both specimens mapped and annotated (DAO) are at hand and they fail to exhibit the smaller flowers in a denser raceme, the shorter petioles, and other distinguishing features from L. argenteus. The same dot map carries no dot to match his Alberta report, no specimen cited, no precise locality stated, and we have not encountered any Alberta specimen under that name.

L. alpestris Nelson is here reckoned as a synonym of A. argenteus, but in a recent treatment by Dunn 1967 it is presented as a putative hybrid of L. argenteus X L. caudatus Kell., with 3 mapped localities in Canada. All 3 localities are outside the range of both parents. Two of the mapped specimens are at hand (D&C); the Melita sheet has been returned to L. argenteus while the Waterton collection has been revised to L. sericeus. Correct disposition of the other sheet has not yet been ascertained.

4. L. sericeus Pursh var. sericeus (L. flexuosus Lindley; L. lepidus AA.) -- Similar, the whole plant more densely pubescent; the leaflets densely strigose to sericeous or velvety above. Lower petioles longer, 2-3 times as long as their leaflets. Flower blue, the standard usually densely pubescent dorsally. First half of summer. Foothill and montane prairies. -- swAlta-30, US -- F. leucanthus Boivin -- Flowers white. -- swAlta.

F. leucanthus f.n., petalis albis. Type: Boivin & Alex 9501, Montagne de Lait, 10 milles au sud ouest de Milk River, 25 juin 1952 (DAO). Not to be confused with var. asotinensis (Phillips) C.L. Hitchc., also white-flowered, but the standard less pubescent.

In our var. sericeus the hairs hardly ever exceed 1 mm, while in southwestern Yukon a var. Kuschei (Eastwood) Boivin is normally clothed with hairs up to 1-3 mm long.

A distribution map by Phillips 1955 carries 2 dots in southeastern B.C., 6 across southern Alberta, and 2 in southwestern Saskatchewan. However, the text on page 168 includes only Alberta and B.C. in the range, which leads one to suspect that the Saskatchewan dots may be so many lapsus calami. One may also note that the dots on this and other maps in the same paper are more or less equidistant, a rather improbable type of plant distribution.

At least some of the specimens previously reported as L. lepidus Douglas or L. minimus Douglas have since been revised

to L. sericeus. However it may be that at least one collection from Waterton (CAN) may prove to belong to L. lepidus.

L. leucophyllus Douglas was reported for Alberta and B.C. by Phillips 1955 by means of an equidistant-dotted map. See comment above. Some Alberta specimens (DAO) originally identified as L. leucophyllus have since been revised to L. sericeus. A more recent report by Dunn 1967 from Lumby, B.C., has not been investigated.

5. L. pusillus Pursh var. pusillus (L. Kingii AA.) -- Erect annual, 2 dm high or less, densely velvety throughout, often much branched. Leaflets 3-7 entire, narrowly oblanceolate to linear. Flowers in few-flowered terminal racemes. Corolla white, tinted blue upwards. Legume velvety. Late spring to early summer. Loose sands. -- SW3-sAlta, US.

J.M. Macoun 1895 also reports L. arcticus Watson for Medicine Hat. This is undoubtedly based on a misidentification but we have not succeeded in locating the corresponding specimen, at CAN, HUH or elsewhere.

An Alberta report of L. leucopsis Agardh by Budd 1957 was based on material (SWC; DAO, photo) now revised in part to L. sericeus and partly to L. polyphyllus.

3. TRIGONELLA L.

Much like Melilotus, but the legume asymmetrical and dehiscent. Petals more or less marcescent over the young fruit.

1. T. COERULEA (L.) Ser. -- Sweet Trefoil (Mélilot bleu) -- Similar to Medicago sativa, but the legume nearly straight. Annual, glabrous or nearly so. Flowers in short dense axillary racemes borne on a long peduncle. Corolla sky-blue to violet. Legume ± 7 mm long, semi-obovate to nearly sigmoid. Summer and fall. Locally adventive in crops and around gardens. -- O-BC, (Eur)

4. MEDICAGO L.

MEDICK

Similar to Melilotus, but the indehiscent legume falcate to spirally coiled.

a. Annual with small yellow flowers 3. M. lupulina
aa. Perennials.

b. Fruit spiny; flowers yellow, about
4 mm long 4. M. hispida

bb. Not spiny; flowers larger.

c. Fruit falcate; flowers yellow 2. M. falcata

cc. Fruit spirally coiled; flower
colour variable 1. M. sativa

1. M. SATIVA L. -- Alfalfa, Lucerne (Luzerne, Lentine) -- Legume small, coiled into a tight spiral. Diffuse-branchy perennial about 1 m high. Leaflets finely serrate above the middle. Flowers in tight axillary racemes. Corolla 7-10 mm long, of variable colour, nearly always blue or violet tinted. All

summer. Cultivated and often escaped to waste lots, roadsides, etc. -- Mack, (Aka), BC-BC, US, Eur -- F. ALBA Bonke -- A casual form with white flowers, these sometimes turning blue in drying. -- Q, Kan-Alta

2. *M. FALCATA* L. var. *FALCATA* -- Yellow Lucerne, Sickle-Medick (Lucerne jaune, Luzerne sauvage) -- Very much like the preceding but the flowers always yellow and the legume merely falcate. Leaflets finely serrate near the tip. Corolla 6-7 mm long. All summer. An occasional escape, especially along roadsides. -- (Aka), Q-B), (US), Eur.

Highly variable. In a recent monograph by J.L. Bolton, it is subdivided into 19 varieties.

3. *M. LUPULINA* L. (var. *glandulosa* Neidreich) -- Black Medick, Monarch (Minette, Triflet) -- Legume small, black and spirally coiled at the tip. Annual or biennial with decumbent or prostrate stems, 1-6 dm long. Flower yellow, 2-3 mm long. Legume ovoid, strongly asymmetrical. All summer. An innocuous introduction of grassy places along roads, rivers, etc. -- (I), Mack, (Aka), F-SP, BC-BC, US, (CA, SA), Eur, Afr.

4. *M. HISPIDA* Gaertner (*M. polymorpha* AA.) -- Burr-Clover (Minette punaise) -- Pod spirally coiled and beset marginally with an outward ring of hooked spines. Flower 3.5-4.5 mm long, yellow. Spines about 1.5 mm long. All summer. A rare weed: Spalding. -- (Aka), BC, S, BC, US, SA, Eur.

M. polymorpha L., Sp. Pl. 2: 772.1753 fell into disuse more than a century ago as each of the original elements of this entity came to be known by a name of its own. In 1846 ~~1846~~: 5. 1950 it was correctly pointed out the Linnean name should be typified and restored for one of the original elements. The name was then duly restored but not typified by one of the original elements, it was instead typified by a later accretion, a var *nigra* L., published eight years later in the *Mantissa Plantarum*. The reason for this procedure was apparently to avoid a typification that would coincide with any of the varieties originally named by Linnaeus; the rationale behind this self-imposed restriction not being made clear. The restriction is, at least in this case, inconsistent with the long accepted principle of priority in nomenclature.

Since Linnaeus had subdivided *M. polymorpha* in 13 varieties and provided names for each one, including the alpha variety, it would seem unavoidable that *M. polymorpha* be typified in the sense of one of the original Linnean varieties, if this species is to be typified by one of its original elements. Typification by a later accretion is unacceptable.

There is some variation in the Linnean technique of designating varieties. Most of the time the existence of an alpha variety is merely implied by Linnaeus and only the other varieties are expressly dealt with. There seems to be no doubt that this was the procedure followed by Linnaeus; witness the various cases (p. 629, 940, etc.) where no alpha variety is published as such, yet is discussed in the notes. The other varieties were, however, designated by consecutive Greek letter starting with β . A "r" men

triviale" is often appended to the Greek letter, or else the variety is merely individualized by its diagnosis. Once in a while the alpha variety was also designated by its own greek letter or even decorated also with a nomen triviale. The latter was the situation under M. polymorpha in its place of original publication.

Now it is fairly obvious from perusal of the Species Plantarum that Linnaeus generally intended the alpha variety to be the main phase of a species. Exceptions are few and are mainly discussed by Sprague 1955 and Stern 1957. Unless it can be demonstrated that M. polymorpha is one of the exceptions, we are of the opinion that it should be typified in the sense of its alpha variety. On that basis, the relevant synonymy for the two main taxa concerned is as follows.

M. polymorpha L. sensu stricto, M. polymorpha L. α orbicularis L., Sp. Pl. 2: 779.1953; M. orbicularis (L.) Bartalini, Cat. Piante Siena 60.1776.

There are two syntypes in the Linnaean Herbarium, sheets 933.14 and 933.15, both bearing large mature legumes.

M. hispida Gaertner, Fruct. Sem. Pl. 2:349, 1791; M. polymorpha L. var. nigra L., Mant. Pl. 2:44.1771; M. polymorpha sensu Shinnars, Rhodora 58: 5-12. 1956, sensu Clapham 1952.

Both species are cultivated in Canada, both occur as infrequent casual escapes.

See Bailey 3:107-8. 1955 for another similar problem in typification.

5. MELILOTUS Miller

SWEET CLOVER

Herbs with trifoliolate leaves and similar to Trifolium, but the flowers in elongate racemes. Legume straight, indehiscent.

- a. Flowers 2-4 mm long; calyx lobes deltoid to triangular.
- b. Pedicel 2-3 times longer than the calyx... 3. M. wolgica
- bb. Somewhat shorter than the calyx 4. M. indica
- aa. Larger, 4-7 mm long; calyx lobes narrower, lanceolate to linear.
- c. Flowers yellow 1. M. officinalis
- cc. Flowers white 2. M. alba

1. M. OFFICINALIS (L.) Lam. var. OFFICINALIS -- Yellow Sweet Clover (Trèfle d'odeur jaune) -- Biennial, branchy, about 1 m high. Flowers 4.5-7.0 mm long, yellow, drooping in long racemes. Legume black. All summer. Cultivated and frequently escaped, usually found with the following and quite distinct when fresh, although the flowers may fade in drying. -- Mack-Aka, NF, NS-BC, US, Eur.

Many varieties are recognized in the Old World, such as a var. maximus (Langr.) O.E. Schulz with longer flowers and fruits, a var. micranthus O.E. Schulz with smaller flowers and fruits, etc.

2. M. ALBA Desr. var. ALBA -- White Sweet Clover (Trèfle
MEDICAGO

d'odeur blanc) -- Very much like the preceeding. Taller, up to 2.5 m high. Flowers white. Legume brownish. Summer. A common escape, especially in evidence along new roadsides, where it is sometimes seeded in. -- (G), Mack-Y-(Aka), L-SPM, NS-BC, US, (CA), Eur.

Still taller is var. arbereus Castagne from western Asia which may reach a height of 6 m!

3. M. WOLGICA Poiret -- Pedicels longest, commonly about as long as the flower, the latter 2.5-4.0 mm long. Calyx 1.0-1.5 mm long, its lobes short and narrowly to broadly deltoid. Corolla white. First half of summer. Rare escape from experimental plots: Brandon. -- Man, (Eur).

4. M. INDICA (L.) All. -- Somewhat smaller than the first two, with smaller flowers. Pedicels less than 1 mm long. Fruit ovoid, strongly verrucose with very sinuous nerves. First half of summer. Sometimes cultivated and a rare weed of cultivated or waste land: Brandon. -- NS, Man, BC, Eur, (Afr).

6. TRIFOLIUM L.

CLOVER

The herb with the typical trifoliate leaves. Leaflets denticulate. Inflorescence condensed into a pseudo-head. Corolla marcescent. The keel and wings usually more or less fused together.

- a. Head subtended by an involucre of two trifoliate leaves 5. T. pratense
- aa. No involucre.
 - b. Flower yellow.
 - c. Central leaflet with a petiolule 1.5-4.0 mm long, at least twice as long as those of the lateral leaflets 1. T. procumbens
 - cc. All leaflets equally sessile 2. T. agrarium
 - bb. White to purple.
 - d. More or less erect and very branchy 3. T. hybridum
 - dd. Creeping, the stems branching near the base only 4. T. repens

1. T. PROCUMBENS L. -- Quite similar to the next, but annual and the stipules ovate, less than 1 cm long. Flower 3.5-4.5 mm long. Summer. Weed: Souris. -- (Aka, NS-BC)-Q-Man, (BC), US, Eur, (Afr).

All mentions of T. procumbens for Saskatchewan are based on Breitung's collection at Bannock (DAO). This has been revised to T. agrarium and is the only collection of the latter for the province.

2. T. AGRARIUM L. -- Yeo Clover (Trèfle jaune) -- Erect or nearly so, 1-4 dm high, tufted, biennial, hispid. Stipules lanceolate, 1 cm long or more. Leaflets oblanceolate, 1.0-1.5 cm long. Flowers yellow, 5-6 mm long, marcescent, becoming brown and reflexed. Early summer. Cultivated and rarely escaped around farm buildings, etc.: Bannock, Coleman. -- (Aka, L)-NF-SPM, NS-O, S-(Alta)-BC, US, Eur.

3. *T. HYBRIDUM* L. -- Alsike (Trèfle Alsike) -- Erect or nearly so, 1-4 dm high, tufted, biennial or perennial, puberulent. Upper stem leaves all subtending either a branch or an inflorescence. Flowers more or less pinkish, pendent after anthesis. Late spring to end of summer. Cultivated and frequently escaped along roadsides, etc. -- (Mack)-Y-Aka, L-(NF)-SPM, NS-BC, US, Eur -- F. PROLIFERUM Dore -- Floral parts replaced by a mass of small scales. Known from Beaverlodge. -- (Q-Q, Alta-BC) -- F. ALLIOIDEM Dore -- Also a local form, has a mis-shaped corolla that remains included in the calyx and never opens: Sylvania. -- S.

4. *T. REPENS* L. var. REPENS -- White Clover (Trèfle blanc) -- The leaflets carry near the base a very obvious white marking shaped like a \wedge (= lambda). Perennial, creeping and rooting at the nodes. Shoots of the year floriferous but simple, the branches arising only the following year. Inflorescence globular, borne on a long erect peduncle. Flowers white to pinkish, drooping after anthesis. Late spring and summer. Often grown in lawns and escaping to wetish places, ditches, roadsides, waste lots, etc. -- G, Mack-Aka, L-SPM, NS-BC, US, Eur.

Some European authors will distinguish a number of varietal segregates, such as a much smaller var. alpinum Schur, a spreading-pubescent var. alpestre Gussone, and many others.

5. *T. PRATENSE* L. -- Red Clover, Honeysuckle-Clover (Trèfle rouge) -- The heads are subtended by usually two large trifoliate bracts, nearly as large as the leaves. Perennial, hispid, tufted, decumbent to more or less erect, 3-6 dm high. All upper stem leaves subtend either a branch or an inflorescence. Leaflets marked above by a pale green or purple \wedge . Flowers red to purple, remaining erect. Calyx teeth very long and spinose after anthesis. Late spring and summer. An infrequent escape along fences, etc. -- (G), Y-Aka, L-NF-(SPM), NS-BC, US, Eur -- F. LEUCOCHRACEUM Asch. & Pohl -- Flowers white. -- Q, Man.

7. *LOTUS* L.

Anther filaments dilated towards the summit. Trifoliate and the flowers in heads as in Trifolium, but the leaflets entire and the heads few-flowered or even reduced to a single flower. Inflorescence subtended by a bract. Legume dehiscent.

- a. Flowers solitary 3. L. Purshianus
 aa. In small heads.
 b. Calyx lobes 1.5-2.0-(2.5) mm long.... 1. L. corniculatus
 bb. Larger, 2.5-4.0 mm long; leaflets
 typically larger 2. L. pedunculatus

1. L. CORNICULATUS L. -- Birdsfoot-Trefoil (Patte d'oiseau) -- Leaf pinnate with 5 leaflets, two of which are borne near the stem and resemble a pair of large stipules at the base of a trifoliate leaf. Tufted, branched perennial 2-6 dm high. Leaflets 3-10 mm long. Inflorescence a few-flowered head, axillary on a long peduncle, the bract subtending the head small and simple to trifoliate. Corolla two-toned: pale and brownish yellow. Legu-

me 2-4 cm long. Summer. An infrequent escape of waste places, etc. --NF-SPM, NB-Man, Alta-33, US, (Eur).

The only record for Saskatchewan, Blue Jay 20:116. Sept. 1962 was based on Wagner & Ledingham 3417, Regina, roadside ditch, plant over several square yards, July 17, 1962 (NY; DA, photo). It has since been revised to L. pedunculatus and is the only record of the latter for our area.

2. L. FERRUGINEUS Cav. (L. uliginosus Schkuhr) -- Closely resembling the first, but generally larger. Up to 11 dm high. Leaflets oblanceolate, (5)-10-15-(20) mm long. Calyx lobes 2.5-4.0 mm long, nearly always very long ciliate. Summer. Recently introduced and still rarely escaped: Regina. -- NS, NB-3, S, 33, US, (Eur, Afr).

3. L. Purshianus (Benth) Clem. & Clem. (L. americanus (Nutt.) Bisch.; Hosackia americana (Nutt.) Piper) -- Spanish Clover -- Flower solitary, subtended by a bract reduced to a single leaflet. Erect, pilose annual, branched above. Stipules minute and furaceous. Calyx about as long as the pinkish corolla. All summer. Ditches and creek banks. -- sMan-seS, swBC, US, (CA).

Highly variable south of the border and many debatable segregates have been proposed, but more recent floras have taken to dealing with this species sensu amplo. While this may be a justifiable procedure for the U.S. material, the Canadian specimens clearly fall into a pair of readily recognizable entities with good morphology and a wide geographical discontinuity. These may be defined as follows:

L. Purshianus -- Leaves all trifoliate, peduncle much longer than the flowers; single-stemmed.

L. unifoliolatus (Hooker) Benth -- Branch leaves mostly unifoliate; peduncle shorter than the flower; mostly many-stemmed. Southeastern B.C.

8. PSORALEA L.

Anthers alternately dimegath. Legume indehiscent, one-seeded. Leaves trifoliate to digitate, usually punctate.

- a. Leaves all trifoliate 1. P. lanceolata
- aa. Some leaves digitate.
 - b. Silvery and silky appressed-pubescent 2. P. argophylla
 - bb. Long spreading, hirsute 3. P. esculenta

1. P. lanceolata Pursh var. lanceolata (Psoralidium lanceolatum (Pursh) Rydb.) -- Scurf-Pea -- Finely punctate throughout in brownish black. Long stoloniferous sand binder. Leaves trifoliate. Leaflets narrowly oblanceolate, entire, glabrous above. Inflorescence small, axillary. Corolla small, white, with a large blue dot on the keel. Legume 4-6 mm long, coarsely rugose-punctate. All summer. Dry sand. --swS-sAlta, US.

Ours have the legumes pilose with hairs 0.5-1.0 mm long. Specimens from the more western parts of the U.S. range exhibit legumes more densely pilose and the hairs more uniformly 1.0 mm

long; these are barely distinguishable as var. Purshii (Vail) Piper.

2. P. argophylla Pursh (Psoralidium argophyllum (Pursh) Rydb.) -- The whole plant silvery-shiny in the sun, being densely appressed silky. Tap root thickened, weakly linked to the erect stem. The fine, dark green punctation hidden under the pubescence. Main leaves with 5 leaflets, the other trifoliate. Leaflets oblong to oblanceolate, entire. Flowers small, in an interrupted spike. Corolla blue, drying brown. Summer. Steppes and hillsides. -- sMan -seAlta, US.

3. P. esculenta Nutt. (Pediomelum esculentum (Fursh) Rydb.) -- Cree-Turnip, Breadroot (Navet de prairie, Forme de prairie, Pomme blanche) -- Very long villous throughout, not punctate. Taproot thin and fragile in the upper 5-10 cm, thickened below into an oblong, starchy, edible tuber. Leaves all or mostly with 5 leaflets, these oblanceolate, glabrous above. Flowers in a dense raceme, pale blue with a dark blue spot. Legume enclosed in the long calyx. Mid spring to mid summer. Hillsides, especially along coulees. --sMan-Alta, US.

9. AMORPHA L.

FALSE INDIGO

Corolla reduced to a single petal, the 10 stamens fused at the base only. Leaves pinnate, punctate. Leaflets stipellulate.

- a. Densely short villous, often grayish 1. A. canescens
- aa. Glabrous to sparsely pubescent.
 - b. Leaflets 1 cm long or less 2. A. nana
 - bb. Obviously longer 3. A. fruticosa

1. A. canescens Pursh -- Leadplant, Shoestrings -- The year's shoots numerous, herbaceous, mostly simple, arising from a shrubby base. Leaf almost sessile. Leaflets crowded and very numerous, mostly 30-50, oblong, entire, about 1 cm long, much paler below. Flowers dark purple. Pod small, canescent. Mid summer. Dry hills, mostly on sandy or rocky ground. -- wO-sMan, US.

2. A. nana Nutt. (A. microphylla Pursh) -- Shoestrings, False Indigo -- Branchy shrub less than 1 m high. Leaflets quite numerous, oblong, light green on both sides, conspicuously glandular-punctate below and glabrous or nearly so. Pod small, glabrous, strongly glandular-punctate. First half of summer. Hilly prairies, mostly on the Prairie Coteau. -- sMan, US.

3. A. fruticosa L. var. angustifolia Pursh -- Bastard Indigo, Indigo-Bush (Indigo bâtard) -- Shrub, usually 1-2 m high. Pubescence rather strigose. Leaves with 5-10 pairs of leaflets, these oblong, 1-3 cm long. Petal purple-blue. Pod with conspicuous, brown, glandular spots. First half of summer. Galerie - forests of the Red River to the Sault à la Biche. -- swQ, scMan, US, CA.

In the more eastern var. fruticosa the pubescence of the younger parts is of spreading and somewhat longer hairs.

10. PETALOSTEMON Mx. PRAIRIE CLOVER

Stamens only 5, alternating with the 4 petaloid staminodes and the lone petal. Flowers in very compact terminal racemes, looking much like a cylindrical to globular head. Leaves pinnate, punctate. Pod small, indehiscent.

- a. Leaflets 11-13 1. P. villosum
 aa. Leaflets fewer, 3-7.
 b. Flower violet-pink 2. P. purpureum
 bb. Flower white 3. P. candidum

1. P. villosum Nutt. -- The large fleshy taproot like a red-brick carrot. Tufted perennial densely soft villous all over. Leaflets 0.5-1.0 cm long, black-punctate dorsally. Raceme 2-6 cm long. Calyx long villous, neither glandular nor punctate. Flowers pink. After mid-summer. Sandy blowouts. -- swMan-scS, US.

2. P. purpureum (Vent.) Rydb. var. purpureum -- Thimbleweed, Red Tassel-Flower -- Tufted perennial, glabrous to somewhat pubescent. Leaflets 3-5, narrow, 1-2 cm long, punctate dorsally with about 6 rows of purple dots. Flowers pale pink to magenta. Before mid-summer. Dry open places, especially if hilly. -- O-sAlta, US -- F. albiflorum Hoor & McGregor -- Flowers white or nearly so, Local: Carey. -- Man, (US) -- Var. molle (Rydb.) Boivin (var. pubescens (Gray) Boivin; P. mollis Rydb.) -- Stem and foliage grayish-villous. Hillsides of major coulees. -- swS-sAlta, (US).

Var. molle (Rydb.) stat. n., P. mollis Rydb., Mem. N.Y. Bot. Gard. 1: 238. 1900; P. purpureum mollis (Rydb.) A. Nelson ex Coulter & Nelson, Man. Bot. Rocky Mts. 299. 1909; P. purpureum (Vent.) Rydb. var. pubescens (Gray) Boivin, Nat. Can. 87: 43. 1960 nec P. purpureum (Vent.) Rydb. var. pubescens (A. Nelson) Harrington, Man. Pl. Colo. 319, 641. 1954.

Var. purpureum is native in our area but adventive in Ontario at Ingolf and possibly also at Pt. Edward.

3. P. candidum (W.) Mx. (var. oligophyllum (Torrey) Herman, var. occidentale Gray; P. occidentale (Gray) Fern.; P. oligophyllum (Torrey) Rydb.) -- White Prairie-Clover, White Tassel-Flower -- Much like the preceding and usually growing with it, but white-flowered. Stems and foliage glabrous. Leaflets 5-(7), with dark-green spots on the back. Calyx with a ring of 10 or more large brown glands. Mid summer. Dry places, usually on hillsides. -- wO-sAlta, US.

Willdenow's publication precedes Michaux' by one year, hence the author reference used above. See Article 30 of the International Code of Botanical Nomenclature for the relevant dates of publication. Now this change of authorship should not affect the application of the name as Willdenow's type is presumably a duplicate of Michaux' collection.

Many authors will distinguish a more western var. oligophyllum (or var. occidentale). Sometimes treated as a distinct species, in which case the correct name is P. virgatum Nees because

earlier. However we have not been able to distinguish clearly among our Canadian material a more western var. oligophyllum characterized by larger leaflets, longer peduncle, longer bracts, pubescent calyx, etc.

The various morphological types have the same range in our area and the intermediates are numerous. The primary character of calyx pubescence showed about 1/5 of intermediates and the remainder of the material from Manitoba eastward was about equally divided between the two types of pubescence while the more western material showed a preponderance of pubescent calices. Other characters were even less clearly segregated geographically and were not particularly linked together. Obviously all we can detect here is a difference in relative frequency of characters and it is not possible to detect a geographically restricted type unless one is willing to shift the emphasis now to one character, now to another, in accordance with the place of origin of the specimen and a preconceived distributional pattern. Our U.S. material is too limited and we can not confidently state that our observations are equally applicable south of the border.

11. CARAGANA Lam.

Shrubs with paripinnate leaves, that is the terminal leaflet is lacking and the rachis merely ends into a spiny point.

1. C. ARBORESCENS Lam.-- Caragana (Caragana, Arbre aux pois) -- Stoloniferous shrubs, usually 1-3 m high. Stipules somewhat spinescent. Flowers yellow, few, borne on the short shoots. Legume pendent. Mid spring. Much planted, persistent and more or less spreading by roots and perhaps also by seeds. -- (Y), Q, Man-Alta-(BC), Eur.

12. ASTRAGALUS L.

MILK-VETCH

A generalized type of Leguminosae. Perennial herbs with pinnate leaves and entire leaflets. Flowers papilionaceous with fused sepals and free petals. Stamens in two groups, one stamen being free, the other 9 fused by their filaments. Flowers in axillary racemes. Leaflets usually not punctate. Stem usually well developed.

- a. Stemless or the stem short and poorly developed, usually less than 1 dm long, no longer than the peduncle of the inflorescence Group A
- aa. Stem well developed, usually more than 1 dm long.
 - b. Inflorescence very compact, almost in the manner of a Trifolium Group B
 - bb. Inflorescence looser and more elongate, often secund.
 - c. Flowers small, 4-10 mm long Group C
 - cc. Flowers longer.
 - d. Flowers very long, 15-30 mm long Group D
 - dd. Flowers middle-sized Group E

Note also that species 1-17 have unilocular legumes while 18 to 26 have a false partition and are more or less bilocular.

Group A

Stemless or the stem poorly developed, commonly not longer than the peduncles, and mostly less than 1 dm long.

Not to be confused with Oxytropis which has the leaves pinnate and the leaflets slightly asymmetrical at base.

- a. Not more than 3 leaflets.
 - b. Trifoliate 16. A. gilviflorus
 - bb. Leaf reduced to a single leaflet 12. A. spathulatus
- aa. Leaves pinnate.
 - c. Flowers yellow, with or without a purple patch on the keel.
 - d. Flowers 8-9 mm long 5. A. lotiflorus
 - di. Flowers 20-30 mm long 15. A. Purshii
 - cc. Whitish to mauve or purple.
 - e. Flowers 11-20 mm long 11. A. missouriensis
 - ee. Obviously smaller.
 - f. Ovary and fruit glabrous to lightly white strigose 3. A. miser
 - ff. Densely black pubescent.
 - g. Inflorescence dense at flowering time, elongating in fruit 18. A. alpinus
 - gg. Inflorescence elongate at flowering time 9. A. Bourgevilii

Group B

Flowers in compact heads, almost like a Trifolium.

- a. Tufted 27. A. adsurgens
- aa. Finely stoloniferous 28. A. danicus

Group C

Flowers small, 4-10 mm long; stem well developed.

- a. Leaflets sharp pointed and spinescent ... 10. A. Kentrophyta
- aa. Leaflets not spinescent.
 - b. Raceme on a short peduncle, 1-2 cm long 11. A. vexilliflexus
 - bb. Peduncle much longer.
 - c. Calyx teeth broadly deltoid and + 0.5 mm long 2. A. americanus
 - cc. Calyx teeth much narrower and longer.
 - d. Peduncle short, much shorter than its raceme 7. A. tenellus
 - dd. Peduncle about as long as to much longer than its raceme.
 - e. Leaflets numerous, mostly

- in 8-15 pairs.
- f. Pubescence white 6. A. flexuosus
- ff. Black pubescent in the inflorescence.
- g. 4-15 dm high 24. A. falcatus
- gg. Smaller, 3 dm high or less 18. A. alpinus
- ee. Leaflets fewer, mostly in 4-9 pairs.
- h. Stems weak, decumbent 3. A. Bodinii
- hh. Stems ascending to erect.
- i. Stipules not fully encircling the stem 19. A. eucosmus
- ii. Lower stipules fully encircling the stem and * fused together on the other side of the stem.
- j. Remotely flowered ... 8. A. miser
- jj. Flowers closely imbricated at flowering time.
- k. Flowers borne on pedicels 3-4 mm long 21. A. Robbinsii
- kk. Pedicels shorter, less than 3 mm long 20. A. aboriginum

Group D

Flowers large, 15-30 mm long. Stems well developed.

- a. Leaves narrowly pectinate, the segments 2 mm wide or less 13. A. pectinatus
- aa. Leaves obviously pinnate.
- b. Stem stiffly long-hirsute 22. A. Drummondii
- bb. Pubescence shorter and more or less appressed.
- c. Calyx more or less black-pubescent ..
..... 29. A. crassicaarpus
- cc. Entirely white-pubescent 23. A. racemosus

Group E

Flowers middle-size; stem well developed.

- a. Flowers white to yellow.
- b. Flowers remote 8. A. miser
- bb. Densely flowered.
- c. Flowers yellow, ascending 26. A. Cicer
- cc. Flowers white to lightly greenish.

- d. Calyx teeth broadly deltoid and
± 0.5 mm long 2. A. americanus
- dd. Longer and narrower.
 - e. Stipules broad-based, short-
connate on the other side of
the stem 25. A. canadensis
 - ee. Narrow-based and free from
one another 4. A. neglectus
- aa. Flowers pink to purple.
 - f. Standard very wide, almost orbicular 1. A. isochrous
 - ff. Narrower, the flower ± lanceolate.
 - g. Leaflets all or mostly linear and
2 mm wide or less 8. A. miser
 - gg. Leaflets wider.
 - h. Most of all leaves with 15
leaflets or less 21. A. Robbinsii
 - hh. Mostly 15 or more leaflets.
 - i. Pod sulcate, black hairy 18. A. alpinus
 - ii. Bisulcate and white
strigose 17. A. bisulcatus

The key above stresses the flowers. The text below stresses the very characteristic fruits.

1. A. Iochrous Barneby (Swainsona salsula (Pallas) Taub.)
-- Pod inflated and very large, very long stipitate. Coarse, tufted and long stoloniferous, the stems 4-9 dm long. Racemes elongate, loosely flowered. Pedicels rather long. Flowers about brick red, fading purple, with a very widely spreading standard. Legume glabrous, ovoid, about 2 cm long, the stipe about twice as long as the calyx. All summer. Saline shores: Maple Creek, -- S, US, Eur.

Sometimes placed in the Australian genus Swainsonia, sometimes in the monotypic Sphaerophysa. The latter differs from Astragalus merely by a few more hairs on the style and one is tempted to say that the similarities to Astragalus greatly outweigh the difference.

2. A. americanus (Hooker) M.E. Jones (A. frigidus (L.) Gray var. americanus (Hooker) Watson; Phaca americana (Hooker) Rydb.) -- With large pendulous pods, inflated and lanceolate. Stems erect, about 1 m high and mostly solitary, sometimes stoloniferous. Stipules rather large. Flowers white, descendent. Calyx with very low teeth, glabrous or nearly so. Legume pale green, glabrous, about 2 cm long, thin walled, the stipe nearly twice as long as the calyx. First half of summer. Aspen groves and forest margins. -- Mack-Aka, Q-BC, US.

3. A. Bodinii Sheldon var. yukonis (M.E. Jones) Boivin (A. yukonis M.E. Jones) -- The pod small, 5-10 mm long ellipsoid, strigose, sessile, asymmetrical. Tap root with a more or less buried crown, branching into a very large number of weak decumbent stems, often forming circular mats about 1 m across. Raceme few-flowered on a very long peduncle. Corolla mauve to blue.

First half of summer. Grassy places, especially disturbed places. -- Mack-Aka, nMan, nAlta.

Stat. n., A. yukonis M.E. Jones, Rev. N. Am. Sp. Astr. 69. 1923. Our variety has a more elongate and much laxer inflorescence than the more southern typical phase.

The rather large apparent distributional gap across the central part of our area is presumably an artifact resulting from insufficient collecting across northern Saskatchewan.

Macoun 1883 reports A. microcystis Gray for Saskatchewan on the basis of an 1875 collection from the Methye River. No such collection has been located and under that name we have found only the following: Macoun 4370, West of North Saskatchewan River, grassy slopes, Aug. 23, 1873 (CAN; DAC, photo). However, the latter has been revised to A. Bodinii var. yukonis.

4. A. neglectus (T. & G.) Sheldon (A. Cooperi Gray) -- Large sessile pods, inflated and glabrous. Erect perennial about 1 m high, lightly strigose. Inflorescence lax. Flowers white. Legume 1.5-2.5 cm long, ovoid, sessile in the calyx, ascending on a stiff pedicel. Early summer. Open Aspen groves on gravelly soil. -- O-seMan, (US).

Has been reported for northeastern Alberta by Raup 1936. At least his collection 7056 has been revised to A. Bodinii var. yukonis.

The correct name of this entity has given some trouble in the past. Astragalus neglectus (T. & G.) Sheldon 1894 is based on Phaca neglecta T. & G. 1838. The latter is in no way affected by the existence of an earlier Astragalus neglectus Fischer ex Steudel, Nom., ed. 2: 162.1840 since the latter is a nomen nudum. The case of Astragalus neglectus Freyn 1893 and of A. neglectus (Freyn) Freyn 1895 has been recently discussed by Barneby 1964; the first is an inadmissible form, being a binomial to designate a subspecies, while the second is illegitimate as a later homonym. There seems to be no reason to take up A. Cooperi Gray 1856.

5. A. lotiflorus Hooker (Batidophaca lotiflora (Hooker) Rydb.) -- Tufted, the stems very short, 1-3 cm long, with the fruits mostly born among the leaf bases, or some of them on a scape. Plant and pods quite pilose or strigose. Raceme short. Flowers yellow, small. Pod sessile, broadly lanceolate. Mid spring. Gravelly or sandy hillsides. -- sMan-BC, US.

Despite numerous Manitoba reports and many collections under that name, the Treesbank specimens proved to be the only collection east of Regina to be correctly identified. To be searched for along the Agassiz Coulee from Craven east to Brandon.

6. A. flexuosus (Hooker) Douglas var. flexuosus (Fisophaca flexuosa (Hooker) Rydb.) -- Pod cylindrical, 10-16 mm long, spreading to drooping, straight to falcate, finely pubescent. Tufted plant, gray pubescent. Stems 2-7 dm long. Racemes somewhat secund, the flowers distant. Corolla white to light purple. Early summer. Steppes, especially on light soils. -- sMan-sBC, US.

Native in our area. Probably introduced at Cranbrook which is the only known locality west of us.

Legumes mostly 3-4 mm thick. A more southern variety, var. Greenii (Gray) Barneby has somewhat inflated pods, 5-9 mm thick.

7. A. tenellus Pursh var. tenellus (Homalobus tenellus (Pursh) Britton) -- Pod flat, purple-blotched and usually drying black. The whole plant tending to dry black. Stems 2-7 dm high. Racemes somewhat lax and secuni. Flowers whitish, often with a large purplish patch. Legume 6-15 mm long, oblong to oblong-lanceolate, glabrous. Late spring to mid summer. Hillsides and shores. -- sMack-swY, Man-BC, US.

The more southern var. strigulosus (Rydb.) Hermann has a strigose ovary and legume, and a flower more consistently small, being 6-7 mm long.

8. A. miser Douglas var. miser -- Flat, drooping pods about 2 cm long. Tufted and the stems very variable in length. Foliage rather thin, the leaflets mostly linear and mostly less than 2 mm wide, strigose on both faces. Flowers distant, white to pale rose or pale blue. Late spring to mid summer. Dry open slopes at low altitude in the Rockies, rare: Waterton. -- Alta-seBC, (US) -- Var. serotinus (Gray) Barneby (A. decumbens Nutt.) Gray var. serotinus (Gray) M.E. Jones; A. serotinus Gray -- Leaflets glabrous above. Flowers somewhat smaller, the calyx 2-4 mm long and the keel 6-8 mm long. More common: Rockies. -- Alta-seBC, wUS.

9. A. Bourgovii Gray -- Pods flat, black-strigose and unilocular, otherwise much like A. alpinus and easily confused with it. Also, more densely tufted and less densely flowered. Stems 1-2 dm high. Leaflets finely strigose. Fruiting racemes more or less secuni, the pods spreading to drooping. Legume lanceolate, 1.5-2.0 cm long, short stipitate, the stipe shorter than the calyx tube. Up to mid summer. Alpine prairies. -- Alta-seBC, US.

10. A. Kentrophyta Gray var. Kentrophyta (Kentrophyta montana Nutt.) -- Quite spinescent because of the stiff leaflets ending in a sharp point. Half-buried in loose sand and spreading from a central tap root. Densely strigose, the stems whitish. Stipules connate and forming obvious sheaths 1-2 mm long. Leaves small, mostly with 7 leaflets and sparsely dotted, the dots green to brown. Inflorescence rather small, on a short peduncle. Flowers white, few, 4-5 mm long, often with a purple patch. Legume 5-6 mm long, slightly compressed, narrowly ovoid. Late spring. Loose sands. -- swS-sAlta, US.

A number of varieties occur further south, of which one may mention var. elatus Watson, a more or less erect plant with more or less acuminate legumes.

11. A. vexilliflexus Sheldon var. vexilliflexus (Homalobus vexilliflexus (Sheldon) Rydb.) -- Much like the preceding and similarly small, the leaves small, with few leaflets, the flowers and fruits also small. But the flowers bluish and the foliage soft. Stems 2 dm high or less, densely tufted, but not buried. Mid spring to mid summer. Eroded badlands. -- swS-sAlta-seBC, wUS.

Leaflets glabrous above. In central Idaho there is a var. nubilus Barneby with leaflets strigose or velvety above.

12. A. spathulatus Sheldon (A. caespitosus (Nutt.) Gray;

Homalobus caespitosus Nutt.) -- Leaf reduced to a single leaflet. Stemless and forming dense convex cushions. Whitish-silky. Leaflets 1-3 cm long, linear. Scapes 3-8 cm high, few flowered. Flower purple, 6-7 mm long. Legume about 1 cm long, flattened, lanceolate, ascending. Mid spring. Badlands. -- swS-sAlta, US.

The name is usually written as spatulatus, but this form would seem to be more in accord with english usage. Spathulatus is the correct latin spelling.

13. A. pectinatus (Hooker) Douglas (Cnemidophacos pectinatus (Hooker) Rydb.) -- Leaf narrowly pectinate rather than pinnate, the remote segments mostly 1-2 mm wide and 2-5 cm long. Stems 2-5 dm long, half decumbent. Flowers 1.5-2.5 cm long, creamy yellow and quite showy. Legume 1-2 cm long, ellipsoid, becoming woody and with prominent sutures. Second half of spring. Steppes and hillsides. -- swMan-sAlta, US.

14. A. missouriensis Nutt. var. missouriensis (Xylophacos missouriensis (Nutt.) Rydb.) -- A short-stemmed species with rather large and deeply coloured flowers. The tufted stems 1-10 cm long. Hairs malpighiaceous. Leaflets grayish silky on both faces. Raceme compact in flower, elongating in fruit. Flowers 14-20 mm long, magenta to purple-blue. Calyx 8-11 mm long, including the teeth. Legume 2-3 cm long, chestnut brown, more or less sulcate ventrally. Spring and early summer. Dry prairies. -- swMan-sAlta, US.

Varies further south to a var. amphibolus Barneby with falcate legumes and to a var. mimetes Barneby with shorter flowers.

15. A. Purshii Douglas var. Purshii -- The pods white-lanate with a very dense and very long tomentum. In small tufts and stemless, the whole plant densely villous. Flowers few, large, yellow with keel purple-tipped. Legume 1.5-2.0 cm long, ovoid, curved, somewhat sulcate ventrally. Early spring. Steppes on dry hills: Climax, Manyberries. -- swS-sBC, US.

Flower very small, 2-3 mm long, yellow with a purple-tipped keel. Not too clearly distinct from the more western var. glau-reosus (Douglas) Barneby with purplish flowers only 1.0-2.5 mm long.

16. A. gilviflorus Sheldon (A. triphyllus Pursh; Crophaca caespitosa (Nutt.) Britton) -- Leaves trifoliolate. Stemless, caespitose, forming small dense cushions, silvery-silky throughout. Leaflets 1-3 cm long, oblanceolate. Racemes reduced to 1-2 flowers, subsessile among the leaf bases. Flowers 1.5-3.0 cm long, yellow, purplish on the keel. Legume small, white-lanate, more or less hidden in the calyx. Spring. Eroded hillsides and very showy when in flower. -- (Man)-S-Alta, US.

The Manitoba reports are questionable. The records for Reston and Lyleton have yet to be traced to correctly named specimens. The East Crossing of the Souris River is a North Dakota locality (Woodend) at the mouth of the Willow River.

17. A. bisulcatus (Hooker) Gray var. bisulcatus (Diholcos bisulcatus (Hooker) Rydb.) -- Skunk-Weed -- Pod deeply bisulcate ventrally. Malodorous, tufted, 2-7 dm high, finely strigose.

Flowers 11-15 mm long, numerous, in dense racemes, magenta, fading blue, stinking of old urine. Legume 10-15 mm long, pendent, cylindrical, strigose, short-stipitate. Late spring to mid summer. Rolling prairies and steppes, often on saline or selenic soils. -- sMan-Alta, US -- F. albiflorus Boivin. Flowers white, local. -- S.

F. albiflorus f.n. Floribus albis. Type: A.C. Budd 209, Saskatchewan Landing, roadside ditch, white flowered, June 18, 1946 (SCS).

In the southwestern U.S.A. one may find two more varieties with shorter corolla and standard: var. Haydenianus (Gray) Barneby and var. nevadensis (M.E. Jones) Barneby.

18. A. alpinus L. var. alpinus (Atelephragma alpinum (L.) Rydb.) -- Pod black hairy, deeply sulcate dorsally. Tufted and stoloniferous from a deeply buried tap root, and forming loose patches. Stems thin, very short to 4 dm high. Leaflets glabrous to hirsute. Inflorescence black-strigose throughout, long-petioled, secund, few-flowered, at first dense, elongating in fruit. Calyx tube 2.5-3.5 mm long. Flowers 9-13 mm long, mauve, drying blue, the keel longer than the wings. Legume stipitate, exert, pendent, straight or falcate. Late spring. Alpine prairies, river gravels and disturbed soils. -- (G)-F-Aka. L-(NF), sMan-neS-wAlta-BC, US, Eur -- Var. Brunetianus Fern. (var. labradoricus (DC.) Fern.) -- Calyx tube only 2.0-2.5 mm long. River gravels. -- L-NF, NS-BC, US.

Habitally similar to Oxytropis deflexa var. capitata. The varieties distinguished herewith are defined differently from other current treatments; the resulting distributions are also different. Barneby 1964 places the accent on the strigose pubescence of the calyx. The resulting distribution for var. Brunetianus is much more restricted: NF, wNB-sQ, neUS: but then Barneby admits that the distinction is not always very clear and that quite a few Rocky Mountain sheets must be identified with due regard to their place of collection. We are not very happy with varieties for which the place of origin tends to become a taxonomic character.

We consider that an individualized distribution is normally a resulting characteristic of a sound taxon at the level of variety or above. It results from the taxon having enjoyed an independent history on a geological time scale. A population having become isolated by genetic or geographical or other barriers, it will pursue an independent evolution until it may become phenotypically recognizable. Simultaneously the range of this taxon will also evolve independently, now expanding here, now retracting there, until it offers a pattern unlikely to be duplicated by any of its close relatives.

However an individualized distribution and a place of origin are not taxonomic characters per se. Any taxon in which the place of origin plays too large a role in identification is likely to prove to be of little taxonomic value, if not purely arbitrary.

19. A. eucosmus Rob. var. eucosmus (Atelephragma elegans

(Hooker) Rydb. -- Ovoid pods drooping, black-pubescent. Somewhat similar to the preceding. Tufted, 3-5 dm high. Leaves mostly with 13-15 leaflets. Inflorescence black-pubescent. Flowers 6-7 mm long, purplish. Legume 7-10 mm long, not sulcate, slightly falcate, sessile and usually rupturing the calyx at maturity. Late June. River gravels and sands on shores and bluffs. -- F-Aka, L-NF, MB-BC, US -- *F. leucocarpus* Lepage -- Pods and calyces with the pubescence entirely white. -- (Aka, Q)-O, S-BC.

The more eastern var. *Fernaldii* (Rydb.) stat. n., *Atelophragma Fernaldii* Rydb., Bull. Torr. Bot. Club 55:126. 1928; *Astragalus Fernaldii* (Rydb.) H.F. Lewis, Can. Field-Nat. 46:36. 1932, differs by its slightly larger and short stipitate legume, the stipe 1-3 mm long, the body of the legume 10-15 mm long. This variety is fairly neatly intermediate to *A. Robbinsii*.

In such a case of intermediate variety, it seems generally preferable to attach it to the species of coincident range. Because the intermediate type is much more likely to be derived from the species near at hand than from the more remote one. Further, any problem of distinctiveness and identification is much more likely to involve the near at hand species rather than the remote one.

20. *A. aboriginum* Rich. var. *aboriginum* (*A. aboriginorum* sphalmate; *Atelophragma aboriginorum* (Rich.) Rydb.) -- Long-stipitate, semi-lanceolate legume. Tufted, 2-4 dm high. Stem densely and finely hirsute, the hairs spreading. Leaves mostly with 9-11 leaflets, these 1-3 cm long, elliptic-lanceolate to linear-lanceolate, hirsute on both faces. Inflorescence at first dense, somewhat elongating. Flowers 7-10 mm long, creamy white to purplish on the keel and standard, drying bluish. Legume strongly flattened, straight to falcate, often slightly sulcate dorsally, the body glabrous to white-pubescent, 1.5-2.2 mm long, the stipe about twice as long as the calyx. Late spring. Open, sandy or gravelly places. -- sMack-Aka, seQ, Man-BC, US -- Var. *major* Gray (var. *glabriusculus* (Hooker) Rydb.; *A. linearis* (Rydb.) Pors.) -- Less densely pubescent to nearly glabrous, the pubescence appressed. -- Y-Aka, wQ, swMan-BC, US.

This is a much subdivided species. None of the proposed segregates seems to present sufficient morphological discontinuity to warrant specific rank. The better defined phenotypes may be recognized as varieties as follows.

- a. Stem hirsute.
 - b. Flowers 6-10 mm long var. *aboriginum*
 - bb. Larger, 10-15 mm long, and more deeply coloured, mostly pink to purplish, usually turning bluish in drying var. *Richardsonii*
- aa. Pubescence strigose and usually less abundant.
 - c. Flowers 6-10 mm long var. *major*
 - cc. Larger, 10-14 mm long var. *Lepagei*

Var. *Lepagei* (Hultén) stat. n., *A. Lepagei* Hultén, Fl. Aka. Yuk, 10:1761. 1950. Known from northern Mackenzie district and

Umiat in Alaska.

Var. Richardsonii (Sheldon) stat. n., A. Richardsonii Sheldon, Bull. Geol. Nat. Hist. Surv. Minn. 2:126. 1854. Known from the western parts of the Arctic Archipelago and the northern reaches of Mackenzie district.

21. A. Robbinsii (Cakes) Gray (A. Macounii Rydb.; A. occidentalis (Watson) M.E. Jones) -- The narrowly ellipsoid pods black-pubescent and descendent. Stems 2-6 dm high. Leaves with 9-13 leaflets, these elliptic to lanceolate. Flowering racemes dense, elongating in fruit, becoming secund. Flowers 9-12 cm long, mauve or pale blue. Legume 1.0-1.5 cm long, stipitate, mid spring to early summer. Rivers shores and banks. -- (Mack-Y)-Aka, (NS), Alta-BC, US.

Varies in a manner reminiscent of A. aboriginum except that the various phenotypes do not seem to be restricted geographically.

22. A. Drummondii Douglas (Tium Drummondii (Douglas) Rydb.) -- The whole, and especially the stem, stiffly hirsute, the hairs very long. Stems 4-6 dm high. Flowers pale yellow, at first spreading, then pendent. Legume glabrous, pale green, drooping, cylindrical, dorsally sulcate, long stipitate. The body of the fruit is 1.5-2.5 cm long. Late spring to mid summer. Growing as scattered clumps in the Fescue prairies. -- S-Alta, US.

23. A. racemosus Pursh -- Pod triangular, flattened into 3 wings. Otherwise quite similar to A. canadensis and easily confused with it when in flower. Flowers bigger, 15-18 mm long, creamy white, spreading to drooping. Legume spreading to drooping, glabrous, sulcate dorsally and concave on both sides. Body of the pod about 2 cm long. Stipe very long. Late spring and early summer. Dry or eroded hillsides, tolerant of selenium; from Craven and Moose Jaw to the Dirt Hills. -- scS, US.

Mentioned for Alberta by Jones 1923 and Gleason 1952. There is no Alberta specimen in any Canadian herbaria, nor at NY, nor (fide Barneby in litt.) at PCM where M.E. Jones' herbarium is now preserved. This mention of Alberta was possibly based on a misinterpretation of the original report by Macoun 1883 for the Moose Jaw region.

24. A. FALCATUS Lam. -- Habitally similar to A. canadensis, but in its fruit more like A. alpinus, although much longer. Stems (4)-10-(15) dm high. Hairs strigose and partly malpighiaceous, black in the inflorescence. Flowers 1 cm or a little longer, pendent, whitish yellow with a purple tinge on keel and edge of standard. Legumes 2.0-2.5 cm long, pendent, strongly falcate, deeply sulcate dorsally, black strigose. Early summer. Rarely spreading or persisting from experimental plantings: Brandon. -- sMan, (nwUS, Eur).

25. A. canadensis L. var canadensis. -- The fruiting raceme very dense and of stiffly erect pods. Stems 1 mm high or less, erect, solitary or in small tufts. Peduncle usually much shorter than the subtending leaf. Flowers 11-15 mm long, at first slightly ascending, then slightly descending, those colle'ed in bud

usually developing a large brown spot in drying. Legume about 1.5 cm long, short-cylindric, sessile, glabrous. First half of summer. Moist open places. -- Mack, Q-BC, US.

Not to be confused with the habitually similar Glycyrrhiza. The latter has larger, acute and punctate leaflets.

West of us var. canadensis gives way to var. Mortonii (Nutt.) Watson with the ovary and fruit densely strigose.

26. A. CICER L. -- (Chiche de montagne) -- The inflated pods heavily black-hirsute at maturity. Stoloniferous, the stems 4-6 dm high, solitary. Leaflets strigose on both faces. Inflorescence dense, black-strigose. Flowers yellow. Legumes 1.0-1.5 dm long, ovoid to globular, maturing black, thin-walled. Early to mid summer. Rare weed of field crops; Brandon, Stavelly. -- Man, Alta, Eur.

27. A. adsurgens Pallas var. robustior Hooker (A. striatus Nutt.) -- Legume small, \pm 7 mm long, white-strigose. Tufted with a thick tap root. Stems numerous, 2-4 dm high, \pm decumbent at base. Leaflets mucronulate. Axillary racemes very compact, almost like a Trifolium, elongating slightly in fruit. Flowers 11-16 mm long, purplish, drying blue. Legume bilocular, sulcate. Early to mid-summer. Steppes and hillsides. -- Mack-(Y), O-BC, US -- F. Chandonnetii (Lunell) Boivin -- Flowers white or cream. -- Man-Alta, US.

Another type from Yukon and Alaska has short-stipitate fruits: var. tananaicus (Hultén) Barneby. The typical phase is siberian; its inflorescence is not quite so dense and the calyx is slightly shorter.

F. Chandonnetii (Lunell) stat. n., A. Chandonnetii Lunell, Am. Midl. Nat. 2:127. 1911.

28. A. danicus Retz. var. dasyglottis (Fisher) Boivin (A. agrestis Douglas; A. goniatus Nutt.; A. hypoglottis AA.) -- Generally similar to the preceding, but smaller and long stoloniferous. Stolons and stems thin. Leaflets \pm retuse at tip. Inflorescence dense, black-pubescent. Flowers 14-20 mm long, mauve to blue, drying blue, legume densely velvety with long white hairs. Mid-spring to early summer. Prairies. -- Mack-Y, NO-BC, US, Eur -- F. virgultulus (Sheldon) Boivin -- Flowers white. Local -- Mack, Man-Alta, (US).

Var. dasyglottis (Fischer) stat. n., A. dasyglottis Fischer ex DC., Prodr. 2: 282. 1825, nec. A. dasyglottis Pallas 1800; A. hypoglottis L. var. dasyglottis (Fischer) Led., Fl. Alt. 3:293. 1831.

There has been a fair amount of tergiversation about the correct name of this entity and about the distinctiveness of the american plant from the eurasian A. hypoglottis, A. danicus and A. dasyglottis.

We cannot detect any difference between the american A. agrestis and the siberian A. dasyglottis. The resemblance of A. agrestis to A. hypoglottis L. is superficial only; the latter is pilose (agrestis is strigose) with longer hairs, the bracts are longer and mucronate-ciliate, the leaflets are stubbier, the fruits is sharply triangular and at maturity the outer angles are

much flattened and almost wing-like. The distinctiveness from A. hypoglottis is ample enough to justify specific rank.

But the difference between A. dasyglottis and A. danicus is much more tenuous. There is no morphological discontinuity, only a series of tendencies, and barely marked enough at that to justify varietal rank. In var. danicus the pubescence is generally somewhat looser, the calyx bears more appressed pubescence and its tube and lobes are generally a bit shorter, the fruit averages shorter. Hence the classification adopted here which is intended to reflect the taxonomic situation.

Var. dasyglottis (Fischer) Boivin f. virgultulus (Sheldon) stat. n., A. virgultulus Sheldon, Minn. Bot. Stud. 1: 165. 1894.

29. A. crassicaulus Nutt. (var. Paysonii (Kelso) Barneby, var. trichocalyx (Nutt.) Barneby; A. caryocarpus Ker; A. mexicanus A.DC.; A. succulentus Rich.; Geoprumnon crassicaulus (Nutt.) Rydb.; G. succulentus (Rich.) Rydb.) -- Buffalo-Bean, Buffalo-Berry (Graines de boeuf) -- The large heavy pods resting on the ground. Stems numerous, tufted, only 1-2 dm long at anthesis, elongating to 4-(7) dm and rather decumbent in fruit. Leaflets slightly fleshy. Inflorescence dense. Flowers large, 15-25 mm long, at first cream to mauve-blue, fading mauve-blue, drying blue at least in part. Legume 1-2 cm long, bilocular, indehiscent, hard, subglobular to ellipsoid, thick walled, at first somewhat fleshy, becoming heavily wrinkled and more or less woody, glabrous, red above, green below. Mid to late spring. Steppes and hillsides. -- Man-Alta, US.

Varieties based on flower colour and pubescence of calyx do not seem to be geographically segregated in our area. If anything, the flower colour is partly related to the time of collecting, the colour darkening before the corolla fades, but even as the flowers open some plants are of a much darker colour than others.

A more southern species, A. gracilis Nutt., has been reported by Barneby 1964 from between Prince Albert and Rosthern. A rather unlikely range extension which requires confirmation.

13. OXYTROPIS DC.

Technically different from Astragalus by the legume having a false partition arising from the ventral suture. In Astragalus there is no such partition or, if there is one, it arises from the dorsal suture. In practice Astragalus is normally caulescent, while Oxytropis is nearly always stemless and the leaflets are asymmetrical at the base.

- a. Leaflets mostly fascicled in 2's or more, appearing subverticillate.
 - b. Inflorescence \pm capitate, with few flowers 9. O. arctica
 - bb. Flowers numerous in an elongate, \pm lanceolate inflorescence 10. O. splendens
- aa. Leaflets alternate to subopposite.
 - c. Inflorescence reduced to (1)-2-(3)

- flowers 2. O. podocarpa
 cc. Flowers more numerous.
 d. Glandular-verrucose, especially so on
 the calyx lobes 5. C. leucantha
 dd. Not glandular-verrucose.
 e. Corolla 4-11 mm long; legumes
 pendent 1. C. deflexa
 ee. Corolla obviously longer; legume
 erect to spreading.
 f. Flowers yellow or cream.
 g. Flowers about 2 cm long;
 leaflets 9-15 7. O. sericea
 gg. Flowers smaller, mostly
 around 1.5 cm long; leaflets
 usually more numerous.. 6. O. campestris
 ff. Flowers purple.
 h. Calyx long spreading villous.
 i. Legume included in the
 calyx 4. O. Besseyi
 ii. Long-exserted; leaves
 much shorter 3. O. Lanopus
 hh. Calyx appressed-pubescent.
 j. Flowers mostly around
 2 cm long; hairs mal-
 pigilaceous 0. O. Lambertii
 jj. Flowers smaller; hairs
 basifixed 6. O. campestris

1. O. deflexa (Pallas) DC. var. grisea T. & G. (var. de-
 flexa AA.; var. foliolosa (Hooker) Barneby; O. foliolosa Hooker)
 -- The stem usually short but clearly developed, the plant com-
 monly 2-4 dm high. Abundantly long-villous. Leaflets mostly
 2.5-4.5, the largest 1-2 cm long. Inflorescence at first ovoid,
 elongating while flowering, up to 1 dm long in fruit. Flower
 6-11 mm, mauve to bluish, drying deep blue. Legume 13-19 mm
 long. First half of summer. Around bluffs and near watercourses.
 -- Mack-BC, US -- Var. parviflora Boivin -- similar, but the flo-
 wers smaller, 4-5 mm long, mauve to cream, often drying livid.
 Calyx tube around 2 mm long. Legume mostly 10-14 mm long. Early
 summer. -- Mack-Y-(Aka), Alta-BC -- Var. capitata Boivin (var.
foliolosa AA.; O. foliolosa AA.) -- Nearly always stemless and
 less than 2 dm high. Inflorescence globular or nearly so, not
 elongating in fruit. Calyx tube 2.5-3.0 mm. First half of sum-
 mer. Shore gravels, cliffs and alpine scree. -- (F), Mack-Aka,
 NF, w-nC, swAlta-nBC, US.

2. O. podocarpa Gray var. inflata (Hooker) Boivin -- Very
 large bladderly pods. Low, densely tufted, the scapes up to 6 cm
 high. Leaflets densely strigose. Stipules long-ciliate, not
 glandular. Raceme reduced to (1)-2-(3) flowers. Flowers blue,
 1.5-1.8 mm long. Legume ovoid, short-stipitate, long-acuminate,
 the body 1.5-2.5 cm long, strigose. First half of summer. High
 alpine shale slides. -- (swMack), Alta-BC, WUB.

Often confused with typical var. *podocarpa* from the eastern arctic. The latter has a blackish-looking calyx because of the more abundant and longer black hairs, mostly 0.5-1.0 mm long; the white hairs absent or few, if present mostly 1.0-1.5 mm long and about 1 1/2 times as long as the black ones. In our var. *inflata* the black hairs are shorter and are long overtopped by the more abundant white hairs, the latter mostly 1.0-2.0 mm long and mostly 2-3 times longer than the black ones. Further, var. *inflata* shows more or less definite tendencies to laxer growth, longer leaves, longer and more numerous leaflets, longer scapes and bigger fruits.

3. *O. Lagerus* Nutt. var. *confusus* Barneby -- Fruit similar to the next, the calyx enlarging at maturity and not splitting, falling off with the legume, but the latter partly exerted and bigger, about twice as long as the calyx. In small and grayish-white tufts, the herbare being densely long villous. Leaves short, less than 5 cm long and bearing only 1-2 leaflets. Flowers like the next on a scape about 2-3 times taller than the foliage. Early spring. Rolling steppe on gravelly soil at Cardston. -- swAlta, nwUS.

The more southern var. *Lagerus* has a longer leaf bearing more numerous leaflets borne on a longer rachis, at least twice as long as the leaflets.

4. *O. Besseyi* (Rydb.) Blank. var. *Besseyi* -- Rather similar to a small *O. Lambertii*, but the pubescence not malpighiacous and in part long spreading-villous, especially so on the calyxes. Main leaves commonly 1 dm long and bearing (11)-15-(17) leaflets. Inflorescence overtopping the foliage but the scapes less than twice taller. Flowers about 2 cm long, bright magenta, spreading. Legume small, included in the calyx and soon falling off with it. Early summer. Rolling steppes, rare: Canopus, Val-Marie. -- swS, US.

The Alberta report by Boivin 1957 was based on a collection by Dawson incorrectly labelled Alberta. It came from along the Missouri River in Montana (WG; DA; photo).

Other varieties are all more southern and differ by shorter or fewer leaves, by a more compact inflorescence, etc.

5. *O. leucantha* (Pallas) Pers. var. *depressa* (Rydb.) Boivin. (*O. viscida* AA.; *O. viscidula* (Rydb.) Tid.) -- Glandular- verrucosus throughout and especially dense; so on the lobes of the calyx and on the ovary. Also more or less strigose, except on the ovaries and the calyx lobes. About 1-15 cm high. Leaflets 1-14 mm long. Calyx tube 4.0-5.5 mm. Flowers 12-13 mm long, maculate to purple. Fruit 13-15 mm long. Mid spring to early summer. Steppes. -- swAlta-(seS), US -- Var. *magnifica* Boivin -- Generally larger. About 15-25 cm high; leaflets (6)-6-12-(14) mm long. Calyx tube 5-6 mm long. Flowers 13-17 mm long, purple. Legume 13-20 mm long. -- swAlta-neS.

When *O. leucantha* 1900 and *O. viscida* Nutt. 1830 are subordinated as varieties of the same species, *O. leucantha* takes precedence because it is the earlier name.

6. *O. campestris* (L.) D. var. *gracilis* (Nelson) Barneby (*O. albertina* (Greene) Rydb.; *O. glabrata* AA.; *O. gracilis* (Nelson) OXYTROFIS

son) K. Schum.; *O. Macounii* Greene; *O. villosa* (Rydb.) K. Schum.) -- In large dense tufts. Stipules densely silky and ciliate with long hairs. Strigose throughout, the scapes 1.5-4.0 dm high. Leaves in two sizes, the short ones about half as long as the more numerous long ones. Leaflets numerous, mostly 19-33 per leaf. Flowers 12-18 mm long, white or cream. Early to mid summer. Very common in prairies. -- Man-BC, US -- Var. *varians* (Rydb.) Barneby -- Similar to var. *gracilis*, but the stipules ciliate with long hairs mixed with short glandular ones. Flowers yellowish. More northern. -- (F), Mack-Aka, nMan, nwBC -- Var. *Cusickii* (Greenman) Barneby -- Smaller than var. *gracilis*, about 0.5-1.5 dm high. Leaflets fewer, mostly 11-17. Inflorescence shorter and more compact. Alpine prairies. -- sWAlta-seBC, wUS -- Var. *dispar* (Nelson) Barneby -- Flowers more or less mauve to purplish, drying bluish. Otherwise as var. *gracilis*, the foliage dimorphic. Sporadic mainly in the eastern prairies. -- Mack, sMan-Alta. (ncUS) -- Var. *johannensis* Fern. (*O. johannensis* Fern.; *O. terrae-novae* Fern.) -- Flowers purple, drying blue. Leaves mostly of about the same length. Scapes variable, mostly short. Churchill. -- (F), L-NF, (NS, NB)-Q-nO-nMan, (ne US).

Our varieties belong to ssp. *gracilis* (Nelson) Boivin in which the lerule typically lacks a septum while the eurasian ssp. *campestris* comprises varieties with a weakly developed septum. Both subspecies are highly variable and may be subdivided into a series of weak varieties that are not always easy to define.

7. *O. sericea* Nutt. var. *spicata* (Hooker) Barneby (*O. spicata* (Hooker) Standley) -- Often confused with either the following or the preceding. Flowers large, about 2 cm long and leaflets few, mostly 9-15, as in *O. Lambertii*. But the flowers yellowish and the pubescence not malpighiaceus, like *O. campestris*. Calyx lobes strongly contrasted from the tube by their heavy, black pubescence. Starts flowering around mid-spring and is in fruit by the time *O. campestris* is flowering. Prairies. --Y, (sMan)-S-BC, US.

Our var. *spicata* has yellow flowers in an inflorescence usually 5 cm long or less. South of the border it grades into a more southern var. *sericea* with a white flower mauve-tinted on the keel, and an inflorescence elongating to \pm 1 dm in fruit.

The range was extended to southern Mackenzie District by Raup 1947 on the basis of two fragmentary collections by Crickmay along the Liard River (CAN: DAO, photo). While it would be difficult to achieve positive identification of these fragments, it would seem equally difficult to justify their identification to *O. spicata*; the flowers are rather large, but not large enough for *O. spicata* and the lobes of the calyx are devoid of the black pubescence so characteristic of the latter. We have tentatively revised both collections to the more likely *O. campestris* var. *varians*.

8. *O. Lambertii* Pursh var. *Lambertii* -- Locoweed, Loco -- Pubescence obscurely malpighiaceus, the lower arm of the hair being very short. Pubescence also partly strigose and more or

less sericeous. Mostly 2-4 dm high. Leaves with only (9)-15-(19) leaflets, these rather narrow and \pm linear. Inflorescence lax. Flowers bright and showy, about 2 cm long, purplish, usually drying very dark blue. Calyx lobes heavily white-villous, hence paler than the tube. Late spring to early summer. Prairies. -- sMan-seS, US.

Macoun and other earlier authors have used this name to cover more than one species, hence earlier reports are unreliable. Most older collections still filed under that name have now been revised to other species, mostly to O. campestris (L.) DC.

Two other varieties occupy the southern part of the range of the species: a var. Bigelovii Gray with broader leaflets, mostly lanceolate, and an often stipitate legume, and a var. articulata (Greene) Barneby with a somewhat longer calyx nearly enclosing a somewhat shorter legume, the latter not exerted except for the attenuate tip.

9. O. arctica Br. var. Bellii (Britton) Boivin (O. Bellii (Britton) Halibine) -- Some of the leaflets geminate and appearing subverticillate with 3-4 leaflets per verticil. Tufted, villous and small, about 1 dm high. Leaflets less than 1 cm long, 17-35 per leaf. Flowers few, mostly 4-6, closely aggregated at the summit of the scape. Flowers purple, about 2 cm long, more or less spreading. Legume densely black villous. Early spring to mid summer. Arctic gravels. -- F-K, nMan.

In the more widespread and generally more western var. arctica, the less numerous leaflets are alternate or opposite and only 11-19 per leaf.

10. O. splendens Douglas var. splendens -- Locoweed -- A very showy species, very densely long villous, the leaflets mostly subverticillate by 3-6 and the flowers deep pink. Densely tufted, 2-4 dm high. Grayish-villous, sometimes whitish-villous, less often with yellowish pubescence. Inflorescence dense. Flowers drying blue. Mid summer. Chernozems around bluffs and on top of hills. -- Mack-Y-(Aka), O-eBC, US -- Var. Richardsonii Hooker (O. Richardsonii (Hooker) K. Schum.) -- Much less densely villous and green. Semi-open places. May be only an ecological form. -- (Mack), nwO, cS-wBC.

14. GLYCYRRHIZA L.

LICORICE

Legume densely covered with hooked prickles. Otherwise much as in Astragalus.

1. G. lepidota Pursh var. lepidota -- Licorice, Wild Licorice -- Leaflets densely and finely punctate above in purple-black, but below only punctate with yellow glands. Erect herb about 1 m high, long stoloniferous and forming large colonies. Glandular throughout, the glandulosity sessile except on the calyx. Leaflets mostly lanceolate, entire, puberulent along the margin and the mid-nerve only. Legume 1-2 cm long, cylindrical, \pm brown, indehiscent, very catchy. Early to mid-summer. Open places, mostly river banks. -- O-seBC, US -- Var. glutinosa (Nutt.) Watson -- Glands stipitate not only on the calyx, but, also at

least on the peduncle of the inflorescence. Rare. -- swAlta-
(BC), US.

15. CORONILLA L.

Flowers in globose umbels as in Lotus or Trifolium, but the legume moniliform and at maturity breaking up into segments as in Hedysarum. However the legume is not flattened.

1. C. VAILA L. -- Crown-Vetch (Faucille) -- Flowers in a small globose umbel, but the leaves pinnate. Leaflets oblong-oblancoelate. Leaves nearly sessile, the lowest pair of leaflets subbasal. Flowers rose with the protruding keel tips conspicuously purplish. Legume moniliform and falcate. First half of summer. Cultivated and rarely spreading: Brandon. -- Q-Man, US, Eur, (Afr).

16. HEDYSARUM L.

Like Astragalus, but with a fruit which readily breaks up into flat indehiscent articles. Keel truncate at tip, longer than the standard. Leaflets minutely black-punctate above. Legume more or less narrowed towards the articulations.

- a. Flowers yellow 1. H. sulphurescens
 aa. Flowers pink to purple.
 b. Calyx lobes much shorter than the
 tube 2. H. alpinum
 bb. Lobes longer than the tube 3. H. boreale

1. H. sulphurescens Rydb. -- Flowers yellow or cream. Calyx lobes slightly narrower and a bit longer, mostly 1.5-2.0 mm long, otherwise almost identical with H. alpinum. Late spring to mid summer. Open slopes. -- swAlta-seBC, WUS.

2. H. alpinum L. (var. americanum Mx., var. grandiflorum Rollins, var. philoscia (Nelson) Rollins; H. americanum (Mx.) Britton) -- Tufted erect perennial, 2-8 dm high. Flowers in elongate, more or less secund racemes. Calyx lobes (0.8)-1.0-(1.5) mm long, deltoid to triangular, shorter than the calyx tube. Corolla pink to carmine. First half of summer. Rich prairies, especially around Aspen groves. -- (F)-K-(Mack)-Y-(Aka, L)-NF, NB-BC, (US, Eur) -- F. albiflorum (Standley) Fern. -- Flowers white. Local: Cypress Hills -- (Aka), Q, S.

The american phase is usually separated varietally or specifically from the typical eurasian plant, however we have failed to detect a tangible and constant difference other than geography.

3. H. boreale Nutt. var. boreale (H. Mackenzii Rich. var. Fraseri Boivin) -- Erect to decumbent, 2-5 dm high. Strigose throughout except on the glabrous upper face of the leaflets. Calyx lobes 3-4 mm long, lance-subulate, all similar and nearly twice as long as the tube. Raceme elongate, not secund. Flowers 12-16 mm long, magenta to purple. Late spring to early summer. Hills and river valleys. -- wcS-Alta-(BC, US) -- Var. cinerascens (Rydb.) Rollins (H. cinerascens Rydb.) -- Leaflets

pubescent above. Dry hills and steppes. -- S-Alta, US -- *F. album* Boivin-Like the preceding but with white flowers. Local: Eastend. -- S -- Var. *Mackenzii* (Rich.) C.L. Hitchc. (*H. Mackenzii* Rich.) -- Inflorescence short and more compact. Flowers larger, 13-21 mm long and purple coloured. Prairies, especially in river valleys. -- F-(K-Aka, NF), Q-(O)-Man-BC, (Eur) -- *F. niveum* Boivin -- Flowers white. Local: Churchill -- F, Mack-Y, Man.

17. *DESMODIUM* Desv.

TICK-TRIFOLI

Fruit very catchy, being covered with small hooked hairs. Otherwise much as in *Hedysarum*, the legume flat, indehiscent, constricted successively into a moniliform series of articles. The indehiscent articles separating readily at maturity. Leaves divided ternately rather than pinnately as in *Hedysarum*.

1. *D. canadense* (L.) DC. -- Beggar's Lice -- Erect perennial, mostly about 1 m high. Leaves trifoliate, the leaflets 3-3 cm long, ovate to lanceolate. Inflorescence a single terminal raceme or a panicle of racemes. Flowers purplish. Legume slightly falcate, stipitate, more deeply constricted on the dorsal than on the ventral side. Mid summer. Wetter, open spots. -- (NS), NB-SMan, US.

18. *CICER* L.

Leaves pinnate and serrate. A genus of herbs similar to *Vicia* and *Lathyrus*, but with the tendrils vestigial. However, our only species lacks any trace of tendrils and the leaf ends in a normal leaflet.

1. *C. ARIETINUM* L. -- Chick-Pea (Pois chiche) -- Erect annual herb 3-6 dm high, glandular-pubescent. Leaflets 1.0-1.5 cm long, elliptic to obovate, serrate and mucronate. Flower axillary, solitary. Calyx rather large, overtopping the whitish corolla. Peduncle strongly geniculate. Pod 1.5-2.0 cm long, ovoid, much inflated. All summer. Sometimes cultivated and appears to reseed itself at times, but not persistent. -- D-S, (BC), Eur.

19. *VICIA* L.

VETCH

Generally similar to *Astragalus*, but the terminal leaflet(s) replaced by 1-3 tendrils. Wings adnate to the keel. Style bearded at apex only. Legume dehiscent along both sutures, thus forming 2 valves.

- a. Raceme with 1-7 flowers.
 - b. Inflorescence sessile or nearly so 1. *V. sativa*
 - bb. Peduncle of the inflorescence longer than the lowest flower 4. *V. americana*
- aa. Flowers much more numerous and mostly smaller.
 - c. Calyx tube longer than the lobes 2. *V. cracca*
 - cc. Shorter than the lower lobes 3. *V. villosa*

1. *V. SATIVA* L. var. *ANGUSTIFOLIA* (Reichard) Wahl. (*V. angustifolia* Reichard) -- Vetch (*Pois sauvage*) -- Flowers (and fruits) mostly 2 on a rachis, the latter less than 1 cm long. Flowers 12-18 mm long. Calyx lobes 3-6 mm long, subequal. Late spring to mid summer. Rare weed: Otterburne. -- (G), Aka, NF-SPM, NS-Man, US, Eur.

An earlier report from Fort Garry was based on a depauperate specimen of *V. americana*.

Var. *sativa* has larger leaflets and flowers, the leaflets mostly 5 mm wide or more, the flowers 20-(30) mm long. Not yet known from our area, but probably as likely to occur as var. *angustifolia*.

2. *V. CRACCA* L. (var. *tenuifolia* (Roth) G. Beck) -- Bird-Vetch, Tufted Vetch (*Jargeau, Petits oiseaux*) -- Perennial, mostly 1 m long or more, glabrous or appressed pubescent. Leaflets 13-21, linear to lanceolate. Racemes dense, secund. Flowers blue, 9-13 mm long. Calyx-lobes up to 2.0 mm long. Legume flat, straight, stipitate. All summer. Cultivated and rarely escaped to roadsides, etc. -- (G), K, Y-Aka, L-NF-(SPM), NS-BC, US, Eur.

Despite reports to the contrary, not obviously native in our area, or in any other part of North America. A number of varieties are sometimes recognized; none is clearly significant in the American part of the range.

3. *V. VILLOSA* Roth (*V. Cracca* L. var. *multiflora* (Poll.) Gaudin) -- Much like the preceding, but the calyx seemingly attached dorsally because of a strong gibbosity on the ventral side. Reputedly annual or biennial. More or less villous throughout. Flowers purplish, 11-18 mm long. Calyx-lobes 3.5-5.0 mm long on the dorsal side, those of the ventral side much shorter. Summer. Cultivated and casual in fields and roadsides: Brandon. -- (Aka), NS, Q-Man, BC, US, Eur.

4. *V. americana* Muhl. var. *americana* (*V. angustifolia* AA.) -- Pea-Vine, Buffalo-Pea -- Perennial, 2-8 dm high, glabrous to puberulent. Leaflets 7-13, ovate to narrowly lanceolate, entire, broadly acute to truncate at summit. Flowers 15-22 mm long, purple, fading blue. Mid spring to early summer. Bushes or margins of Aspen bluffs. -- Mack, (Aka), Q-BC, US -- Var. *truncata* (Nutt.) Brewer (*V. oregana* Nutt.) -- Leaflets of the upper leaves retuse to retuse-truncate at summit, often few-toothed on the shoulders. -- O-seS-(Alta)-BC, US -- Var. *minor* Hooker (var. *angustifolia* Nees; *V. sparsiflora* Nutt.; *V. trifida* Dietr.) -- Smaller and commonly 2-3 dm high. Leaflets smaller, linear-lanceolate to narrowly linear, mostly 2-3 mm wide. Prairies and steppes. -- Man-BC, US.

Vicia hirsuta (L.) S.F. Gray was mentioned from Olds by J.M. Macoun 1897 on the basis of a collection by T.K. Willing. In 1964 we failed to find such a collection under *Vicia* at CAN.

20. LATHYRUS L.

EVERLASTING PEA

Quite similar to *Vicia* from which it differs by its free wings and its style bearded along the upper side. More obviously different is the flower, straight in *Vicia*, sharply bent in ours.

VICIA

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- a. Leaflets 2.
 - b. Stem wingless 1. L. tuberosus
 - bb. Stem with 2 obvious decurrent wings.
 - c. Leaflets long linear 2. L. sativus
 - cc. Broadly lanceolate to rhomboid-
obovate 3. L. odoratus
- aa. Middle and upper leaves with 4 or more
leaflets.
 - d. Raceme dense, with 15-25 flowers 6. L. venosus
 - dd. Raceme with only 2-12 flowers.
 - e. Leaflets lanceolate to linear 5. L. palustris
 - ee. Leaflets oblong to ovate.
 - f. Stipules cordate 4. L. japonicus
 - ff. Stipules semi-ovate 7. L. ochroleucus

1. L. TUBEROSUS L. -- Tuberous Vetchling -- The thin and wingless stem from a larger tuber. Leaflets 2, narrowly elliptic to oblanceolate, mostly 2-4 cm long. Flowers few, purple, about 1.5 cm long. All summer. Spreading from cultivation. -- Q-sMan, US, Eur.

2. L. SATIVUS L. -- Chickling Vetch (Lentille d'Espagne)-- Annual with solitary flowers. Stem winged. The 2 leaflets narrowly linear, 4-10 cm long. Flower white to pink or blue, about 1.5 cm long. All summer. Sometimes cultivated and rarely reseeding itself. Boharm. -- Q, S, (US), Eur, (Afr).

3. L. ODORATUS L. -- Sweet Pea (Pois de senteur) -- Flowers larger and mostly in 2's. Herbage somewhat hirsute, glandular and long ciliate. Flowers very showy 2.5-3.0 cm long, white or coloured, 1-3 and pendent at the end of a long peduncle recurved at tip. Legume long pilose. All summer. Cultivated ornamental sometimes reseeding itself in dumps or loose soil, but not long persistent: Brandon. -- O-Man, Eur.

4. L. japonicus W. (var. aleuticus (Greene) Fern., var. glaber (Ser.) Fern., var. pellitus Fern.; L. maritimus Big.) -- Beach-Pea, Indian-Pea (Pois de mer, Pois des dunes) -- Slightly fleshy seacoast herb. Stem wingless, up to 1 m high. Stipules cordate or hastate and at least half as large as the leaflets. Leaves with 4-10 mostly oblong leaflets. Mid summer. Shores: Hudson Bay, Lake Winnipeg. -- (G), K-Mack-(Y)-Aka, L-SPM, NS-Man, BC, US, Eur.

Quite a few phenotypes have received names; they seem to have essentially the same distribution, although one or the other may be dominant locally. While this species is essentially a maritime plant, it does also occur inland on the shores of a few large bodies of freshwater.

5. L. palustris L. (var. linearifolius Ser., var. macranthus (T.C. White) Fern., var. myrtifolius (Muhl.) Gray, var. pilosus (Cham.) Led.) -- Vetchling, Marsh-Pea (Pois de marais) -- More or less pubescent and 5-9 dm high. Upper leaves with 6-8 leaflets, these 3-6 cm long, lanceolate to linear. Stipules narrowly semi-sagittate. Racemes with 4-7 blue flowers. Early summer. Moist and wooded habitats. -- (K), Aka, (L-NF) - SPM,

NS-S, BC, US, Eur.

Quite variable, but the many described varieties do not seem to be in any way significant.

6. *L. venosus* Muhl. var. *intonsus* Butt. & St. John -- Cattle-Pea-Vine -- Pubescent and about 1 m high. Leaflets 10-12, elliptic, 2-6 cm long. Stipules semi-sagittate. Flowers numerous, violet. First half of summer. Moist places in and around woods. -- (Aka), Q-neBC, US.

In the more eastern var. *venosus* the herbage, including the calyces, is glabrous or nearly so.

7. *L. ochroleucus* Hooker -- Yellow Pea -- Flower two-toned, cream and pale orange. Glabrous and 4-8 dm high. Leaflets 4-8, ovate, 2-5 cm long. Stipules semi-ovate and coarsely toothed towards the base. Raceme with 5-11 flowers. Late spring and early summer. Moist places, mostly in Aspen groves. -- Mack, Q-BC, US.

21. PISUM L.

Differs from *Vicia* by its dilated calyx-lobes which are like leafy appendages.

1. *P. SATIVUM* L. -- Pea (Pois) -- Glaucous and glabrous annual mostly 1 m high. Leaflets 2-4, ovate to rhombic, 2-7 cm long, entire or dentate. Stipules semi-ovate to semi-elliptic, dentate, as large or larger than the leaflets. Flowers in 2's or solitary, 1.5-2.0 cm long, mostly white. Summer and fall. Cultivated in heavy soils and exceptionally reseeding itself: Saint-Pierre-Jolys. -- (G), Q-Man, BC, (Eur).

22. PHASEOLUS L.

BEAN

Like the following, a climber with trifoliate leaves, but the calyx 5-lobed and subtended by a pair of accessory bracts.

1. *P. VULGARIS* L. -- Bean, String-Bean (*Fève*, *Fève à beurre*) -- Twining stem retrorse-scabrous. Leaflets deltoid-ovate, the lower cordate. Calyx bracts broadly ovate. Legume mostly around 1 dm long. Mid summer. Cultivated and rarely subsontaneous: Grand Rapids. -- cMan, (US, CA, Eur).

23. AETHIOCARPA Ell.

Climbing by its twining stem. Calyx with only 4 lobes and bractless except for the bract at the base of the pedicel.

1. *A. bracteata* (L.) Fern. var. *bracteata* (*A. monoica* Ell.) -- Hog-Peanut -- Stems thin, up to 1 m long, finely retrorse-pubescent, with a ring of longer, reflexed and stiff hairs at each node. Raceme few-flowered, on a long peduncle. Flowers whitish to pale mauve. Mid-summer. Galerie-forests. -- NS, NB-sMan, US.

In our variety the pubescence is pale or transparent and more or less appressed, especially on the leaflets; the legumes may be lightly strigose on both faces or merely antrorse-hirsute

at the edge. In the more southern var. comosa (L.) Fern., the pubescence is tawny, coarser, more abundant and hirsute; it is especially obvious on the stem, the petioles and at the margin of the leaflets. The pubescence of the legume becomes retrorse below the middle.

Order 9. SALICALES

Single family. This and the next two orders have flowers in catkins.

17. SALICACEAE (WILLOW-FAMILY)

Diocious trees and shrubs. Mature carpels liberating many pappus bearing seeds. Leaves simple and alternate. The catkin is a raceme (or spike) of highly reduced flowers, each subtended by a bract. Calyx and corolla absent, each flower being reduced to its stamens or to its ovary.

- a. Buds covered by many overlapping scales 1. Populus
- aa. Buds covered by a single hood-shaped scale 2. Salix

1. POPULUS L. POPLAR

Stamens 5 or more per flower. Trees, often very large, mostly with large leaves. Leaves always simple and entire to coarsely toothed.

- a. Leaves lanceolate or narrower 5. P. angustifolia
- aa. Leaves ovate to round or deltoid.
 - b. Leaves round or ovate.
 - c. Leaves ovate, strongly discoloured..... 4. P. balsamifera
 - cc. Leaves roundish, barely paler beneath.
 - d. Finely crenate 1. P. tremuloides
 - dd. Coarsely toothed 2. P. grandidentata
 - bb. Leaves broadly deltoid 3. P. deltoides

Various other hybrids, besides those mentioned below, are also known in our area, but are still under study.

1. P. tremuloides Mx. (var. aurea (Tid.) Daniels) -- Aspen, White Poplar (Tremble, Peuplier blanc) -- The leaves quaking even when there seems to be no breeze. Perhaps our most common tree, stoloniferous and forming numerous bluffs in the prairie. The bark pale grayish green to almost white. Leaves round, glabrous, crenulate, abruptly short-tipped, not resinous and slightly glaucous below. Petiole strongly flattened laterally. Very early spring. General, in depressions southward, in well drained situations northward. -- (K)-Mack-Aka, L-SM, NS-BC, US, (CA).

From the Red River and the Coteau de Prairie westward, this is supposed to give way to var. aurea, but no such transition is obvious in the field. In the herbarium no consistent difference

could be detected between the populations of eastern and western Canada and we came to the conclusion that the description of var. aurea was the description of a random specimen within the normal range of variation of the species. Other named varieties appear to be extremes of variation of no geographical significance.

2. P. grandidentata Mx. -- Poplar (Tremble) -- Very conspicuous in early spring when the foliage is entirely covered by a thick white tomentum. Otherwise much like the preceding. Leaves very coarsely toothed, soon glabrous. Very early spring. In better drained situations. -- NS-seMan, US.

3. P. deltoides Marsh. var. occidentalis Rydb. (P. Sargentii Dode; P. virginiana AA.) -- Cottonwood (Liard, Cottonnier) -- One of our larger trees, up to 20 m high, the trunk up to 1 m across, the bark deeply furrowed. Petioles flattened. Leaves broadly deltoid, coarsely serrate, long-acuminate, green on both faces. Bud scales ciliate, finely puberulent on back. Early spring. Sand hills and shores, usually sandy, of larger rivers. -- Man-Alta, US.

Populus Sargentii Dode is reputed to differ from P. deltoides by its pedicels shorter than the capsule, its puberulent bud scales and its coarser serration of fewer teeth. All our specimens, either eastern or western had short pedicels and we consider this difference to be of no account.

A sampling of Ontario and Quebec specimens contrasted with a sampling from Saskatchewan and Alberta showed that the difference in serration has a statistical value but is not a practical character to distinguish an eastern and a western population. On spring leaves the eastern specimens showed 10-27 teeth per side with the average around 15-20, while the western specimens had a much narrower range of 8-15 teeth per side. Leaves produced later in the season have gradually smaller and more numerous teeth with a maximum of 12 per side in the East and only 28 in the West. Another character worth noting, but hard to appreciate without a fair amount of comparison material on hand, is that in the East the serrations reach to the base of the acumen, while in the West they tend to stop may be 1 cm short of the base of the acumen.

The pubescence and ciliation of the bud scales is a more clear cut character. All our western specimens showed such pubescence, while it was present only in a few eastern ones (maybe 1 in 10). This character is however, of limited usefulness since about half of the specimens on hand were collected before mid summer and had not yet developed their winter buds.

In short, the characters of P. Sargentii show such a wide range of overlap that the taxon may best be treated as a variety of the eastern P. deltoides.

All specimens examined from our area proved to belong to var. occidentalis.

3 X. P. Bernardii Boivin -- Northwest Poplar -- A hybrid with P. tremuloides. Leaf broadly ovate to broadly cordate, not or little gummy, paler and slightly glaucous below. Serration

tions well marked but not as coarse and much more abundant than in *P. deltoides*. Sporadic in sandhills, rare on river shores, but very common in cities and towns where it seems to be our most commonly planted tree. -- swQ-Alta, ncUS.

4. *P. balsamifera* L. var. *balsamifera* (var. *Michauxii* Dode) Henry, var. *subcordata* Hylander; *F. Tacamahacca* Miller -- Black Poplar (Peuplier, Peuplier noir, Liard) -- Tree with strongly discoloured leaves. Buds large and very resinous. Petiole terete. Leaves mostly ovate, varying from lanceolate on young shoots to cordate on old trees, minutely glandular-serrulate, minutely ciliate, glabrous to finely puberulent along the nerves, dark green above with a yellow mid-nerve, much paler below, whitish-green with a conspicuous reticulation, somewhat resinous and often developing, upon drying, large russet patches. Capsule finely rugulose. Styles and carpels 2. Early spring before the leaves. Shores and wetter places. -- sK-Aka, L-(NF-SPM), NS-(PEI)-NB-Alta-(BC), US -- *F. candicans* (Aiton) Boivin (*P. candicans* Aiton; *P. gileadensis* Rouleau) -- Leaves very finely puberulent below or on both faces and usually also cordate. Twigs and petioles also puberulent. Sporadic; sometimes planted. -- MF, NS, NB-O, S, US, (Eur) -- Var. *californica* Watson (*F. trichocarpa* T. & G., var. *hastata* (Dode) Henry) -- Capsule coarsely verrucose and/or of 3 carpels. -- (Y)-Aka, swAlta-BC, wUS, (CA).

Older trees tend to produce more deeply cordate leaves (= var. *subcordata*).

4 X. *P. Dutillyi* Lepage -- Hybrid with *P. tremuloides*. The leaves not so strongly discolored, not so gummy and perhaps a bit glaucous below. Buds smaller and less gummy. Petioles a little flattened. Leaf broadly ovate or broadly cordate to roundish, abruptly short-acuminate at tip, minutely ciliate. -- Q-Alta.

5. *P. angustifolia* James -- Yellow Cottonwood, Black Cottonwood (Liard amer) -- A small tree with ± lanceolate leaves and paler yellowish twigs. Petioles terete and short, mostly about 1 cm long. Leaf yellowish green, somewhat paler below, glabrous, glandular-serrulate to the tip, the marginal glands very resinous and usually marking the paper in drying. Early spring with the leaves. Flood-plains of large rivers. -- swS-sWAlta, wUS, (CA).

5 X. *P. acuminata* Rydb. -- Hybrid of *P. deltoides*. Leaves rhomboid to elongate-rhomboid, more coarsely serrate. Petioles somewhat longer and compressed. Leaf definitely acuminate but not as much as in *P. deltoides* and the acumen entire except at base. Serrations often gummy. Rather frequent wherever both parents occur as *P. angustifolia* seems to hybridize very freely with any other Poplar that may occur near by. Backcrosses are also frequent -- swAlta, wUS -- Nm. *Andrewsii* (Sarg.) Boivin -- A backcross to *P. deltoides*. Leaves thick and firm, broadly ovate-rhomboid, long acuminate, coarsely serrate right up to the base of the acumen. Local and less frequent. Sometimes used as a shade tree further south. -- swAlta, wUS.

5 X. *P. Sennii* Boivin -- Hybrid of *P. tremuloides*. Leaves

dimorphic, the earlier ovate, the later ones elliptic lanceolate. Twigs yellowish, becoming pale gray. Buds small and only slightly glutinous. Petioles variable, tending to be short and mostly under 2 cm long, not compressed. Leaves slightly paler and slightly glaucous below, finely serrulate at margin. Older leaves not gummy, the younger ones gummy in the manner of P. angustifolia. Rare: Lethbridge. -- swAlta.

2. SALIX L.

WILLOW

Stamens fewer, mostly 2, sometimes 3-5 per flower. Buds covered by a single hood-shaped scale. Small to large shrubs, sometimes trees.

The following key is based on pistillate specimens. In the field staminate specimens plants may be readily associated with the pistillate plants of the same species. Foliare specimens do not key out easily and are best identified by comparison. Once well learned, a species can usually be recognized by its foliage alone.

- a. Prostrate, or creeping alpine or arctic shrubs, 2 dm high or less Group 1
- aa. Taller, erect or ascending.
 - b. Carpels glabrous.
 - c. Catkin scales pale coloured, yellowish to pale brown, fugaceous Group 2
 - cc. Scales dark coloured, brown to black, remaining on the catkin to maturity Group 3
 - bb. Carpels pubescent.
 - d. Catkin borne on the old wood, not leafy at base, sessile or on a short leafless peduncle Group 4
 - dd. Catkin at the end of a leafy new shoot Group 5

Group 1

Low, prostrate or creeping shrubs, alpine or arctic, the ascending shoots less than 2 dm high.

- a. Carpels glabrous.
 - b. Catkins subterminal, few-flowered, with less than 10 ovaries 9. S. herbacea
 - bb. Catkin on lateral shoots and much more heavily flowered.
 - c. Catkin sessile, leafless at base 23. S. calcicola
 - cc. Catkin on a leafy peduncle (i.e. terminating a leafy short-shoot).
 - d. Leaves crenulate 21. S. myrtilifolia
 - dd. Leaves entire 10. S. arctophila

- aa. Carpels pubescent.
- e. Leaves finely and shallowly crenate all around with a gland in each sinus.
 - f. Petioles at least one fourth as long as the blade 7. S. reticulata
 - ff. Petioles much shorter, less than twice as long as the corresponding bud 8. S. vestita
 - ee. Leaves entire, not glandular-margined.
 - g. Catkins subterminal, that is borne on a normal size shoot and opposite the uppermost leaf, with the terminal bud in the middle. Very small shrubs 7. S. reticulata
 - gg. Catkins terminal on leafy peduncles or short lateral shoots bearing only a few leaves without axillary buds, or with only poorly developed ones.
 - h. Pistillate bracts light coloured, yellowish to light brown 12. S. glauca
 - hh. Pistillate bracts dark coloured, blackish throughout or at least in the upper half.
 - i. Capsule grayish to white-pubescent 11. S. arctica
 - ii. Capsule more thinly pubescent to glabrous, reddish, drying black 10. S. arctophila

Group 2

- Carpels glabrous, subtended by a caducous pale coloured scale. Erect or ascending trees or shrubs, at least 2 dm high. Stamens 4-5 in the first 3 species, only 2 in the others.
- a. Petiole glandular above near the junction of the limb.
 - b. Capsules 4.5-7.0 mm long 2. S. lucida
 - bb. Capsules 7.0-10.0 mm long 3. S. serissima
 - aa. Not so glandular.
 - c. Flowers and capsules clustered and subverticillate 1. S. amygdaloides
 - cc. Flowers and capsules spirally arranged.
 - d. Leaves remotely serrulate to entire.
 - e. Leaves remotely serrulate to nearly entire 6. S. fluviatilis
 - ee. Leaves entire 26. S. pedicularis
 - dd. Broader and closely serrulate.
 - f. Branchlets brittle, the year's growth separating very readily from the main branch 4. S. fragilis
 - ff. Not brittle 5. S. alba

Group 3

Like group 2, but the scales dark coloured, at least at

- the tip, brownish to black and persistent at least to the maturity of the catkin.
- a. Catkin sessile on old wood and quite leafless at base, or on a short peduncle bearing a few very small leaves barely longer than the capsules.
 - b. Twigs long spreading-villous 23. S. calcicola
 - bb. Twigs glabrous or somewhat pubescent when very young, by exception densely puberulent 16. S. monticola
 - aa. Catkin terminating a lateral shoot bearing a few normal or reduced leaves.
 - c. Leaves entire, slightly revolute 26. S. pedicellaris
 - cc. Leaves glandular-serrulate.
 - d. The 2- or 3-year old twigs jet black.
 - e. Young leaves villous on both faces, green below 20. S. commutata
 - ee. Leaves glabrous and slightly glaucous below 19. S. Barclayi
 - dd. The 2-year old twigs paler, yellow to reddish or brown.
 - f. Twigs yellowish or straw coloured, the new ones sometimes purplish 17. S. lutea
 - ff. Twigs green, reddish or purplish to brownish, often drying blackish, the older ones turning gray.
 - g. Stipe slightly shorter than to slightly longer than the scale 21. S. myrtillifolia
 - gg. Stipes much longer than the small scales.
 - h. Young shoots with strong balsam fragrance 15. S. pyrifolia
 - hh. Not odoriferous ... 18. S. mackenzieana

Group 4

Erect or ascending shrubs or small trees with pubescent ovaries and capsules. Catkins appearing before the leaves, sessile or nearly so, leafless at base and borne on old wood.

- a. Leaves glabrous or nearly so below.
 - b. Capsules 7-10 mm long on pedicels
 - 1.0-2.5 mm long 27. S. discolor
 - bb. Capsules smaller, 5-6 mm long and subsessile 31. S. phlycifolia
- aa. Leaves densely puberulent to white tomentose below.

- c. Leaves densely soft villous on both faces 24. S. Barrattiana
- cc. Glabrous to lightly floccose above.
 - d. Leaves rather narrow, more than four times longer than wide.
 - e. Twigs white-tomentose 25. S. alaxensis
 - ee. Twigs bluish to dark coloured 32. S. pellita
 - dd. Leaves oblanceolate to obovate.
 - f. Capsule 2.5-4.0 mm long, white-silky at least when young 34. S. sitchensis
 - ff. Capsule much longer.
 - g. Pubescence of lower surface of leaf entirely of white hairs 28. S. humilis
 - gg. Pubescence of new leaves partly russet coloured 27. S. discolor

Group 5

Similar to group 4, but flowering later, at the same time as the leaves, and the catkins borne at the end of a short leafy shoot.

- a. Pedicels well developed, as long as to many times longer than the scales.
 - b. Leaves narrowly lanceolate to linear 29. S. petiolaris
 - bb. Leaves broader, ovate to oblanceolate.
 - c. Leaves of the sterile and fertile shoots of about the same size 26. S. pedicellaris
 - cc. Leaves of the sterile shoots many times larger 22. S. Bebbiana
- aa. Pedicels shorter to nearly lacking.
 - d. Aments subterminal; stigma sessile 8. S. vestita
 - dd. Aments terminal; style at least 0.5 mm long.
 - e. Leaves entire to shallowly and remotely crenate.
 - f. Leaves white-tomentose below, floccose above, remotely crenate 30. S. candida
 - ff. Leaves glabrous to sericeous, entire.
 - g. Leaves lanceolate to long-linear 6. S. fluviatilis
 - gg. Leaves broader, ovate to oblong-lanceolate.

- h. Petiole very short, 2 mm long or less 13. S. brachycarpa
- hh. Petiole longer.
- i. Capsule 2.5-3.5 mm long 34. S. sitchensis
- ii. Much larger, 4-8 mm long.
- j. Catkins at the end of a leafy shoot bearing leaves at least half as long as the leaves of sterile shoots 12. S. glauca
- jj. Catkins subsessile, bearing at base a few bracts hardly longer than the capsules 31. S. phyllicifolia
- ee. Leaves serrate.
- k. Very remotely serrate 6. S. fluviatilis
- kk. Closely serrate.
- l. Leaves glaucous and silky to lightly strigose below 33. S. arbusculoides
- ll. Leaves glabrous on both faces and slightly paler green below 14. S. MacCalliana

1. S. amygdaloides Andersson -- A fairly large native tree with yellowish-green foliage of long caudate and somewhat drooping leaves. Branchlets yellow. Stipules small and nearly always absent. Petioles slender, yellowish, glandless, rather long, mostly about 1 cm. Leaf lanceolate, glabrous except when very young, finely glandular serrulate, slightly paler and glaucous below. Earlier leaves not caudate, much smaller, entire, cuneate at base and nearly sessile. Catkins lax, terminating short leafy shoots. Stamens about 5. Capsule glabrous, ± 4 mm long. Stipe glabrous, 1.0-1.5 mm long. Stigma subsessile. Scale about 2 mm long, white or nearly so, densely tomentose ventrally, at least partly glabrous on the back. Flowering in mid-spring with the leaves. River shores at the inner edge of the galerie-forest.--swQ-sBC, US.

2. S. lucida Muhl. (var. angustifolia Andersson, var. intonsa Fern.; S. candata (Nutt.) Heller, var. parvifolia C.R. Ball; S. lasiandra Bentham, var. caudata (Nutt.) Sudw., var. lanceifolia (Andersson) Bebb) -- (Saule laurier) -- A small native tree with long-caudate shining leaves. Twigs yellow to brownish. Leaves dark green, thick, lanceolate, glabrous or nearly so, paler to strongly glaucous below. Mid-nerve pale yellow. Catkins stout, terminating short leafy shoots. Sta-

mens 4-(5). Capsules subverticillate, glabrous, 5-7 mm long. Stipe 1-2 mm long. Style not well defined, 1 mm long or less. Scale caducous, pale, mostly whitish, lightly pilose. Flowering after mid spring, shortly after the leaves. Along streams and lake shores.--Mack-Aka, L-S.M, NS-BC, US.

The western plants are commonly distinguished as S. lasiocarpa but there is no geographical discontinuity and we have been unable to detect a morphological one. However the phenotype with the leaves strongly glaucous below presents a statistical difference, being uncommon in the east but the most frequent type in the west. Var. caudata is commonly used for western specimens with leaves green on both faces.

3. S. serissima (Bailey) Fern. -- A colonial shrub with dark shining leaves and the last to flower and fruit, usually shedding its seed after mid summer. Similar to the preceding and long confused with it. Twigs shining and reddish brown. Leaves lanceolate, merely acute to subacuminate, firm, glandular-serrulate, dark green above, paler and usually more or less glaucous below. Mid-nerve pale yellow. Catkins terminating short leafy shoots. Stamens 5. Capsules subverticillate, glabrous and shining, 7-9 mm long. Stipe glabrous. Scales caducous, pale yellow, villous. Style less than 1 mm long. Late spring to early summer, after the leaves. Marshes and bogs.--(Mack, L-NF), c-Alta, US.

4. S. FRAGILIS L. -- Crack Willow (Saule) -- A large introduced tree, rarely escaped, the new lateral shoots snapping off very readily at the point of origin in a strong breeze or when pressed backwards. Leaves about lanceolate, somewhat caudate, closely glandular-serrate, glabrous, glaucous below. Catkins long and narrow, terminating short leafy shoots. Stamens only 2 (like all the following species). Capsule small, glabrous, 3-5 mm long, short stipitate. Flowering in mid spring with the leaves. Planted and rarely escaped at Otterburne, Athabaska Landing, La Saule river and may be elsewhere.--NF, (NS-NB)-Q-S.Mn, (nAlta), US, Eur.

5. S. ALBA L. -- French Willow (Saule) -- Similar to the preceding. Branchlets not brittle. Leaves lightly silky or strigose, the hairs essentially parallel to the mid-nerve. Flowers in mid-spring with the leaves. Rarely escaped to river shores: Edmonton.--(NF, NS-NB)-Q-O, Alta, (US, Eur).

S. acutifolia A., S. alba L., var. argentea Wimmer, var. sericea Gaud, var. vitellina (L.) Stokes and S. pentandra L. were included in the Saskatchewan list by Breitung 1957. There is a gradual transition from cultivated to spontaneous or naturalized species and authors of floras vary greatly as to where they draw the line between the escaped plants to be included in a flora and the cultivated ones to be searched for in manuals on cultivated plants. We have included such as are obviously or apparently long persistent after cultivation, such as rheum, or spreading from cultivation, such as Hesperis, or at least very readily reseeding itself, such as Lepidium sativum. Species

more contingent upon the immediate or continuous care of the cultivator have been omitted. The six Willows enumerated above are omitted as being a clear case of "planted" or "cultivated" ornamentals and windbreaks.

6. *S. fluviatilis* Nutt. var. *fluviatilis* (*S. melanopsis* Nutt., var. *Bolanderiana* (Rowlee) Schneider) -- Differs from the more widespread var. *sericans* by its wider leaves 3-8 times longer than wide, mostly 5-10 mm wide, sometimes glaucous below. Twigs mostly purplish and turning black upon drying. Capsule variable, mostly glabrous and 4-6 mm long. Mostly a shore species.--swAlta-seBC, US -- Var. *sericans* (Nees) Boivin (*S. exigua* Nutt.; *S. interior* Rowlee, f. *wheeleri* (Rowlee) Rouleau, var. *pedicellata* (Andersson) C.R. Ball; *S. longifolia* Muhl.; *S. melanopsis* Nutt. var. *tenerrima* (Hend.) R.R. Ball -- Leaves narrowest. Sometimes a small tree, but commonly forming large dense colonies of flagelliform shoots 1-2 m high. Young shoots densely grayish-silky, soon becoming green and much less pubescent to glabrous. Leaves long linear 10-15 times longer than wide, mostly 5 mm wide or less, very remotely glandular-denticulate, or rarely entire, usually equally green on both faces. Catkins often in clusters of 2 or 3, terminating lateral shoots that carry normal-size leaves and often branch again to produce latter catkins and carry the flowering into mid-summer. Scales yellowish, caducous. Ovary glabrous. Flowering with the leaves or a little later, from mid to late spring or sometimes up to mid summer. Wet places, but especially common on sandy shores. --Mack-Aka, NB-BC, US -- *F. Hindsiana* (Bentham) Boivin (*S. interior* Rowlee var. *exterior* Fern) -- Pubescence spreading, longer, denser, velvety, persistent all summer. Local --Mack, O, S-BC.

Travelling through the western U.S.A. in 1960, we found it impossible to recognize more than one species in the *S. fluviatilis* group. This confirmed our previous field experience in Canada and explained our troubles in the herbarium in trying to distinguish the 4 to 7 species that some authors recognize in this group. More heavily pubescent plants, such as *S. sessilifolia* Nutt. or *S. Hindsiana* Bentham are fairly frequent and will often appear to be genetically controlled or sometimes only ecologically conditioned; it seems doubtful if they deserve to rank taxionomically any higher than form.

Some specimens of var. *sericans*, from Saskatchewan or Manitoba, especially vigorous shoots, will on occasion exhibit larger leaves and may be found in various herbaria determined as *S. fluviatilis* or *S. melanopsis*, but do not seem to have ever been reported as such in the botanical literature.

7. *S. reticulata* L. -- Leaves conspicuously reticulate and deeply impressed above. Very depressed and mostly buried underground. Stoloniferous. Twigs reddish and glabrous. Leaves mostly 1-4 cm long, oboval to oblong, crenulate, dark green above, usually glabrous below and strongly whitish - glaucous with strongly contrasting reticulate nerves. Petiole elongate.

Catkins subterminal on a normal shoot. Scales light to deep purple. Capsule densely pubescent, ± purplish. Flowers after the leaves in late spring. Carpeting wetland, open, arctic habitats.--F-Aka, (L-NF), Q-Man-(nS), BC, wUS -- Var. nivalis (Hooker) Andersson (S. nivalis Hooker, var. saximontana (Rydb.) Schneider; S. saximontana Rydb.) -- Leaves entire. Often smaller and more completely buried underground except for the leafy tips. Leaves often smaller, mostly 0.5-2.0 cm long. Catkins rather short, mostly less than 1 cm long. Flowers after the leaves in late spring to mid-summer. Carpeting alpine prairies.--swAlta-sBC, wUS.

8. S. vestita Pursh (var. erecta Andersson) -- Much like the preceding, but more pubescent and the branches not buried. Trailing to erect, 1-5-(10) dm high. Twigs grayish and densely pubescent. Leaves nearly always densely whitish-silky below. Petioles short, mostly about as long as the buds. Scales yellowish. Capsules grayish-pubescent. Flowers just after the leaves in early summer. Wet, shaded subarctic habitats, or subalpine near timberline.--(F)-K, L-NF, Q-(O)-Man, Alta-BC, US.

In 1838 Hooker described a var. nana, "glabra, foliis multo minoribus amentis pauci-(6-8)-floris" from the Rocky Mountains. The exact disposition of this name remains in doubt. If it proves to be synonymous with var. nivalis of the previous species as proposed by Cronquist 1964, var. nana will have to supersede var. nivalis. However, such smaller (=f. mensalis Fern.) or nearly glabrous (=var. psilophylla Fern. & St. John) types also occur as extremes of variation of S. vestita and the correct disposition of var. nana is not obvious on the basis of its description alone.

9. S. herbacea L. -- Very small and completely buried except for the leaves and catkins. Glabrous throughout or nearly so. Petioles short. Leaves about 1 cm, orbicular, crenate-serrate, often lined with red at margin, green on both faces. Aments subterminal, small, less than 1 cm long and few-flowered. Capsule glabrous, deep red, short stipitate. Flowers after the leaves in early summer. Arctic prairies.--G-K-(Mack), L-(NF), Q, (nMan, US), Eur.

10. S. arctophila Cockerell -- Generally similar to the following, not so deeply buried and less pubescent. Branches trailing, often ascending at tip. Leaves sometimes sericeous, commonly glabrous, slightly shiny above, glaucous below. Catkins 3-9 cm long at maturity, terminating lateral leafy shoots. Ovary sometimes tomentose when very young, soon becoming lightly pubescent to glabrous, red to dark purple, often drying blackish. Scales about the same colour as the capsules and not conspicuous except for their abundant and very long pilosity. Flowers with the leaves from mid-spring to mid-summer. Mostly wet gravels in arctic tundra.--(G-F)-K-Y, L-(NF), Q-(nO)-nMan, (US).

Quite closely related to the following with which it is largely sympatric.

11. *S. arctica* Pallas (var. *araioclada* (Schneider) Raup, var. *torulosa* (Trautv.) Raup) -- Half-buried trailing shrub with large and stiffly erect catkins. Foliage mostly glabrous, or somewhat villous. Leaves mostly 2-5 cm long, mostly obovate to oblanceolate, entire or minutely serrulate, rather dull above, slightly paler to glaucous below. Catkins 2-4-(8) cm long at maturity, terminating lateral leafy shoots, strongly two-toned because of the contrasting capsules and scales. Capsules densely grayish to whitish-tomentose. Scales dark brown to blackish, long pilose. Flowers with the leaves before mid summer. Wet alpine slopes.--(G)-F-Aka, L-(NF), Q-nO, wAlta-BC, US, (Eur).

Rather variable and many varietal or specific segregates have been proposed of which some are very rare and hence highly localized. The more common phenotypes tend to have the distribution of the species and are accordingly not reckoned as significant with the exception of *S. arctophila*.

11 X. *S. arctica* X *glauca* -- Has been reported for Jasper.--(G, Y, NF, nQ, swAlta-seBC, US).

12. *S. glauca* L. var. *glauca* (*S. desertorum* Rich.; *S. glaucops* Andersson) -- A middling shrub, rather branchy, mostly about 1 m high, with grayish-tomentose twigs and a general dull-gray appearance; the foliage and catkins much as in *S. arctica*. Foliage often somewhat villous when young, usually glabrous at maturity. Petioles well developed. Leaves 2-5 cm long, mostly broadly oblanceolate, dull green above, glaucous below, entire or nearly so. Catkins terminating short, leafy lateral shoots. Capsules tomentose, at first grayish-white, later pale green to pale brown, short stipitate. Scales very pale yellow and as pale as the capsule, varying to brown and obviously darker than the capsule, lightly tomentose to somewhat villous, but not conspicuously so. Flowers with or after the leaves, but before mid summer. Frequent in arctic or subarctic, alpine or subalpine habitats.--(G-K)-Mack-(Y)-Aka, (L), nwQ-(O)-nMan-BC, (US, Eur) -- Var. *Macounii* (Rydb.) Boivin (*S. cordifolia* Pursh, var. *callicarpaea* (Trautv.) Fern.) -- Less pubescent. Usually lower, mostly 1-5 dm high and leaves broader, obovate to oblong. Not always clearly distinct and the specimens from our area are mostly transitional.--(G-F)-r-(Mack)-Y, L-(NF-SFM, NS), n-O-(Man).

Highly variable like the precedent and a wide selection of phenotypes have received names. The more eastern material is usually distinguishable as var. *Macounii*.

Many collections have been reported as the putative hybrid *S. brachycarpa* X *glauca* (= *S. wyomingensis* Rydb.) All those we have examined were more like one or the other of the numerous variants of *S. glauca* or *S. brachycarpa*.

13. *S. brachycarpa* Nutt. var. *brachycarpa* (var. *antimima* (Schneider) Raup, var. *psammophila* Raup, var. *Sansonii* C.R. Ball; *S. brachycarpa* X *glauca* A.A.) -- A smallish, grayish and branchy shrub with nearly sessile leaves. Densely soft-pubescent throughout, rarely glabrescent at maturity. Usually less than

1 m high. Leaves (1)-2-3-(5) cm long, obovate-lanceolate, entire, glaucous below. Petiole very short, usually less than 1 mm long. Catkins short, terminating short lateral shoots with leaves about as large as those of other sterile lateral shoots. Capsules 4-7 mm long, tomentose, sessile. Scales pale. Flowers with the leaves in late spring to early summer. Boys and wet ground.--seK-(Mack)-Y, C-(O)-Man-BC, nwUS.

Specimens from the sand dunes around Lake Athabaska tend to be more densely pubescent and were described as var. psalmodioides. Other described segregates seem to have the range of the species and are not considered to be significant, one exception being the more northern var. Mexiae C.R. Ball, a larger plant, the leaves mostly 3-6 cm long, often glabrous or nearly so above, and the catkins longer, mostly 2-4 cm long.

There is a dot in northern Manitoba on a map of S. nipoclada Rydb. (=var. Mexiae) in Porsild 1957. It may be only the result of a lapsus calami as the species is not mentioned in Scott's Flora of Manitoba published the same year and we found no corresponding specimen at CAN in 1962.

Intuitive hybrids of S. brachycarpa X glauca parentage are not readily distinguishable from var. Mexiae. However reports of this hybrid within our area were apparently based on ordinary specimens of S. brachycarpa.

13X. S. arusei Boivin -- Hybrid with S. candida. Similar to the above but the branchlets, leaves and thin floccose-tomentose in the manner of S. candida, not sericeous. Leaves obovate-lanceolate, the main ones 3-4 cm long, 1.1-1.3 cm wide. Sand dunes near Courtenail.--(seq), nMan.

13Xa. S. brachycarpa Boivin -- Apparently a hybrid with S. lutea var. Turnorii and similar to the last, similarly purplish, but more pubescent and the catkins borne on leafy shoots. New leaves white-tomentose, becoming grayish villous on expanding, glabrescent at maturity. Petioles 1-3 mm long. Catkins terminating short leafy shoots which bear 4-5 leaves only half as large as those of the sterile shoots. Capsule grayish villous. Dunes between Little Cull and Athabaska Lakes.--nWS.

Hybr. n. A3 S. lutea var. Turnorii varieg. sed pubescentior et ramis fertilibus foliosis. Folia in primis albotomentosa, deinde grisea in actate glabrescentia. Petiolus brevis, 1-3 mm. Rami fertiles foliosi, foliis 1.0-2.5 cm long et 4-8 in ramo. Capsula purpuracens sed griseo-villosa. Type: C.W. Arns 221-62, Northern Saskatchewan, south shore of Lake Athabaska, east of Williams River, sand dunes north of "Little Hill" Lake, lat. 59N, long. 109W, lee slope of dune, 27 Jun 1962 (Dac).

14. S. MacCalliana Rowlee -- A colonial shrub with the foliage rather similar to that of S. serissima, equally thick, glossy above and paler but not glaucous below, glandular-serrulate, acute but not caudate at tip. Midnerve sharply yellow. Catkins terminating short lateral shoots. Stamens only two. Ovary and capsule white-tomentose, short stipitate. Scales

persistent, rather large and conspicuous, ± glabrous in the upper half and dirty brown, at least half as long as the ovary or capsule and seemingly enlarging at maturity, becoming 3-5 mm long. Flowers with the leaves, from early to late spring. Swamps.--sMack, cQ-eBC, (US).

15. *S. pyrifolia* Andersson (*S. balsamifera* Barratt) -- A bog species, rather strongly balsam-scented and thin-leaved. Even in the herbarium, the leaves remain balsam-scented for years. Glabrous shrub, 1-3 m high. Stipules small and nearly always absent. Leaves 3-6 cm long, ovate to lanceolate, thin, shining green above, glaucous below, serrulate, acute at tip, mostly cordate at base. Catkins large, on very short shoots bearing leaves less than half the size of leaves on sterile shoots. Capsules glabrous, purplish. Stipe glabrous and long, subtended by a shorter, villous and tomentose scale. Flowers with the leaves around mid-spring. Very wet places, especially at the edge of bogs.--(seK-Mack), L-NF, (NS-NB)-Q-Alta-(BC, US).

16. *S. monticola* Bebb (*S. Barclayi* AA.; *S. Farrae* C.R. Ball; *S. padophylla* Rydb.; *S. pseudomonticola* C.R. Ball, var. *padophylla* (Rydb.) C.R. Ball) -- The foliage much as in the preceding but thicker and with stipules 5-10 mm long, conspicuous, nearly always present, especially on the leading shoots. Branchlets puberulent. Catkins sessile and leafless to short-peduncled and with 1-3 very small leaves. Capsules yellowish to purplish, often half hidden by the villosity of the scales. Stipe variable. Scales small and very long villous, the hairs longer than the scales, sometimes glabrous. Flowers before or with the leaves in early spring. Shores and wet places.--(Mack)-Y-Aka, (L), Q-BC, US.

After the catkins have fallen off, it may not be readily distinguished from *S. mackenzieana* except that the latter tends to narrowly oblanceolate leaves while they are mainly broadly oblanceolate in *S. monticola*.

17. *S. lutea* Nutt. var. *lutea* -- Last year's twigs yellow, the new ones often reddish, the older ones turning gray. Tall shrub, 2-4 m high. Foliage glabrous, except when very young. Stipules smallish, nearly always present. Leaves lanceolate, short-acuminate, serrulate, glaucous below. Catkins subsessile and bracteate at base. Capsule glabrous, pale green to reddish, long stipitate. Scales brown, small, long villous, persistent. Flowers in mid spring, with or slightly before the leaves. River banks and ditches.--(sMack), nO-Alta, US -- Var. *Turnorii* (Raup) Boivin (*S. Turnorii* Raup) -- Strongly purplish-tinged, especially the more vigorous new shoots, the petioles, the midnerves and the capsules. Leaves thickish, usually not acuminate. Catkins tending to be shorter, mostly 1-3 cm long. Dunes on the south side of Lake Athabaska.--nWS.

Var. *Turnorii* (Raup) stat. n., *S. Turnorii* Raup, Journ. Arn. Arb. 17: 234. 1936.

A report of *S. rigida* Muhl. for Otterburne by Löve 1959 was based on a collection now revised to *S. lutea* (DAO, MT).

Other western specimens similarly identified S. rigida or S. cordata were all revised to other species, mostly S. lutea, S. mackenzieana and S. monticola.

The more eastern S. cordata Mx. and its var. rigida (Muhl.) Carey tend to be more pubescent, the larger leaves are usually quite clearly cordate, and the catkins are borne on short shoots bearing a few reduced leaves.

18. S. mackenzieana (Hooker) Barratt -- The red tinted stipes very long, much overtopping the pubescence of the scales and at least half as long as the capsule. Shrub around 3 m high, with glabrous foliage, except when very young. Stipules large and usually present on leading shoots. Leaves lanceolate or narrowly lanceolate, serrulate, glaucous below. Catkins on a very short peduncle bearing quite small leaves. Capsules glabrous, often reddish. Scales brown, small, very loosely tomentose rather than villous. Flowers probably early. Along streams.--(Mack-Y), wS-BC, US.

19. S. Barclayi Anderson -- The leaves soon glabrous below, but remaining villous-pubescent above, especially along the mid-nerve, at least till mid summer; the coarse twigs rather jet black in the herbarium. Very young twigs often whitish-villous. Stipules mostly present and rather variable. Leaves mostly broadly obovate, serrulate, acute to rounded at tip, slightly glaucous below, tending to blacken in drying. Catkins on a short peduncle, bearing a few half-size or smaller leaves. Capsules glabrous, at least half buried in the very long villosity of the scales. Styles elongate, over 1 mm long. Stipe less than half as long as the blackish, lanceolate, long-villous scales. Probably flowers in late spring, or early summer, after the leaves. Near mountain lakes and creeks, below timberline.--(Mack)-Y-Aka, Alta-BC, (nwUS).

20. S. commutata Bebb (var. denudata Bebb) -- Much like the preceding in its black twigs; the pubescence, leaves and stipules similar, but the leaves equally green and equally villous on both sides, becoming equally glabrous. Catkins terminating short lateral shoots bearing a few somewhat reduced leaves. Stipe very short. Scales brownish, small, loosely tomentose to long-villous. Styles mostly less than 1 mm long. Flowers after the leaves in late spring. Near mountain lakes and creeks: Cameron Lake.--(wMack-sAka), swAlta-BC, (US).

21. S. myrtillofolia Andersson (var. brachypoda Fern., var. pseudomyrsinites (Andersson) C.R. Ball; S. curtiflora Andersson; S. pseudocordata (Andersson) Rydb.) -- A smallish bog species, commonly half buried in Sphagnum and looking somewhat like a Blueberry bush (i.e. like Myrtillus). Mostly 3-6 dm high. Stipules insignificant and mostly absent. Leaves oblong to lanceolate, mostly 2-5 cm long, soon glabrous, serrulate, acutish to obtuse at summit, slightly paler to slightly glaucous below. Catkin terminating a short lateral branch with nearly normal to slightly reduced leaves. Stipe slightly shorter to slightly longer than the scale. Scale puberulent to villous,

strongly two-toned, pale yellow nearer the base, blackish nearer the tip. Flowers after the leaves in late spring. Marshy places, mostly in Black Spruce bogs.--(oF)-K-Aka, L-(NF), NB-BC, US.

22. S. Bebbiana Sarg. (var. capreifolia Fern., var. perrostrata Rydb.; S. rigida Rich.) -- (Chaton, Petit Minou) -- Very loose catkins of finely silky capsules on very long pedicels. A very common species, colonial, a bush or a small tree, with the general appearance of S. discolor and not infrequently confused with it. Leaves fairly variable, typically the early leaves are villous or short sericeous when young, while the later leaves are felty-tomentose below when young, becoming nearly glabrous, without rusty hairs, broadly oblanceolate, entire to weakly glandular-serrulate, glaucous below. Vigorous shoots usually bearing large stipules and crisp-margined leaves, the elongating branchlets grayish-tomentose. Catkins flowering from base to summit, borne on a very short peduncle bearing a few bracts or some very reduced leaves about as long as the capsules. Scales yellowish, somewhat villous, the villosity more or less overtopped by the stipes. Flowers in early spring with the leaves or almost ahead of them. All kinds of wet and not so wet or very wet places.--K-Mack-(Y)-Aka, (L-NF, NS-PEI)-NB-Man-(S)-Alta-BC, (US).

23. S. calcicola Fern. & Wieg. (var. glandulosior Boivin) -- A low arctic shrub, flowering before the leaves. Up to 1.5 m tall but usually much lower, to depressed and trailing. Twigs coarse, the younger ones abundantly spreading-villous, becoming dark coloured and usually blackish. Leaves very variable, round to lanceolate, mostly ovate, often broadly cordate at base, entire to glandular-serrulate, glaucous below, with a thick and short petiole. Stipules commonly present and large. Catkins sessile, leafless at base, rather large, dense and thick, at maturity 5-10 cm long. Capsules rather large, almost sessile. Scales very long, very black and very long-villous, the villosity not infrequently overtopping the capsules. Very early spring, before the leaves. Wet tundra and mountain river gravels.--F-K-(Mack), L-(NF), Q-neMan, swAlta.

Reports of S. Richardsonii Hooker from Churchill proved to be based on specimens of S. calcicola and S. planifolia.

24. S. Barrattiana Hooker (var. angustifolia Anderson) -- The leaves densely and permanently soft villous on both faces. Very variable in size, commonly around 1 m high. Twigs becoming coarse, permanently long spreading villous, darkish and with very prominent leaf scars. Leaves lanceolate, slightly paler below, entire to minutely glandular-serrulate. Catkins dense, rather large, 6-10 cm long at maturity, subsessile, the very short peduncle usually bracteolate. Capsules large, short stipitate, densely puberulent to white-sericeous, at least half buried in the long pilosity of the long and very black scales. Flowers in early spring before the leaves. Near lakes and creeks, mostly above timberline.--(Mack-Y)-Aka, (Alta-BC, nwUS).

25. S. alaxensis (Andersson) Cov. -- New twigs permanently white felty-tomentose. Mostly 1-3 m high. Leaves obovate to oblanceolate, slightly revolute and entire or minutely glandular-serrulate at margin, green and nearly glabrous above, white felty-tomentose below. Stipules large and mostly present. Catkins large, dense, up to 7-12 cm long at maturity, sessile on old wood, bractless to bracteolate at base. Capsules densely puberulent, subsessile. Scales long, black and very long villous, the villosity about equalling the top of the capsule. Flowers in early spring before the leaves. Along alpine and arctic or subarctic lakes and streams.--F-Mack-(Y-Aka, nQ, nMan, swAlta-nBC, Eur) -- F. longistylis (Rydb.) Boivin (var. obovalifolia C.R. Ball) -- The twigs not pubescent beyond the first year, often heavily pruinose the second year.--(K-Aka, nQ), nMan, (Alta) -- Var. silicicola (Raup) Boivin (S. silicicola Raup) -- More pubescent, the leaves grayish-tomentose above and somewhat concave. Subarctic lake dunes.--sMack, nWS.

26. S. pedicellaris Pursh var. pedicellaris (var. hypoglauca Fern.; S. myrtilloides ssp. pedicellaris (Pursh) Andersson) -- A smallish bog species with entire, subrevolute and smallish leaves. Mostly 3-6 dm high. Leaves ovate or oblong-lanceolate, to narrowly lanceolate, mostly 2-4 cm long and glabrous, strongly glaucous below. No stipules. Catkins small, mostly 1-3 cm long at maturity, terminating normal-size lateral shoots which bear normal-size leaves. Capsules small, glabrous, often purplish, long stipitate. Scales small, pale, often with a large dark purple patch, glabrous to villous. Mid to late spring, after the leaves. Very wet places, mostly in open Black Spruce bogs.--(K)-Mack-(Y), L-SPM, NS, NB-BC, (US) -- Var. athabascensis (Raup) Boivin (S. athabascensis Raup; S. fallax Raup; S. glauca X pedicellaris AA.) -- Leaves and ovaries more or less pubescent. Catkins often larger, 2-4 cm long. Stipe often shorter.--(Mack)-Y, nC-(Man)-S-(Alta-BC).

26 X. S. pedicellaris X phylicifolia (S. pedicellaris X planifolia) -- Has been recently reported for a few northern localities.--(nS).

27. S. discolor Muhl. var. discolor (var. Overi C.R. Ball, var. prinoides (Pursh) Andersson) -- Fussy-Willow, Diamond-Willow (Chaton, Petit minou) -- A most common and most conspicuous species in very early spring, when it flowers so early that the capsules are almost ripe by the time the leaves come out. Colonial shrub to small tree. Leaves variable, obovate to lanceolate, mostly broadly oblanceolate, entire to serrulate or sinuate, glabrous at maturity and strongly glaucous below. Stipules smallish and mostly absent. Catkins subsessile on old wood, bractless and leafless, rather large, mostly 4-8 cm long at maturity. Capsules about 1 cm long, attenuate, densely puberulent. Scales black, long pilose, from about as long to about twice as long as the stipe. Styles 0.5-1.0 mm long. One of the earliest plants to flower. Most common where the land is subject to flooding right after the melting of the snow.--

(L-NF, NS-NB)-Q-O-(Man-S)-Alta-(BC), US -- Var. latifolia Andersson (f. hirsuta Andersson, var. ericocephala Andersson; S. Scouleriana Barratt, var. coetanea C.R. Ball) -- Leaves remaining more or less velvety below at maturity. Branchlets generally velvety. Frequent and more common westward.--(Mack-Aka, Q-Man)-S-(Alta)-BC, US.

28. S. humilis Marsh, var. humilis -- Leaves thick-velvety below, the lateral nerves immersed in the white pubescence. Rather similar to S. discolor var. latifolia, but generally smaller. Shrub 0.4-3 m high. Twigs cinereous-puberulent to velvety. Leaves glaucous below, sometimes glabrous. Catkins short-petioled, bractless and leafless at base, 2-4 cm long at maturity. Style rather short, 0.2-0.5 mm long. Flowers very early, long before the leaves. Dry open places, tolerates spring flooding.-- L-NF, NS-nAlta, US -- Var. microphylla (Andersson) Fern. (S. tristis Aiton) -- Generally only half as large. 1 m high or less. Leaves mostly 3-5 cm long. Fruiting catkins 1-2 cm long. Late spring before the leaves. Wetter spots in the prairie--(O)-sMan, US.

29. S. petiolaris Sm. (var. gracilis Andersson, var. rogmarinoides (Andersson) Schneider, var. subsericea Andersson; S. gracilis Andersson, var. textoris Fern.; S. subsericea (Andersson) Schneider) -- The leaves rather narrow and glaucous below with a conspicuously yellow midnerve. Tufted shrub, mostly 1-3 m high, slender branched, the twigs deep red when fresh, usually blackening in drying. Leaves usually linear-lanceolate, at first appressed-pubescent, becoming glabrous or nearly so, serrulate. Stipules absent. Catkin on a short leafy peduncle, the leaves rather variable in size, often very small and not infrequently caducous. Stigma sessile or nearly so. Capsules finely silvery-silky, 5-7 mm long, the stipe usually well developed and as long to much longer than the brownish and villous scales. Flowers in early spring with the leaves. Moist places--sMack, NS-Alta-(BC), US.

29X. S. Clarkei Bebb -- Hybrid with S. candida and the pubescence rather tomentose, but becoming + appressed-sericeous on the smaller and earlier leaves. Leaves glaucous below. Capsule tomentose, usually with a short pedicel and a long style. McKague.--S, (US).

30. S. candida Flügge -- A common bog species, the leaves narrow and covered below with a snow-white tomentum. Mostly about 1 m high, the twigs + grayish or floccose-tomentose. Leaves lanceolate or narrower, entire to crenulate or serrulate, revolute at margin, + floccose above. Catkins terminal on short, lateral branches bearing a few much-reduced leaves. Style elongate. Capsule white-tomentose, with a short stipe, subtended by a longer, dark and villous scale. Flowers with the leaves in mid-spring. Muskegs and sometimes marshes.--K-Y-(Aka, L)-NF-SPM, NS-PEI-(NB)-Q-BC, US -- F. denudata (Andersson) Rouleau -- Leaves more or less glabrous below. Occasional.--NF, Q-O, S-(Alta).

31. S. phylicifolia L. var. phylicifolia (ssp. planifolia (Pursh) Breitung, var. Nelsonii nomen; S. planifolia Pursh, var. Nelsonii (C.R. Ball) E.C. Smith) -- Rather similar to S. discolor and readily confused with it, but flowering somewhat later. Also the leaves more glaucous below and more entire, the twigs and branchlets more strongly blackened in drying. Leaves mostly broadly oblanceolate, soon glabrous. Catkins on a short peduncle and usually bracteolate at base. Capsules densely puberulent, subsessile. Scales black, long pilose. Flower early before the leaves. Wet places, especially if subject to spring flooding.--(F-K)-Mack-(Y, L-SPM), Q-O-(Man-S)-Alta-(BC, US), Eur.

Taken as a group, the American specimens (S. planifolia) have a less pronounced denticulation than the eurasian ones, but the difference is not sharp enough to be taxonomically tenable.

A more northern var. subglauca (Andersson) Boivin has longer, narrower and marcescent stipules.

32. S. pellita Andersson var. pellita -- The narrow leaves densely silky-pubescent below, appearing somewhat silvery. Usually a tall shrub and mostly with strongly pruinose twigs. Leaves lanceolate to linear, not floccose, but finely puberulent above, minutely glandular-serrulate, but appearing somewhat entire due to the revolute margin. Catkins subsessile and bracteolate at base. Capsule more or less white-silky and rather small, 4-5 mm long, subsessile and subtended by a dark brown to black, long-villous scale. Styles 1 mm long or more. Flowers very early before the leaves. Shores.--(L)-NF-(SPM, NS, NB)-Q-(O-Man)-S, (US) -- F. psila Schneider -- Leaves glabrescent and strongly glaucous below, except for the half grown new leaves. Local.--Q-(O-S) -- Var. angustifolia (Bebb) Boivin (S. Drummondiana AA., var. bella (Piper) C.R. Ball, var. subcoerulea (Piper) C.R. Ball) -- Pubescence of the underside of the leaves shorter, more compact and more uniform. Hairs (0.2)-0.3-(0.5) mm long--(Y, Alta-BC, US).

33. S. arbusculoides Andersson -- Much resembling S. petiolaris but the leaves permanently silky below and the catkins narrower and longer. Usually a tall, tufted shrub with thin branches. Leaves lanceolate or narrower, glabrous above even when very young, glandular-serrulate. Catkins terminating very short branches bearing a few much-reduced leaves at base. Capsules 3-7 mm long, densely sericeous, subsessile. Scales small, dark brown, somewhat villous. Flowers early with the leaves. Mostly on river banks.--(K)-Mack-(Y-Aka), Q, (nMan)-S-(Alta-BC) -- F. glabra (Andersson) Boivin (S. Tyrellii Raup) -- Foliage and capsules glabrous.--(S).

34. S. sitchensis Sanson -- The ovoid capsules very small, 2.5-3.5 mm long, and white-silky at least when young. Pubescence much as in S. pellita, but the leaves broader, oblanceolate to elliptic-oblanceolate and the twigs not bluish. Leaves white-silky below, lightly silky above, sometimes becoming only lightly silky on both faces at maturity. Catkins varying from

sessile and bractless to short-peduncled and leafy-bracted at base. Scale brown to black, long villous. Flowers now with the leaves, now much earlier. Mountain streams: Waterton.--sAka, Alta-BC, wUS.

Re S. nigra Marsh. reported from near Maple Creek by Macoun 1886, see comment under Rosa nutkana.

Order 10. MYRICALES

A single family.

18. MYRICACEAE (SWEET-GALE FAMILY)

Like the Salicaceae, but the ovary one-celled and one-seeded. Seed devoid of pappus. Ovary subtended by a group of bracts. Single genus.

1. MYRICA L. SWEET-GALE

Catkins borne on separate leafless branches.

1. M. Gale L. -- Bog-Myrtle, Gold-Withy (Bois-sent-bon, Herbe à cheval) -- Shrub forming large colonies. Leaves cuneate-oblongate, serrate towards the apex, with numerous yellow resin dots below. Catkins borne in a spike on a separate leafless branchlet. Mid spring, before the leaves. Bogs and boggy shores.--K-Aka, L-SPM, NS-BC, US, Eur.

We have found no specimen to justify a report by Gleason 1952 of M. aspleniifolia L. from Saskatchewan. See comment under Buchloë dactyloides.

Order 11. FAGALES

Much as in the Myricaceae, but the ovary inferior and with 3 or more cells and ovules, only one of which matures. Calyculc present.

- a. Male and female flowers calyculcate 21. Fagaceae
 aa. Either, but not both, with a calyculc.
 b. Male flowers calyculcate 19. Betulaceae
 bb. Female flowers calyculcate 20. Corylaceae

19. BETULACEAE (BIRCH FAMILY)

Both male and female flowers borne in long catkins. Each seed subtended by a bract.

- a. Pistillate catkins axillary 1. Betula
 aa. Pistillate catkins in a leafless panicle or raceme 2. Alnus

1. BETULA L. BIRCH

Seeds with two wings. Pistillate scales thin and trilobed. Buds sessile.

- a. Shrub with compact bark; petiole 5 mm long or less (except sometimes on leading shoots) 4. B. nana
 aa. Tree with papery bark; petiole longer.

- b. Bark purple brown; petiole 1 cm long or less (except sometimes on leading shoots) 3. B. occidentalis
- bb. Bark chalky-white to pink; petiole longer.
- c. Leaves glabrous 2. B. neoalaskana
- cc. At least pubescent below in the axils or the main nerves 1. B. papyrifera

1. B. papyrifera Marsh. var. papyrifera (var. commutata (Regel) Fern; B. winteri Dugle) -- Birch, Paper-Birch (Bouleau, Bouleau à papier) -- A tree with the outer bark readily peeling off in paper-thin sheets. Bark colour mostly whitish-gray or chalky-white. Twigs minutely puberulent, often somewhat glandular-verrucose. Leaves ovate to rhomboid, serrate, rounded to truncate at base, pubescent below with tufts of hairs in the axils of the main nerves, otherwise usually glabrous. Catkins pendulous, mostly 4-5 cm long. Very early spring before the leaves. Mostly along banks and bluffs of larger rivers.--Mack-(Y)-Aka, L-NF-(SPM), NS-BC, US -- Var. cordifolia (Regel) Fern. (var. subcordata (Rydb.) Sarg.; B. cordifolia Regel) -- Leaves mostly cordate and usually doubly serrate. More pubescent, the twigs and petioles abundantly pilose. Leaves pilose along the nerves on both faces, more so and often velvety below. Catkins often stubbier. Bark tending to gray. Scattered tree in Spruce forests.--sMack, L-NF, NS, NB-BC, US.

The distinction between var. papyrifera and var. cordifolia is quite sharp in some parts of Canada, hence some authors will quite understandably treat the two taxa as specifically distinct.

B. winteri was originally described as the hybrid B. neoalaskana (= B. resinifera) X papyrifera. Some of the specimens cited came from well outside the range of B. neoalaskana (West Hawk Lake, Craven, etc.) and it seems highly questionable that these could represent a hybrid as postulated. About two thirds of the syntypes were examined and most seem to belong to B. papyrifera. One collection from Mt. Saskatoon could be doubtfully retained as a possible B. neoalaskana X papyrifera, yet it seems closer to B. neoalaskana. The type collection has not been seen.

2. B. neoalaskana Sarg. var. neoalaskana (B. papyrifera Marsh. var. humilis AA., var. neoalaskana (Sarg.) Raup; B. resinifera AA.) -- White Birch -- Much like the preceding, somewhat smaller and with smaller thickish leaves. Twigs densely glandular-verrucose. Bark white to pale pinkish brown. Leaves deltoid-ovate, simply serrate, short caudate, glabrous. Catkins descending, 2-3 cm long. Early spring, before the leaves. Scattered in Spruce forests, especially on wetter sites.--(K)-Mack-Aka, nO-nBC.

B. resinifera Britton was based on a B. alba L. var. resinifera Regel which was in turn based on a Middendorf collection from Siberia. As our species does not occur in Siberia,

the epithet resimifera is obviously not available to designate our plant as some authors have done, unless one is willing to divorce B. resinifera from its basionym by Regel; this certainly is not a practice condoned by the International Code of Botanical Nomenclature.

In Rhodora 47: 321-3. 1945, Fernald typified B. alba L. var. humilis Regel in the sense of B. neaslaskana by selecting as the type a Bourgeau sheet from the "Bords de la rivière Castor" in Saskatchewan. However, in his original description Regel included as a synonym B. papyrifera var. minor Tuck. and he also cited Tuokerman's collection from the White Mountains. There is no evidence that Regel meant to describe a var. humilis different from a var. minor; quite the contrary, var. minor and its type were unequivocally included by Regel in his var. humilis. We are therefore, of the opinion that the type of var. minor automatically becomes the type of var. humilis and that the 1945 type selection was both superfluous and incorrect.

In Yukon and Alaska there occurs a var. kenayca (Evans) Boivin which differs from our typical variety by its leaves not caudate. Also they are usually pilose above and also towards the margin below.

3. B. occidentalis Hooker var. occidentalis (B. arbuscula Dugle; B. Eastwoodae Sarg.; B. fontinalis Sarg.; B. uliginosa Dugle) -- Mountain Birch, Black Birch (Merisier rouge) -- A smaller and usually tufted species of sandy soils with dark, purple-brown, papery bark, but the layers not peeling off readily. Young leaves and twigs lightly pilose and very resinous, soon glabrous, rarely densely puberulent. Leaves small, round-ovate, usually glabrous. Catkins spreading, 1-2 cm long. Early spring before the leaves. Sandy shores and hollows between sand dunes.--K-(Mack)-Y-Aka, NS, NB-BC, US.

West of us it grades into a more pubescent var. inopina (Jepson) C.L. Hitchcock, the twigs strongly pubescent and the leaves pubescent below, bearing hair tufts in the axils of the main nerve junctions.

There has been some disagreement as to the correct interpretation of B. occidentalis. As pointed out by Hitchcock 1964, Hooker obviously intended to describe the plant later renamed B. fontinalis. An earlier and rejected typification by Sargent was in the sense of one of the variants of B. papyrifera because it was cited first, as was the practice of the tenants of the American Code. The International Code of Botanical Nomenclature allows retypification whenever an earlier one is demonstrably in error. This is applicable here and B. occidentalis should be typified in the sense of the specimens and notes by Drummond and Douglas. The concept of nomen confusum is not applicable here since the name is obviously typifiable one way or another.

B. utahensis Britton (= B. Andrewsii Nelson), a putative hybrid of B. occidentalis X papyrifera, was described from Utah and recently reported from Yukon, Alberta and B.C. by J.R. Du-

gle, Can. Journ. Bot. 44: 972-983. 1966. Many specimens revised by Miss Dugle are at hand from B.C. Saskatchewan and Mackenzie, the latter two areas are not yet reported in the botanical literature. The many B.C. specimens fit into our concept of B. occidentalis Hooker var. inopina (Jepson) C.L. Hitchc., while the Sask. sheet belongs to typical B. occidentalis and the many Mackenzie sheets fit better in B. neocalaskana. The correct disposition of the Yukon and Alberta reports remains in doubt as the relevant sheets have not been examined.

B. uliginosa was described as a putative hybrid of B. glandulifera (= B. nana var.) X resinifera (= B. neocalaskana) from two localities in central Alberta. A photo of the type gives the superficial appearance of B. occidentalis; but none of the specimens cited were at hand for examination. However, a large number of authentic specimens are available ranging from Manitoba to B.C.; mostly they belong to B. occidentalis, the remainder to B. nana var. glandulifera and a few of them were collected outside the range of one of the putative parents.

The type of B. Eastwoodae was illustrated in Can. Journ. Bot. 44: 953. 1966. It is obviously similar to B. uliginosa illustrated on the page facing and neither seem to differ significantly from B. occidentalis. Most of the many specimens cited or identified as B. Eastwoodae fall within our concept of B. occidentalis, but the Saskatchewan ones belong to B. nana var. glandulifera.

4. B. nana L. var. sibirica Led. (B. glandulosa Mx.) -- Swamp Birch (Bouleau de savane) -- A thin shrub with small roundish leaves. Twigs glandular-verrucose, with variable pubescence, usually velvety puberulent. Leaves mostly 1-2 cm long, obovate to rotund or flabellate, crenate-serrate. Catkins 1-2 cm long. Early spring before the leaves. Boggy places.--(G-F)-K-Aka, L-(NF, NS, NB)-Q-Man-(nS)-Alta-BC, US, (Eur) -- Var. glandulifera (Regel) Boivin (B. glandulifera (Regel) Butler; B. glandulosa Mx. var. glandulifera (Regel) Gleason; B. pumila L. var. glandulifera Regel; B. Sargentii Dugle) -- Leaves larger, mostly 2-3 cm long, obovate and cuneate at base, more glaucous below. Marshes and bogs.--(K)-Mack-Y, L, Q-BC, US.

Intermediates between our two varieties are quite common and B. Sargentii was created precisely to designate them.

4X. B. Sandbergii Britton -- Hybrid of B. papyrifera. Rather variable, a tall shrub or small tree with dark brownish bark in the manner of B. occidentalis. Petiole somewhat less than 1 cm long, except on strong leading shoots. Leaves mostly about 3 cm long, broadly ovate to rhomboid-ovate, rounded to subacuminate at tip, rather finely but irregularly serrate, thickish and glutinous, but ± pubescent below, especially in the main axils. Shores and bogs, rare: Saint-Norbert.--O-sMan, (US).

Recently reported, Can. Journ. Bot. 44: 992-7. 1966, from a number of additional localities west to Alberta. Most sheets so-named and examined were more characteristic of B. occidentalis while a few rather resembled B. papyrifera or B. nana var.

glandulifera.

2. ALNUS B. Ehrhart

ALDER

Seeds winged or wingless. Pistillate scales very thick and somewhat woody, not lobed. Buds sessile or stipitate.

- a. Buds sessile; seeds winged 1. A. viridis
 aa. Buds stipitate; seeds wingless,
 merely thin-margined 2. A. incana

1. A. viridis (Chaix) DC. var. sinuata Regel (A. crispata (Niton) Pursh, var. mollis Fern., ssp. sinuata (Regel) Hultén) -- Alder, Green Alder (Aulne, Bois à rames) -- A shrub bearing woody ellipsoid catkins about 1.5 cm long. Very glutinous when young, pubescent to glabrous. Leaves ovate, serrate to nearly doubly serrate, green and often shiny below. Flowers in mid spring after the leaves. Often forming a continuous understory in Coniferous woods.--G, (K)-Mack-Aka, L-NF-(SPM), NS-BC, US.

Not always clearly distinct from the eurasian var. viridis. Our var. sinuata is commonly a larger shrub with much larger leaves and somewhat longer pedicels and pistillate catkins. Var. mollis is an extreme of pubescence which will be found to be somewhat more obvious and more common eastward.

2. A. incana (L.) Moench var. incans (var. virescens Watson, ssp. rugosa (DuRoi) Clausen, ssp. tenuifolia (Nutt.) Breitung; A. rugosa (DuRoi) Sprengel, var. americana (Regel) Fern., f. hypomalaca Fern.) -- Alder, Speckled Alder Mountain Alder (Aulne, Verne) -- A shrub or small tree with stipitate buds, the stipe 1-2 mm long. Leaves ovate, doubly serrate, green to glaucous below, densely puberulent to nearly glabrous. Flowers very early before the leaves. Shores of streams and lakes.--Mack-Aka, L-SPM, NS-BC, US, (CA), Eur.

We cannot detect a satisfactory difference between the european A. incana and the american A. rugosa. The best character appears to be the colour of the pubescence and on this basis one could distinguish an american var. americana Regel (not the earliest epithet available) with the pubescence of the underside of the leaves ± light brown, especially in the axils of the nerves, but sometimes white. In var. rugosa, the pubescence is white and only exceptionally brown tinted. Many other characters have also been stressed, but surely some of them are unrealistic, like the supposed difference in leaf serration, while others exhibit such a broad range of overlap as to have little practical value, even if they may have a statistical one. The difference in size has been overemphasized. The american plant is commonly a shrub 2-4 m high, especially when pioneering in wetish neglected fields. In more stable and less disturbed habitats, such as the floodplains of rivers in undisturbed forested regions, it will usually reach about 5 m with a trunk around 1 dm thick, reaching exceptionally 10-15 m and a trunk of 2 dm. The european counterpart is described as a "tree or shrub

up to 10-(25) m".

Var. virescens will designate the specimens with leaves greenish below. This phenotype is sporadic throughout the range as pointed by Hultén 1944, but it is more common in our area than the glaucous type, which in turn becomes the more common phase in eastern Canada.

Our plants have ovate and doubly serrate leaves, as contrasted with the primarily planicostal var. serrulata (Aiton) stat. n., Betula serrulata Aiton, Hort. Kew. 3: 338, 1789, with obovate and simply serrate leaves. The two varieties show a fair amount of intergrading and an A. rugosa var. subelliptica Fern. is indeed based on such intermediate material.

When A. incana and A. rugosa are treated as a single species, A. rugosa is usually given the priority because its specific epithet dates from 1788 while rugosa is supposed to date only from 1794. However there appears to be an earlier Betula incana (L.) L. f., Suppl. Pl. 417. 1781 which we have not seen but would seem to give priority to A. incana.

20. CORYLACEAE

(FILBERT FAMILY)

Nut partly to completely enclosed by a group of partly fused, accrescent bracts.

- a. Leaves simply serrate 1. Ostrya
 aa. Leaves doubly serrate 2. Corylus

1. OSTRYA Scop.

IRONWOOD

Fruits in an elongate catkin. Seed small, enclosed in a large, inflated involucre of fused bracts.

1. C. virginiana (Miller) K. Koch var. virginiana -- Ironwood, Hop-Hornbeam (Bois de fer, Bois dur) -- The mature catkins resemble Hops. Small tree. Leaves elliptic-ovate, acuminate, pubescent, the terminal leaves on each twig many times larger than the lower ones. Second half of spring. Deciduous forests on hillsides.--NS, N.-sMan, US.

Quite local in our area, being known only from Morden, Sprague and Falcon Lake. It was also noted by Nicholas Garry in his diary in 1821 at Poste de Chute d'Esclave on the Winnipeg River. See Proc. Trans. Roy. Soc. Can. ser. 2, 6: 130. 1900.

In var. virginiana the twigs are glabrous to lightly pilose or sometimes stipitate-glandular. The more southern and primary planicostal var. lasia Fern. has densely pilose to velvety twigs.

2. CORYLUS L.

HAZEL-NUT

Pistillate catkin reduced to a short cluster. Involucre tightly enclosing the nut. Seed edible.

- a. Twigs densely covered with spreading glandular hairs 1. C. americana

aa. Twigs not glandular 2. C. cornuta

1. C. americana Walter -- Hazel, Filbert -- A shrub with the twigs densely beset with long, stiff, spreading, purple, glandular hairs. Leaf ovate, pubescent on both faces and somewhat glandular above. Nut largely enclosed by an involucre. Involucre flaring above the middle, leaving the top of the nut exposed. Early spring, before the leaves. Oak forests and sandy hillsides.--swQ-sMan, US.

2. C. cornuta Marsh. var. cornuta (C. rostrata Aiton) -- Hazel, Filbert (Noisettier, Coudrier) -- The nut completely enclosed by the flask-shaped involucre. Twigs not glandular, lightly pilose with somewhat appressed hairs, glabrescent. Leaves much as in the preceding but not glandular. Involucre covered with stiff, almost acicular hairs, prolonged into a tube 1.5-2.5 cm long. Early spring, before the leaves. Rocky hillsides and dry deciduous woods.--NF-SPM, NS-BC, US.

Two more varieties occur west of us.

In the intermontane area: var. californica (D.C.) Sharp with a shorter beak, 0.5-1.5 cm long, and the twigs remaining pubescent all summer.

Along the coast, south to California: var. glandulosa. var. n. Ramulis petiolisque pubescentia pilis opacis glandulosisque intertexta. Ceteris us var. californica. Type: Calder & MacKay 31517, head of Finlayson Arm below Mt. Finlayson, north of Victoria, common and scattered in open areas along river and in woods, to 15' high, July 16, 1961 (DAO). By its glandular pubescence this new variety is reminiscent of the more eastern C. americana.

21. FAGACEAE

(BEECH FAMILY)

Nut subtended by a cupule made up of a large number of fused bracts.

1. QUERCUS L.

OAK

Involucre not dehiscent.

1. Q. macrocarpa Mx. -- Oak (Chêne) -- Leaves lyrate and strongly discolour. A tree with crooked branching. Leaves lyrate lobed, dark green and nearly glabrous above, pale green and densely stellate-puberulent below. Acorn sitting in a fringed cup. Mid spring, with the leaves. Upper part of galerie-forests and forming bluffs on hillsides and drier prairies.--NB-seS, US.

Westward it is a gradually smaller tree (Q. mandanensis Rydb.) and becomes eventually restricted to the major coulées, namely the Souris, Pipestone and Qu'Appelle in southeastern Saskatchewan.

Order 12. URTICALES

Flowers not in catkins. Petals lacking. Calyx present,

CORYLUS

of fused sepals. Stamens as many as the calyx lobes.

- a. Trees 22. Ulmaceae
- aa. Herbs.
 - b. Non climbers 23. Urticaceae
 - bb. Plant climbing by its twisting stem 24. Cannabinaceae

22. ULMACEAE

(ELM FAMILY)

Trees with distichous, asymmetrical leaves.

- a. Leaf with the middle lateral nerves stronger than those above and below 1. Ulmus
- aa. Lower pair of nerves longest, those above gradually shorter 2. Celtis

1. ULMUS L.

ELM

Fruit a round samara with the seed at the center.

1. U. americana L. -- Elm (Orme) -- A common tree with doubly serrate, asymmetrical leaves. Leaf soft-puberulent to scabrous, short-acuminate, with numerous and conspicuous, strictly parallel nerves. One side of the leaf is broader, ovate and cordate at base; the other side is obovate and cuneate at base. Flowers very early, before the leaves. Galerie-forests; often planted.--NS-(PEI)-NB-S, US.

2. CELTIS

HACKBERRY

Fruit a drupe, solitary, similar to that of a Pin-Cherry.

1. C. occidentalis L. var. occidentalis -- Hackberry, Sugarberry (Bois inconnu, Bois connu) -- A tree with the leaves very obliquely truncate at base, ovate to oblong, caudate, serrate. Fruit black, long pedicelled. Flowers in mid-spring, with the leaves. On the eastern half of the sand dune at Delta. --swQ-Man, US.

Varieties are usually distinguished primarily on the leaves being smooth or scabrous, but this character is not geographically restricted. We have distinguished two varieties on a new basis as follows:

Var. occidentalis. Leaves 6-20 cm long, mostly 1 dm or somewhat less, ovate to oblong-lanceolate, mostly semi-cordate at base, acuminate-caudate at tip. Margin regularly dentate, the teeth mostly 20-30 to a side. This is var. pumila and var. canina sensu Fernald and also var. canina and var. crassifolia sensu Gleason. A photo of the Linnean type, 1209.4, shows a Kalm specimen with caudate leaves about 8 cm long.

Var. crassifolia (Lam.) Gray. More southern, the leaves smaller, 4-10 and mostly 5-7 cm long, broadly oval and mostly rounded at base, merely short acuminate at summit. Margin mo-

re irregularly toothed with fewer teeth, mostly 10-20 teeth to a side. This is var. occidentalis sensu Fernald and also sensu Gleason.

23. URTICACEAE

(NETTLE FAMILY)

Herbs, often stinging herbs. Calyx of 2-5 fused sepals.

- a. Leaves opposite 1. Urtica
 aa. Leaves alternate.
 b. Strongly hirsute with stinging hairs 2. Laportea
 bb. Not stinging; finely puberulent with
 catchy hairs 3. Parietaria

1. URTICA L.

NETTLE

Stinging herbs with opposite leaves. Sepals and stamens

4.

- a. Tall perennial 1. U. dioica
 aa. Low annual 2. U. urens

1. U. dioica L. var. procera (Muhl.) Wedd. (U. gracilis Aiton; U. Lyallii Watson; U. procera Muhl.; U. viridis Rydb.) -- Stinging Nettle (Ortie) -- Stinging herb with a square stem. Perennial in large colonies, commonly 1 m high. Leaves ovate or cordate below, becoming narrowly lanceolate above, coarsely serrate. All summer. Wetish places.--G, Mack-Aka, L-NF-(SPM), NS-BC, US, Eur.

West of us occurs a more densely pubescent var. californica (Greene) C.L. Hitchcock, the stem and leaves grayish puberulent or densely villous, the pubescence mixed with much longer and stiff hairs.

2. U. URENS L. -- Burning Nettle, Dog-Nettle -- Annual and lower. Leaves all ovate and coarsely serrate. Mid summer to early fall. A weed of gardens and disturbed soils.--(G), aka, (NF)-SPM, NS-Man, Alta-(BC), US, CA, SA, Eur.

2. LAPORTEA Gaud.

WOOD-NETTLE

Stinging herbs with alternate leaves. Sepals and stamens

5.

1. L. canadensis (L.) Gaud. -- Wood-Nettle (Ortie du Canada) -- Perennial herb with large, round-ovate leaves, remotely alternate below, close together near the summit. Leaves serrate, acuminate. Early summer. Forms large colonies on flood-plains.--SPM, NS, NB-seS, US.

3. PARIETARIA L.

PELLITORY

Non-stinging; the small flower-clusters subtended by overtopping bracts.

1. P. pensylvanica Muhl. -- A weak, small and inconspi-

URTICA

cuous annual herb with a weakly catchy pubescence. Leaves rhomboid-lanceolate, very thin. First half of summer. Dry woods and under isolated clumps of bushes in the prairies.--swQ-BC, US, (Eur).

Not yet reported from Alberta, although we know of 5 or 6 collections, some more than 40 years old.

24. CANNABINACEAE (HEMP FAMILY)

Non-stinging herbs. Calyx reduced to a single sepal.

Dioecious.

- a. Self supporting herb; leaves digitate..... 1. Cannabis
 aa. Climber; leaves trilobed 2. Humulus

1. CANNABIS HEMP

Achene completely enclosed at maturity by an accrescent and long acuminate bract.

1. C. SATIVA L. -- Hemp, Marijuana (Chanvre) -- Tall annual herb with digitate leaves. Dioecious and conspicuously dimorphic in appearance. Lower leaves opposite, the upper alternate. Leaflets 5-9, very narrow, sessile, serrate. Mid summer. Rare weed of cultivation and waste places: Spirit River.--Q-O, Alta, US, Eur.

2. HUMULUS L.

Inflorescence a dense spike of achenes, each subtended by a very large pale green bract.

1. H. Lupulus L. -- Hops (Houblon) -- Herb climbing by its twining and retrorsely scabrous stem. Leaves opposite, deeply and coarsely palmately lobed. Male flowers in loose panicles; female flowers in small panicles of dense spikes. Mid summer. Galerie-forests.--(NF), NS-S-(Alta)-BC, US, Eur.

Order 13. CUNONIALES

Shrubs with inferior or semi-inferior ovary, the sepals partly fused and forming a more or less developed calyx-tube, the free petals inserted at the top of the calyx-tube.

- a. Leaves alternate; flowers pentamerous.
 25. Grossulariaceae
 aa. Leaves opposite; flowers tetramerous.
 26. Hydrangeaceae

25. GROSSULARIACEAE (GOOSEBERRY FAMILY)

Carpels 2, the flower otherwise pentamerous with only 5 stamens. Single genus.

1. RIBES L. CURRANT, GOOSEBERRY

Shrubs, often spiny, with palmately lobed leaves.

Fruit a berry.

- a. Flowers 1-3-(5) in a very reduced raceme.
Mostly spiny 1. R. oxyacanthoides
- aa. Flowers more numerous, in elongate racemes.
b. Densely spiny along the internodes.
..... 2. R. lacustre
- bb. Spineless or with a few nodal spines.
c. Ovary and fruit densely stipitate-glandular.
d. Leaves coarsely glandular above 9. R. viscosissimum
- dd. Leaves glabrous or finely puberulent above.
e. Ovary (and fruit) abundantly and finely puberulent underneath the glandulosity 3. R. laxiflorum
- ee. Ovary merely glandular-stipitate 4. R. glandulosum
- cc. Ovary glabrous or bearing a few sessile glands.
f. Leaves dotted below with yellow, resinous glands.
g. Pedicels many times longer than the small bracts ..
..... 6. R. hudsonianum
- gg. Bracts much longer than the short pedicels 7. R. americanum
- ff. Not glandular-dotted.
h. Leaf lobes closely and uniformly serrate from base to tip 5. R. rubrum
- hh. Leaf lobes with a few coarse teeth above the middle.
i. Calyx long tubular; bracts persistent in fruit 8. R. aureum
- ii. Calyx saucer-shaped; bracts caducous after flowering 10. R. diacanthum

1. R. oxyacanthoides L. var. oxyacanthoides (R. setosum Lindley; Grossularia oxyacanthoides (L.) Miller; G. setosa (Lindley) Cov. & Britt.) -- Wild Gooseberry (Groseillier sauvage) -- Abundantly armed with straight prickles and acicles, the branches often recurved and then forming fierceful tangles. Racemes very short and few-flowered, mostly shorter than the petiole of the subtending leaf. Bracts glandular-ciliate. Flower yellowish white, the tube variable in length. Berry glabrous, pruinose, dark bluish purple. Early to mid spring. Sandy or rocky places.--(K-mack)-Y, (NF), PEI, (Q)-O-BC, (US) -- Var. saxosum (Hooker) Cov. (R.

hirtellum Mx., var. callicola Fern., var. saxosum (Hooker) Fern.; R. inerme Rydb.; Grossularia hirtella (Mx.) Spach) -- (Fausse épine) -- Bracts long ciliate with glandless hairs; acicules and prickles fewer, weaker and somewhat fugaceous. --L-(NF-SPM), NS-Alta-(BC), US.

2. R. lacustre (Pers.) Poirlet (Limnobotrya lacustris (Pers.) Rydb.) -- Swamp-Currant, Swamp-Gooseberry (Groseillier sauvage) -- Like the precedent, with the stem and twigs densely armed with prickles and acicules, but the fruit glandular-bristly. Pedicels glandular. Flower saucer-shaped, greenish to purplish. Fruit purplish black. Late spring. Forests.--Mack-Aka, L-NF, NS-BC, US.

3. R. laxiflorum Pursh -- Quite thornless, but the ovary and fruit both stipitate-glandular and finely puberulent. More or less finely glandular throughout. Flower saucer-shaped, pale green to deep purple. Fruit purplish-black. Late spring. Wet woods.--sAka, (swAlta)-wBC, US.

4. R. glandulosum Grauer (R. prostratum L'Hér.) -- Skunk-Currant, Wild Cranberry (Gadellier sauvage, Castilles) -- Ovary and fruit stipitate-glandular with red glands, but not pubescent. Stems and branches often decumbent. Foliage glabrous to glandular or pubescent. Flowers whitish to roseate, saucer-shaped. Berries red. Late spring. Wet woods. --K-(Mack-Aka, L-SPM), NS-PEI-(NB)-Q-O-(Man-Alta)-BC, (US).

5. R. rubrum L. var. propinquum Trautv. & Mey. (R. triste Pallas) -- Red currant, Wild Currant (Gadellier sauvage) -- The leaves rather squarish and more prominently 3 lobed with 2 other smaller lobes, very wide. Leaves devoid of yellow dots, mostly pubescent below. Racemes finely glandular and puberulent, but the ovary quite glabrous. Flowers saucer-shaped, greenish-yellow, often red-dotted, the small petals often reddish. Early to late spring. Wet woods.--(sK)-sMack, NF, NS-BC, US, Eur -- Var. alaskanum (Berger) Boivin -- Flowers more showy, pink to deep red. -- Mack-Aka, nAlta-BC.

Ribes triste is merely a statistical variation of R. rubrum with the anthers of the latter averaging larger.

6. R. hudsonianum Rich. var. hudsonianum -- Black Currant, Wild Black Currant (Gadellier sauvage) -- Ovary and lower surface of leaves dotted with large clear-yellow glands. Flowers white, tomentose, without a well defined tube. Fruit dull black, with a few yellow glands. Late spring. Wet woods and swamps.--(Mack-Y)-Aka, wcQ-BC, US.

The more western var. petiolare (Douglas) Jancz. is less pubescent and often nearly glabrous. Leaves generally lightly pilose below, rather than puberulent. Raceme denser, the pedicels rather short, mostly shorter than the flowers.

7. R. americanum Miller (R. floridum L'Hér.) -- Black Currant (Gadellier noir) -- Glandular-dotted like the preceding, but the glands reddish or brownish-tinted and present

on both faces of leaf while lacking on the ovary. Flowers whitish green, with a tube about as long as the lobes. The long bracts persistent. Fruit black. Mid to late spring. Ravines and galerie-forests.--NB-Alta, (US).

8. *R. aureum* Pursh (*R. odoratum* Wendland f.; *Chryso-botrya aurea* (Pursh) Rydb.) -- Golden Currant, Buffalo-Currant -- Very showy in mid-spring with its long, golden-yellow flowers with purple center. Glandless and nearly always entirely glabrous. Leaves thickish, all or mostly trilobed and cuneate at base. Raceme with large persistent bracts. Flowers long tubular, the tube about 1 cm long. Fruit red to yellow brown or black brown. Mid spring. Wooded ravines.--sw.-O, S-Alta-(BC), US.

Most authors will distinguish var. *grandiflorum* Jancz. (= *R. odoratum*) with longer flowers and somewhat more pubescent. This may be a valid distinction south of our borders, but the Canadian material is mostly intermediate and the distinction is neither significant nor practical in our area. Native with us, it occurs only as an escape from cultivation in other parts of Canada.

9. *R. viscosissimum* Pursh var. *viscosissimum* -- Sticky Currant -- Densely covered throughout with stiff and thick glandular hairs. Leaf lobes rounded. Flowers greenish-white to pinkish, the tube well developed, rather large. Berry bluish black. Late spring. Slopes, bluffs and wet woods: Waterton--Alta-BC, WUS.

The fruits are abundantly glandular-stipitate in our var. *viscosissimum* while they are glabrous or nearly so in the more southern var. *Hallii* Jancz.

10. *R. DIACANTHUM* Pallas -- Dioecious. Leaves thickish as in *R. aureum* and more or less trilobed, or merely obovate and coarsely toothed. Glabrous or nearly so. Sometimes with a pair of small acicules at each node. Flower small, saucer-shaped, greenish, subtended by a long bract which falls off soon after flowering. Berry scarlet, small. Mid spring. Cultivated and more or less naturalized at the edge of an Oak bluff in Brandon.--Man, (Eur).

26. HYDRANGEACEAE (HYDRANGEA FAMILY)

Carpels 4, also 4 petals and 4 sepals, but numerous stamens.

1. PHILADELPHUS L.

Capsule 4-locular and opening by as many valves.

1. *P. Lewisii* Pursh -- Mock Orange, Syringa -- Shrub with a short terminal raceme of large, white, opposite flowers. Leaves ovate to lanceolate, entire to coarsely toothed, triple-nerved. Early summer. Hillsides, open to lightly wooded: Waterton.--Alta-BC, US.

We are not quite convinced that this is really different from the more eastern *P. coronarius* L.

Order 14. ARALIALES

Similar to the Rosales, but the carpels united into an inferior ovary. Sepals fused; petals free; carpels 1-5.

- a. Leaves simple and entire; carpel and style 1..
 27. Cornaceae
 aa. Leaves lobed to compound; carpels and styles 2-5 28. Araliaceae

27. CORNACEAE

(DOGWOOD FAMILY)

Shrubs with simple, entire and opposite leaves and white flowers in cymes.

1. CORNUS L.

DOGWOOD

Fruit a one-seeded berry. Stamens and petals 4.

- a. Semi-herbaceous, with verticillate leaves..
 1. C. canadensis
 aa. Woody with alternate or opposite leaves.
 b. Leaves alternate 2. C. alternifolia
 bb. Leaves all opposite.
 c. Twigs pale green, mottled with purple 4. C. rugosa
 cc. Not mottled with purple.
 d. Branches reddish purple 3. C. alba
 dd. Branches gray 5. C. racemosa

1. C. canadensis L. var. canadensis (Chamaepericlymenum canadense (L.) A. & G.) -- Pigeon berry, Bunchberry (Quatre-temps, Rougets) -- Inflorescence subtended by 4 large, showy, white bracts. About 1 dm high and forming large colonies. Stem bearing 1-3 pairs of bracts and a verticil of 4 leaves on sterile stems, or 6 leaves on flowering stems. Pubescence rather sparse and malpighiaceus. Early summer. Coniferous woods.--(G), K-Aka, L-SPM, NS-BC, US, Eur -- Var. Dutillyi (Lep.) Boivin -- Upper part of stem and basal part of leaves with dense, crisp pubescence.--(Y-Aka), L, SPM, Q, Man-Alta.

The bracts of the upper pair are sometimes intermediate in size to the leaves of the verticil. This variant is often designated as var. intermedia Farr. or less commonly as the putative hybrid C. unalaschensis Led. (= C. canadensis X suecica). However, one of the putative parents is absent from our area and the variant appears to be only an infrequent phenotype of sporadic occurrence (Reynolds, Gilliam, McKague, La Ronge, Beaverlodge, etc.)

2. C. alternifolia L. f. -- Green Osier -- Similar to the following, the leaves alternate on the leading shoots, subapproximate to subverticillate on flowering shoots. Twigs greenish. Usually a tall shrub with a flattish top. Early summer. Open woods: Prairie Coteau.--NF-SPM, NS-Man, US.

3. *C. alba* L. var. *alba* (ssp. *stolonifera* (Mx.) Wang.; *C. sericea* AA.; *C. stolonifera* Mx.; *Svida instolonea* (Nelson) Rydb.) -- *Kinnikinnik*, Red Osier (*Harts rouges*, *Poison*) -- A common and conspicuous shrub with its dark red twigs. Pubescence malpighiaceus and appressed throughout. Leaves ovate to lanceolate, mostly with 5 pairs of lateral nerves. Inflorescence a flattish corymb, much wider than high. Early summer. Edge of woods and along watercourses.--(K)-Mack-Aka, L-NF-(SPM), NS-(PEI-NB)-Q-Alta-(BC), US, (CA) -- Var. *Baileyi* (C. & E.) Boivin (*C. Baileyi* C. & E.) -- Leaves densely soft pilose below with spreading hairs.--Q-Man, (Alta), US -- Var. *interior* (Rydb.) Boivin -- Not only the lower surface of the leaves, but also the inflorescence and especially the young twigs and the peduncle of the inflorescence, densely spreading-villous to grayish-lanate.--Mack-Y (Aka, neO-Man)-S-eBC, US.

A report of *C. Baileyi* by Macoun 1890 from Saskatchewan was based on a collection with the typical pubescence of var. *alba*. Reports from Alberta have not been investigated.

Cornus alba L., *C. stolonifera* Mx. and *C. sericea* L. do not appear to be distinct entities except that the latter has bluish fruits. We have examined the types in 1950. The transfers needed are as follows: *C. alba* L. f. *azurea* (Lep.) stat. n., *C. stolonifera* Mx. f. *azurea* Lep., Nat. Can. 81: 59. 1954. This blue-fruited form includes *C. sericea*, the type of which is a flower but the original description stated that the fruit was blue.--*C. alba* var. *Baileyi* (C. & E.) stat. n., *C. Baileyi* Coulter & Evans, Bot. Gaz. 25: 37. 1896. -- *C. alba* var. *californica* (Meyer) stat. n., *C. californica* Meyer, Bull. Phys. - Math. Ac. St. Pet. 3: 373, 1845. -- *C. alba* var. *interior* (Rydb.) stat. n., *Svida interior* Rydb., Bull. Torr. Bot. Club 31: 572. 1904. -- *C. alba* L. var. *occidentalis* (T. & G.) stat. n., *C. sericea* L. var. *occidentalis* T. & G. Fl. N. Am. 1: 652, 1840.

4. *C. rugosa* Lam. (*C. circinata* L'Hér.) -- (*Bois de calumet*) -- Branches pale green with numerous purple patches. Leaves broadly ovate to nearly round, woolly beneath. Berries blue. Early summer. Wooded ravines.--(NS), NB-sMan, US.

5. *C. racemosa* Lam. (*C. candidissima* Marsh.; *C. paniculata* L'Hér.) -- Quite similar to *C. alba*, but the leaves tending to be narrower, mostly lanceolate, and with only 3 pairs of lateral nerves. Inflorescence broadly pyramidal, about as high as wide. Early summer. Open woods.--Q-Man, US.

28. ARALIACEAE (GINSENG FAMILY)

Herbs or semi-woody shrubs, mostly with large compound leaves. Flowers in umbels. Umbels often in racemes or panicles.

- a. Leaf simple 1. Oplopanax
 aa. Leaf compound 2. Aralia

1. OPLOPANAX (T. & G.) Miq.

Carpels 2, styles 2.

1. O. horridus (Sm.) Miq. -- Devil's Club (Bois pi-
 quart) -- Coarse and very spiny shrub. Stems, branches, pe-
 tioles, leaves and inflorescence spiny. Leaves very large,
 palmately lobed, spiny along the nerves. Inflorescence a
 raceme of umbels. Early summer. Rocky woods: Waterton,
 Lesser Slave Lake.--Aka, wO, Alta-BC, US.

2. ARALIA L.

Styles and carpels mostly 5.

- a. Stemless 3. A. nudicaulis
 aa. Stem present.

b. Spineless 1. A. racemosa

bb. Stem densely spiny below 2. A. hispida

1. A. racemosa L. -- Spikenard, Petty Morrel (Grande
 Salsepareille, Anis sauvage) -- A large herb with very lar-
 ge leaves, compound of numerous and large leaflets. Stem
 coarse, up to 2 m high. Umbels in elongate axillary racemes.
 Deciduous woods.--NS-sMan, US.

2. A. hispida Vent. -- Sarsaparilla, Dwarf Elder
 (Salsepareille) -- A herb with a semi-woody and densely spi-
 ny lower stem. Leaves variable, ternately divided to bipin-
 nate. Umbels terminal and axillary on long peduncles in the
 upper part of the plant. Mid summer. Rocky openings in co-
 niferous forests.--L-NF, NS-Alta, US.

3. A. nudicaulis L. -- Wild Sarsaparilla (Salsepareil-
 le) -- A large basal leaf, mostly with 13 large leaflets.
 Stemless and stoloniferous, producing numerous scattered lar-
 ge leaves, the sterile ones mostly with 11 leaflets. Inflo-
 rescence of 3 umbels on a scape shorter than the petiole.
 Late spring. Very abundant and almost ubiquitous in coni-
 ferous forests.--Mack, NF-SPM, NS-BC, US.

Order 15. BIXALES

Similar to the Rosales, but the carpels (mostly 5) u-
 nited into a unilocular ovary with parietal placentation.
 Style 1.

29. CISTACEAE

Petals free. Leaves opposite. Sepals 5, the 2 outer
 much smaller.

- a. Petals 5.

- b. Flowers of two kinds, the terminal ones with larger petals 1. Helianthemum
 bb. Flowers all alike, all axillary 2. Hudsonia
 aa. Petals 3 3. Lechea

1. HELIANTHEMUM Miller ROCK ROSE

The two outer sepals very narrow, sometimes lacking. Flowers of two kinds; the terminal ones with 5 fugaceous petals; the others smaller, cleistogamous, with petals minute or wanting.

1. H. Bicknellii Fern. -- Frostweed -- A smallish tenuous shrub, in tufts of a few stems. Leaves variable, those of the stem 2-3 cm long and about lanceolate, those of the branches much smaller. Flowers large, yellow, in terminal racemiform corymbs of 2-15 flowers. Early summer. Open soils, sandy or rocky: La Petite Montagne de Cyprès. --swO-seMan, US.

2. HUDSONIA L. HUDSONIA

Small shrubs with reduced and closely overlapping leaves, somewhat in the manner of Juniperus horizontalis. Flowers axillary, all alike, all with 5 bright yellow petals.

1. H. tomentosa Nutt. var. tomentosa (var. intermedia AA.) -- Poverty-Grass, Dog's Dinner -- On sand dunes, a very small and very branchy shrub, forming small hemispherical tufts which, seen from a distance, appear blackish. Leaves 1.0-3.5 mm long, lanceolate to linear, lanate. Peduncle short. Petals white at tip. Early summer. Sand dunes and precambrian outcrops. --sMack, L, (NS)-PEI-Alta, US.

Peduncle no longer than the calyx. In the eastern var. intermedia Peck the peduncles are longer, clearly exceeding the leaves and 1-2 times longer than the calyx. The latter is sometimes treated as an interspecific hybrid because it appears to be intermediate to H. ericoides L., but this is not a convincing hypothesis as var. intermedia extends much beyond the common range of the putative parents. This var. intermedia has been reported for lake Athabaska, but all specimens examined (CAN, DAO) for that area turned out to have the shorter pedicels of the typical variety and were revised accordingly.

3. LECHEA L. PINWEED

Petals 3; sepals 5, of which the outer 2 are very narrow.

1. L. minor L. var. maritima (Leggett) Gray (L. intermedia Leggett) -- A low, tufted shrub, with numerous stiffly erect stems bearing alternate leaves, and numerous

basal offshoots bearing opposite or verticillate leaves. Stem leaves 1.5-2.0 cm long, narrowly lanceolate. Flowers deep red, small. Petals shorter than the sepals. Inner sepals deep red. Outer sepals green, very narrow and slightly shorter than the inner ones. Mid summer. Open, sandy soils.--NS-sMan, US -- Var. depauperata (Hodgdon) Boivin -- Smaller, the stem about 1 dm long and decumbent at base: Lake Athabaska.--S.

Order 16. THYMELEALES

Petals reduced or most often absent. Sepals usually well developed and petaloid, fused into a pseudo-corolla. Ovary mostly reduced to a single carpel.

30. NYCTAGINACEAE (FOUR-O'CLOCK FAMILY)

Calyx persistent and enclosing the fruit at maturity. Fruit a one-seeded utricle.

- a. Involucral bracts fused into a peltate involucre 1. Mirabilis
 aa. Bracts free; flowers sessile 2. Abronia

1. MIRABILIS L. FOUR-O'CLOCK

Flowers conspicuous by the petaloid calyx. Petals absent. Flower clusters subtended by a 5-lobed calyx-like involucre of fused bracts. Leaves opposite.

- a. Leaves broadly ovate 1. M. nyctaginea
 aa. Much narrower 2. M. hirsuta

1. M. nyctaginea (Mx.) MacM. (Allionia nyctaginea Mx.; A. ovata Pursh; Oxybaphus nyctagineus (Mx.) Sweet) -- Perennial herb from a large orange-red taproot. Plant glabrous. Leaves ovate or deltoid-ovate. Involucre saucer-shaped, about 1 cm wide, ciliate, becoming larger in fruit. Calyx pink. First half of summer. Open, sandy soils of southern Manitoba, railway embankments elsewhere.--Q-sAlta, US.

2. M. hirsuta (Pursh) MacM. var. hirsuta -- (Allionia hirsuta Pursh; A. pilosa (Nutt.) Rydb.; Oxybaphus hirsutus (Pursh) Sweet) -- Stem lightly to densely long-pilose. Leaves variable, the main ones usually lanceolate and 1 cm wide or larger, often pilose below, abruptly contracted into a short petiole. Glandular-pubescent in the inflorescence. Mid to late summer. Sandy or gravelly prairies and hills.--O-sAlta, US -- Var. linearis (Pursh) Boivin -- (Allionia linearis Pursh; Mirabilis linearis (Pursh) Heimerl; Oxybaphus albidus (Walter) Sweet; O. linearis (Pursh) Rob.) -- Leaves much narrower and gradually attenuate at base, sessile or with a poorly distinct petiole. The grayish-white stem sometimes glabrous, more commonly short-puberulent with curved hairs. Leaves usually puberulent. Mid summer. Arid hillsides.--scMan-sAlta, US, (CA).

2. ABRONIA Juss.

SAND-VERBENA

Involucral bracts free. Flowers sessile.

1. A. micrantha Torrey -- Long tubular flowers, green and yellow in pedunculate glomerules with an involucrem of large and free bracts. Somewhat fleshy perennial, puberulent. Leaves opposite, entire, those of the same pair strongly dimegueth. Calyx small but accrescent into a winged fruit 1.5-2.5 long. Wings 2-3. Early summer. Loose alluvial sands, rare: Manyberries Creek.--sAlta, wUS.

Order 17. VIOLALES

Petals and sepals free, but the flower zygomorphous. Single family.

31. VIOLACEAE

VIOLET FAMILY

Ovary with 3 carpels and parietal placentation. Flower pentamerous.

1. VIOLA L.

Herb with the lower petal spurred, thus the flower is a typical Violet. Low herbs. The zygomorphous flowers are reminiscent of the Leguminosae, but there are two upper petals.

- a. Stem present and leaf-bearing Group A
 aa. Stemless; all leaves basal Group B

Group A

Stem present, bearing at least one leaf. Flowers terminating the stem and branches, some may be axillary.

- a. Stipules about as big as the leaf blades and pin-natifid; annuals.
 b. Petals about as long as the sepals or somewhat shorter 2. V. arvensis
 bb. Petals larger, one and a half times to three times as long as the sepals 1. V. tricolor
 aa. Leaf blade many times larger; perennials.
 c. Flowers yellow.
 d. Leaves cuneate to rounded at base ..
 3. V. Nuttallii
 dd. Leaves deeply cordate.
 e. Leaves mostly basal, the stem leaves few and much smaller ..
 4. V. orbiculata
 ee. Stem leaves quite as large and as numerous or more numerous.
 f. Stipules 2-10 mm long .. 5. V. glabella
 ff. Stipules 8-18 mm long ..
 6. V. pubescens
 cc. Flowers white to mauve to blue.

- g. Stipules coarsely dentate 7. V. adunca
 gg. Stipules entire 8. V. rugulosa

Group B

Stemless, all leaves and flowers borne directly on the rhizome.

- a. Leaf deeply divided 9. V. pedatifida
 aa. Entire to shallowly crenate.
 b. Flowers yellow 3. V. Nuttallii
 bb. White to mauve to violet.
 c. Lateral petals bearded at throat; rhizome thick and fleshy 10. V. cucullata
 cc. Rhizome slender and elongate; petals mostly not bearded.
 d. Flowers + mauve.
 e. Leaves strigose above ..
 11. V. Selkirkii
 ee. Foliage glabrous 12. V. palustris
 dd. Flowers white with purple lines.
 f. Leaves reniform, puberulent below 14. V. renifolia
 ff. Leaves broadly cordate-ovate, glabrous below 13. V. blanda

1. V. TRICOLOR L. -- Pansy (Pensée) -- Large-flowered annual with widely spreading petals. Leaves ovate to spatulate, crenate. Flower variously multicoloured, with a yellow center. All summer. Cultivated and casually reseeding itself in and around gardens.--SPM, NS, NB-S-(Alta)-BC, (US), Eur.

2. V. ARVENSIS Murray var. ARVENSIS (V. Kitaibeliana var. Rafinesquii AA.; V. Rafinesquii AA.) -- Field Pansy (Petite pensée, Pensée des champs) -- Quite like the preceding but the yellow flowers much smaller. Stem finely reflexed-pubescent along the angles. Leaves small, ovate to narrowly oblanceolate. Summer, farmed land and sandy soils, uncommon.--(G), NF-SPM, (NS)-PEI-O, S-BC, US, Eur.

All Canadian reports of the glabrous-stemmed var. Rafinesquii Greene appear to be incorrect. The reports from our area were from Tisdale (DAO, SASK) and Edmonton (ALTA; DAO, photo).

3. V. Nuttallii Pursh var. Nuttallii (var. linguifolia (Nutt.) Henry; V. Russellii Boivin; V. vallicola Nelson) -- Densely tufted, yellow-flowered prairie species. Stems variable, often very short. Leaves ovate to narrowly lanceolate, entire or nearly so. Flowers yellow, often reddish to bluish-tinted outside. Early to mid spring. Steppes on hillsides.--Man-BC, US.

The many segregates proposed for this species are mostly morphologically continuous and sympatric, such as broad-

leaved and narrow-leaved forms. Similarly with the phenotype with flowers smaller and not tinged in brown-red dorsally (=var. Bakeri = V. Russellii). However, west of us there is a more distinct var. praemorsa (Douglas) Watson with denser and coarser pubescence, the hairs up to 1 mm long or more on the petioles.

4. V. orbiculata Geyer -- Stem leaves 1-3, much smaller than the rosette leaves. Perennial with fleshy taproot. Foliage glabrous. Leaves roundish, deeply cordate. Stem bearing a single terminal flower. Petals pale yellow, purple-lined, the lateral minutely bearded. First half of summer. Moist mountain woods.--(Alta-BC, US).

5. V. glabella Nutt. -- Much like the following, the stipules smaller, the rhizome somewhat thicker and more elongate, the leaf serrations mostly smaller and more numerous, the leaf tip less broadly acuminate. Late spring to early summer. Wet woods in Paterton.--Aka, Alta-BC. US.

6. V. pubescens Aiton var. leiocarpa (Fern. & Wieg.) Boivin (V. eriocarpa AA.) -- Yellow Violet -- A forest species with yellow flowers. Stem usually leafless below the middle. Leaves cordate to reniform, mostly deltoid, crenate-serrate, becoming very large. Late spring. Common in Oak woods.--NS-sMan, US.

All Manitoba specimens examined turned out to belong to the glabrous-fruited var. leiocarpa.

The separation of Viola pubescens and V. eriocarpa Schwein. as proposed in current manuals is not satisfactory. This was clearly expressed by C.C. Deam, Flora of Indiana, p. 691. 1940. Quote:

"V. eriocarpa ... Most of our specimens are more pubescent than the typical form, in fact many so closely approach V. pubescens that it seems wrong to place them with this species".

"V. pubescens ... The separation of this species from the preceding is not at all satisfactory. The characters used in their separation are not constant and it appears from my specimens that all characters fail about equally, so that a preponderant character is absent."

He expressed our own experience quite clearly. The character of pubescence is not realistic, intermediate specimens being more numerous than the typical ones.

The character of presence or absence of basal leaves has only a statistical value. Standing in any one colony, it is obvious that it belongs to one type or the other, but a minority of 10-30% of individuals plants will be atypical. Herbarium specimens are not always carefully collected and are rarely numerous enough on any one sheet to carry over the statistical value of this character.

Distinctions based primarily on the above two characters result in entities of roughly the same distribution.

The character of glabrous vs. lanate ovary or fruit is

normally treated as a subsidiary one, but this turned out to be without intermediates and to be clearly restricted geographically.

When the emphasis was shifted and the pubescence of the ovary was made the main character while the other characters were treated as subsidiary, a new picture emerged that was far different, quite sharp and far more satisfactory than any other previous classification. This may be expressed as follows:

Var. pubescens; V. pubescens Aiton 1789; V. pennsylvanica Mx. 1803; V. eriocarpa Schwein. 1823. Ovary and fruit white lanate. Basal leaves mostly absent, more rarely 1-3. Herbage commonly heavily pubescent, varying to nearly glabrous. Restricted in Canada to southern Ontario, the Ottawa valley, the Monteregian Hills and the Richelieu Valley; isolated at Sault-Sainte-Marie and the Grosse Ile in the estuary of the Saint-Lawrence river. In the U.S.A., south to Alabama.

Var. leiocarpa (Fern. & Wieg.) stat. n., V. eriocarpa Schwein. var. leiocarpa Fern. & Wieg., Rhodora 23: 275. 1921; V. pubescens Aiton var. scabriuscula T. & G. f. leiocarpa (Fern. & Wieg.) Farwell 1923; V. pubescens Aiton var. Peckii House 1923. Ovary and fruit glabrous. Basal leaves 1-3 per tuft, rarely none. Herbage pubescence variable. Widely ranging in Canada from the Pembina Hills of southern Manitoba eastward to the Gaspé peninsula and Nova Scotia. South to North Carolina.

We have adopted the rank of variety for these taxa and it is worth pointing out that var. leiocarpa is a good example of the difference between a variety and a species as it is just barely short of the minimum morphological discontinuity essential to a species. This minimum is of two linked characters, but var. leiocarpa exhibits only one clearly defined character, the other being only partially linked.

7. V. adunca Sm. (var. minor (Hooker) Fern.; V. arenaria AA.; V. conspersa Rchb.; V. subvestita Greene) -- Densely tufted caulescent species with blue flowers. Stems all or mostly spreading. Foliage more or less pubescent, becoming glabrous. Leaves ovate, finely crenate. Lateral petals long-bearded. Ovary glabrous. All spring. Common in dry to wet, open habitats.--G, K-Aka, L-SPM, NS-BC, US. -- F. Masonii (Farw.) Boivin (f. albiflora Vict. & Rouss.) -- Flowers white. Local.--NS, Q-O, S-(Alta, US).

8. V. rugilosa Greene (V. canadensis AA.) -- Long stoloniferous forest species, forming large open colonies or carpeting the forest floor. Rhizome twin and fragile, but thickened near the base of the stem. Leaves villous, the lower and basal broadly reniform, the upper subopposite and more or less cordate. Flowers mauve. Lateral petals long-bearded. Capsule finely puberulent. Late spring

to mid summer. Ubiquitous in Aspen groves.--Mack, wO-BC, US.

As pointed out by Boivin 1948, *V. canadensis* L. is a strictly eastern species and all western material of the group belongs to *V. rugulosa*. Most western authors have reported both species as occurring in our area and some of them, finding the distinction difficult to establish, have quite understandably expressed some doubt as to the value of *V. rugulosa*. If western collections are compared only with eastern ones, the morphological distinction is reasonably satisfactory, even if the two species are obviously closely related. The differences may be contrasted as follows.

V. canadensis -- Tufted and many-stemmed. Rhizome short, thick, ascending, branched. Not stoloniferous. Herbage glabrous to lightly puberulent. Leaves cordate, about $1\frac{1}{2}$ times as long as large, the summit acute-acuminate. Sepals 7-10 mm long.

V. rugulosa -- Stems solitary, rarely in 2's. Long stoloniferous, the stolons thin but becoming thicker just below the base of the stem. Forming extensive colonies of mostly single stems. Leaves larger, reniform-cordate, about as long as large, more abruptly short acuminate. Sepals shorter, 4-7 mm long.

9. *V. pedatifida* G. Don -- Prairie-Violet -- Leaves pedatipartite. Flowers large, very showy, reddish purple. Lateral petals densely long-bearded. Late spring. Sandy prairie.--sMan-Alta, US.

10. *V. cucullata* Aiton (*V. nephrophylla* Greene, var. *cognata* (Greene) C.L. Hitchc.; *V. sororia* W.) -- Tufted species with broadly cordate leaves and large blue flowers. Rhizome thick, short, ascending. Foliage glabrous to villos, the leaves with a broadly open basal sinus. Flowers 1.5-2.0 cm long, the spur about 3 mm long. All petals long-bearded at the throat, or the upper two glabrous. Late spring to early summer. Shores and other open, wet places.--K-(sMack), NF-(SPM), NS-BC, US, (CA)-- *F. albiflora* Britton -- Flowers white. Rosthern.--Q-O, S, (US).

11. *V. Selkirkii* Pursh -- Similar to *V. cucullata*, but generally smaller, with the flower 1.0-1.5 long, and a rather long spur, about 5 mm long and at least $\frac{1}{3}$ as long as whole flower. Rhizome thin and elongate. Leaves lightly strigose above, glabrous below, the basal sinus narrow, nearly closed. Petals pale bluish violet, not bearded. Late spring. Deep, wet woods.--(G), K, (Y-Aka, L-NF, NS, NB-Q)-O-Alta-(BC, US, Eur).

12. *V. palustris* L. -- Marsh-Violet -- Rosettes poorly developed, most leaves being alternate on the long thin stolons; this species thus forming a carpet. Plant glabrous. Leaves reniform, deeply cordate. Flower mauve or pale violet, 12-13 mm long including the short spur. All petals glabrous or the lateral ones minutely papillate. Late

spring. Wet woods.--(G), K-(Mack-Y)-Aka, L-(NF), Q-(C)-Man-(S-BC, US, Eur) -- *F. albiflora* Neum. (var. *brevipes* (M.S. Baker) Davis) -- Local form with white flowers.--(NF), Alta-(BC, US).

13. *V. blanda* W. (*V. pallens* (Banks) Brainerd) -- White Violet, White Snowdrops, Mayflower -- Tufted, with long, leafless stolons. Leaves broad-ovate to round reniform, lightly pubescent above to glabrous. Flower 8-12 mm long, with deep purple lines, the spur short. Petals beardless or the lateral bearded. Early spring. Moist, rich woods.--(K-Aka), L-NF-(SPK, NS-PEI)-NB-nMan, swAlta-BC, US.

14. *V. renifolia* Gray (var. *Brainerdii* (Greene) Fern.) -- Tufted species with reniform leaves and white flowers. Foliage pubescent to nearly glabrous. Flowers with deep red lines, small, about 8 mm long including the short spur. Petals beardless. Mid spring to mid summer. Wet coniferous woods.--K-(Mack-Aka, L-NF), NS-(PEI-NB)-Q-BC, US.

Order. 18. POLYGALACTALES

Flowers more strongly zygomorphic than in the Violales and with some reduction or fusion of floral parts.

32. POLYGALACTACEAE (MILKWORT FAMILY)

Only one genus with us, easily recognized by its unusual type of zygomorphic flower.

1. POLYGALA L. MILKWORT

Sepals 5, free, persistent in fruit, the inner ones (termed wings) larger and petaloid. Petals reduced to 3, partly fused at base, the lower one (termed keel) larger and crested dorsally. Stamens 6 or 8, their filaments united into an incomplete tube and partly fused with the petals. Ours are low herbs.

- a. Leaves verticillate 4. *P. verticillata*
- aa. Leaves alternate.
 - b. Leaves elliptic or ovate 1. *P. paucifolia*
 - bb. Much narrower.
 - c. Leaves linear, 1-2 mm wide 3. *P. alba*
 - cc. More or less lanceolate and 2-5 mm broad or wider 2. *P. Senega*

1. *P. paucifolia* W. (*P. pauciflora* Sphalm.) -- Flowering Winter-green, Bird-on-the-Wing -- Stem merely bracteolate below, with a few large leaves above and a few rather large and showy pink flowers. Wings 1.5 cm long, about as long as the corolla. Stamens 6 (all others have 8). Late spring and early summer. Rich woods on light soil.--NB-ecS, US.

2. *P. Senega* L. var. *Senega* (var. *latifolia* AA.) -- Snakeroot (Seneca) -- Leaves alternate, but the uppermost

opposite or verticillate, narrowly lanceolate, rarely over 1 cm wide, finely denticulate, the teeth barely 0.1 mm long. Densely tufted perennial with the upper leaves gradually larger. Raceme dense, whitish. Early summer. Black soils, mostly around Aspen groves.--NB-Alta, US.

Var. latifolia T. & G. has larger leaves, the upper lanceolate to ovate-lanceolate, the larger ones up to 1.5-2.5 cm wide, the denticulation not quite so fine, the teeth often \pm 0.3 mm long. Fruit tending to be larger. This var. latifolia is more southern and barely enters Canada in southwestern Ontario. Intermediates are however widely distributed, especially in southern Manitoba and southwestern Quebec. A previous report for Saskatchewan was based on such an intermediate.

3. P. alba Nutt. -- A rather sparse herb. Leaves all alternate, very narrow, the uppermost smaller. Raceme whitish. First half of summer. Eroded coulées.--sS, US.

4. P. verticillata L. (var. isocycla Fern.) -- Another sparse herb with the leaves disposed in a few distant verticils. Tufted and branched above. Raceme whitish. Second half of summer. Steppes on hillsides.--soQ-sMan, US.

Order 19. CUCURBITALES

Mostly herbs climbing by tendrils. Flowers unisexual and the ovary inferior.

33. CUCURBITACEAE (GOURD FAMILY)

One stamen with only 1 locule, the other 1-4 stamens with 2 locules. Sepals and petals more or less fused.

- a. Leaf minutely denticulate 1. Thladiantha
 aa. Leaf lobed.
 b. Leaf deltoid, irregularly lobed 2. Bryonia
 bb. Leaf palmately and deeply 5-lobed... 3. Echinocystis

1. THLADIANTHA Bunge

Flowers solitary in the axils.

1. T. DUBIA Bunge -- Golden Creeper -- Leaves large, broadly ovate-cordate, scabrous, the nerves excurrent into minute marginal teeth. Perennial from a globose corm. Stems long hirsute. Flowers yellow, large, campanulate, with reflexed sepals. Mid summer to the first frosts. Cultivated and weedy in gardens, roadsides and dumps: Brandon --swQ-sMan, (US, Eur).

2. BRYONIA

Staminate flowers in racemes; pistillate flower solitary or in small clusters.

1. *B. DIOICA* L. -- Bryony, Cow's Lick (Bryone, Navet bêtard) -- Tendrils simple. Leaf ± deltoid, coarsely and irregularly toothed to deeply lobed, very scabrous. Perennial from a carrot. Flowers greenish-white, about 1 cm long. Fruit a berry less than 1 cm across. (Early summer?). Cultivated as ground cover and rarely weedy or long persistent in and around gardens: Altona.--sMan, Eur.

3. *ECHINOCYSTIS* T. & G.

Fruit covered with numerous soft spines. Male flowers in panicles; female flower solitary.

1. *E. lobata* (Mx.) T. & G. (*Micrampelis lobata* (Mx.) Greene) -- Wild Cucumber, Balsam Apple (*Concombre sauvage, Concombre rameur*) -- Annual with huge and persistent cotyledon leaves. Leaf palmately 5-lobed, the terminal lobe larger, the basal ones much smaller. Fruit pale green, soft and juicy, 2-locular with 4 seeds. Mid summer. Scrambling over the floodplain vegetation; cultivated and readily escaping to brush piles.--NS-BC, US.

Native from N.B. to Sask., escaped elsewhere.

Order 20. *CACTALES*

Petals and stamens very numerous and free over an inferior ovary.

34. *CACTACEAE* (CACTUS FAMILY)

Very fleshy and ferociously spiny. Leaves vestigial and fugaceous. The enlarged stem is the fleshy part.

- a. Globular 1. *Mamillaria*
 aa. Elongate and made up of a series of articles..
 2. *Opuntia*

1. *MAMILLARIA* Haw.

Globular and covered with crowded nipple-like protuberances, each of which is topped by a rosette of spines.

1. *M. vivipara* (Nutt.) Haw. (*Neomamillaria vivipara* (Nutt.) Britton & Rose.) -- Purple Cactus, Ball-Cactus -- Just about like a pin cushion and around 5 cm across. Sometimes tufted and forming a half sphere of pin cushions. Flower purple-red, open in the morning only. Early summer. Top of dry hills.--swMan-sAlta, US.

2. *OPUNTIA* Miller PRICKLY PEAR

The fleshy stem constricted into a series of jointed articles. Spines in clusters over the surface of the article.

- a. Articles 1-3 cm long 1. *O. fragilis*

aa. Articles much larger 2. O. polyacantha

1. O. fragilis (Nutt.) Haw. -- Cactus, Prickly Pear (Crapaud vert) -- Much like the following, but generally smaller and the articles only slightly compressed, readily detaching themselves to become attached to the skin and fur of animals. Spines apparently catchy. The terminal and flower-bearing article often much larger than the others. Early summer, rarely flowering. Steppes, especially near the base of hills.--O-BC, US.

Occurs as far north as 56°N, on the sunny south-facing slopes of the coulée of the Peace River.

2. O. polyacantha Haw. -- Cactus, Prickly Pear (Raquette, Corne de raquette) -- Articles 5-11 cm long, broadly flattened, orbicular to broadly obovate. Spines ivory to bright red. Flower large and showy, shining yellow with a red center, fading red. First half of summer. Dry steppes, mostly on hills.--sS-sBC, US.

More southern than the first, and all reports for the Peace are probably based on misidentification of O. fragilis.

All Manitoba collections examined turned out to be O. fragilis. Presumably other collections cited for the province should be similarly revised.

Order 21. TILIALES

Trees or shrubs with a rather typical flower of free sepals and petals, stamens also usually free, but the carpels fused into a superior ovary.

35. TILIACEAE (LINDEN FAMILY)

A primitive type with pentamerous flowers and numerous stamens.

1. TILIA L. BASSWOOD

Rachis of the inflorescence fused to the back of a large bract which acts like the wing of a samara.

1. T. americana L. (T. glabra Vent.) -- Basswood, Whitewood (Bois blanc) -- Tree with round, cordate and asymmetrical leaves, abruptly short-acuminate, serrate, palmately nerved, glabrous to stellate-pubescent. Bract oblanceolate, entire. Flowers greenish yellow. Just before midsummer. Galerie-forests of southern Manitoba; sometimes planted and naturalized at Moose Jaw.--NB-S, US.

The pubescence is rather variable on the lower face of the leaves and some authors will distinguish a glabrous or near glabrous type (= T. americana or T. glabra) and a pubescent or velvety type (T. neglecta Spach). Both occur in our area and are sporadic throughout the Canadian part of the range. They obviously represent an arbitrary dis-

inction of extreme phenotypes within a morphological continuum.

Order 22. MALVALES

Much as in the Tiliales, but the numerous stamens fused into a tube around the style. Single family. Ours all herbs.

36. MALVACEAE

(MALLOW FAMILY)

Sepals fused below. Petals 5, free. Carpels united into a ring.

- a. Calyx without bractlets; leaves entire or nearly so 1. Abutilon
- aa. Calyx usually subtended by 2-9 bractlets; leaves shallowly to deeply divided.
 - b. Bractlets more than 5.
 - c. Flowers in a terminal inflorescence. 4. Althaea
 - cc. Axillary and solitary 7. Hibiscus
 - bb. Only 3 or sometimes less.
 - d. Leaves palmatifid 2. Sphaeralcea
 - dd. Not so deeply lobed.
 - e. Flowers in axillary racemes 6. Iliamna
 - ee. Mostly in axillary clusters or solitary.
 - f. Bractlets fused 3. Lavatera
 - ff. Bractlets free 5. Malva

1. ABUTILON Miller INDIAN MALLOW

Calyx not bracteolate. Fruit a ring of numerous dehiscent follicles.

1. A. THEOPHRASTI Med. -- Velvetleaf, Pie-Marker (Mauve jaune, Mauve des Indes) -- Large annual herb, soft velvety-pubescent throughout, with large cordate leaves, entire or nearly so. Flower variable in size, yellow. Fruit of 10-15 large carpels, each with a spreading beak. Mid summer to fall. Casual weed of gardens and disturbed soils: Brandon, Biggar.--(NS)-PEI, Q-S, US, (Eur).

Also reported from B.C. by Groh 1944, but the justifying specimen was not preserved and the report remains essentially unverifiable, although it is not an improbable one.

2. SPHAERALCEA St.-Hilaire FALSE MALLOW

Calyx normally with about 3 bracts, but these usually lacking in our only species. Carpels of two kinds: the upper dehiscent and sterile, the lower indehiscent and seed-bearing.

1. *S. coccinea* (Pursh) Rydb. (Malvastrum coccineum (Pursh) Gray) -- Moss-Rose -- Densely stellate-pubescent perennial prairie-herb with conspicuous scarlet flowers. Leaf compound or deeply divided into about 5 lobes, the lobes entire to more or less divided. Flowers in a terminal raceme. Late spring and summer. Steppes and prairies, flowering more readily around gopher holes.--Man-BC, US.

3. LAVATERA L.

Calyx with 3 large fused bracts.

1. L. THURINGIACA L. -- Gay Mallows -- Flowers solitary and long-peduncled in the axils of the upper, reduced leaves, forming terminal pseudoracemes. Densely stellate-pubescent. Around 1 m high. Leaves palmately lobed, serrate. Calyx large, the double calyx almost as large. Flowers rose, about 6 cm across. First half of summer. Rare adventive. Minnedosa, Maidstone.--NB-S, Eur.

4. ALTHAEA L.

Calyx very obviously double, being formed of 5 sepals fused at base and subtended by a verticil of 6-9 bractlets also fused at base. Fruit as in Malva.

1. A. ROSEA Cav. -- Hollyhock (Passerose, Rose trémière) -- Very showy and tall virgate herb with very large flowers in a long, terminal, racemiform inflorescence. Leaves polygonal to palmatifid, crenulate. Bractlets and sepals nearly similar. Petals variable, mostly polychrome. Second half of summer. A popular ornamental, rarely spontaneous around dumps and waste places: Pilot Mound.--swQ-Man, (US), Eur.

5. MALVA L.

MALLOW

Bractlets 3, free. Carpels numerous, indehiscent, one-seeded. The fruit breaking up into a ring of achenes at maturity.

- a. Petals 1.5-3.0 cm long.
- b. Flowers in axillary clusters 1. M. sylvestris
- bb. Mostly in a terminal corymb 6. M. moschata
- aa. Flowers smaller.
- c. Stem erect; leaves very crisp-margined.
 2. M. verticillata
- cc. Stem becoming decumbent to trailing.
- d. Petals 2-3 times as long as the calyx.
 5. M. neglecta
- dd. Smaller, about as long as the calyx.
- e. Calyx up to 1 cm wide; fruit 5-6 mm
 across 3. M. rotundifolia
- ee. Calyx becoming larger, its lobes
 broader; fruit larger 4. M. parviflora

1. *M. SYLVESTRIS* L. var. *MAURITIANA* (L.) Boiss. -- High Mallow (Mauve d'Alger) -- Coarse annual herb, up to 1 m tall. Leaf glabrous, palmately veined and lobed, the lobes shallow, round and crenate. Bractlets 3, obovate, free from the calyx. Petals bluish purple. Summer. Snowy but uncommon garden weed.--Q-Alta, (US, Eur).

In the typical var. *sylvestris* the herbage is long hirsute and the leaf lobes are most often triangular or oblong.

2. *M. VERTICILLATA* L. var. *CRISPA* L. (*M. crispa* L.) -- Curled Mallow (Mauve frisée) -- Annual herb with large and heavily crisped leaves. Up to 1.5 m tall. Leaves crenately lobed, finely serrate, somewhat hirsute with simple and stellate hairs. Bractlets 3, narrowly lanceolate, free from the calyx. Petals white to mauve, about twice as long as the calyx. Mid to late summer. Sometimes cultivated and casually escaped or reseeding itself.--I-EI-Alta, (US, Eur).

In the typical var. *verticillata* the leaves are not crisp along the margin.

3. *M. ROTUNDIFOLIA* L. (*M. borealis* Wallr.; *M. pusilla* Sm.) -- Dwarf Mallow (Petite Mauve) -- Leaves nearly round and broadly crenate, serrate, deeply cordate. Herbage hirsute to stellate-pubescent. Very branchy and more or less decumbent or trailing. Flowers in axillary clusters of 2-5. Bractlets 3, very narrow, partly adnate to the base of the calyx. Petals white to pale mauve, about as long as the calyx. Calyx up to 1 cm wide, often glabrous dorsally, hirsute-ciliate with hairs about 1 mm long, the lobes triangular or deltoid. Fruit 5-8 mm wide. Carpels with sharp edges, strongly reticulate on the back. Summer and fall. Common weed of disturbed soils, especially of tramped places; frequent in farmyards and towns.--PEI-30, US, (CA), Eur.

4. *M. PARVIFLORA* L. -- Closely similar to the last. Calyx enlarging in fruit up to 10-(15) mm, ciliate and pubescent dorsally with hairs less than half as long as in the last, the lobes at first overlapping and narrowed at base, becoming 2-3 times wider than long in fruit. Fruit 7-8 mm across. Carpels similar, but the sharp edge produced into a narrow and scalloped wing. Summer. Rare weed: Quinton, Craven, Sunny Brow.--(S), S, (30), Eur.

Reported by Moss 1957 for Alberta but we know of only one collection from that province, McCalla 11223, Calgary, 1950 (Dac) and this was correctly revised to *M. pusilla* (= *M. rotundifolia*) by Dr. C. Frankton in 1955.

5. *M. NEGLLECTA* Wallr. -- Cheese, Cheeseweed (Amour, Fromage) -- Quite similar to the last two, but the flowers larger. Petals about 12 mm long, mostly mauve. Carpels not reticulate, but short-velvety or beak and rounded on the edges. Late spring to fall. Rare town weed: Notre-

Dame-de-Lourdes.--NF, NS, NB-Man, BC, US, Eur, (Afr).

All other reports from Manitoba and all reports from Saskatchewan were apparently based on specimens of M. rotundifolia, while the Alberta entry was a mere speculative listing.

6. M. MOSCHATA L. -- Musk-Mallow (Mauve musquée) -- Leaf palmatipartite, the segments pinnatifid, the lobes linear. Basal leaves less divided. Herbage lightly hirsute with simple hairs, or sometimes with stellate hairs on the calyx. Petals 2-3 cm long, mostly mauve. Summer. Cultivated and locally escaped to waste places or disturbed soils: Saint-Norbert.--NF, NS-Man, BC, US, Eur.

6. ILIAMNA Greene

Similar to Malva, but the carpels 2-4 seeded and dehiscent at maturity. Bractlets 3, free.

1. I. rivularis (Douglas) Greene -- Wild Hollyhock, Mountain-Hollyhock -- Tall, virgate, maple-leaved herb with pink flowers. Tufted perennial, about 1 m high. Leaves large, palmately veined and lobed, serrate to doubly serrate. Flowers pink, in axillary clusters and a terminal raceme. Petals about 2 cm long. Summer. Wet woods along creeks, also ditches.--swAlta-BC, US.

7. HIBISCUS L.

ROSE MALLOW

Carpels only 5, becoming a loculicidal capsule at maturity. Bractlets numerous, free.

1. H. TRICNUM L. -- Flower-of-an-Hour, Modesty (Fleur d'une heure, Oeil de faisan) -- Calyx very large, pale green with deep purple nerves. Annual, stellate-hirsute herb. Leaves tripartite to almost trifoliate, the lower sometimes palmatipartite. Petals large, pale yellow, darker along one edge, with a large purple patch at base. Summer. Rare garden weed.--(NS-PEI)-NB-S, US, Eur.

Order 23. EUPHORBIALES

Flowers imperfect and more or less reduced. Single family.

37. EUPHORBIACEAE

(SPURGE FAMILY)

Represented with us by a single genus characterized by its highly specialized and flower-like inflorescence termed a cyathium.

1. EUPHORBIA L.

SPURGE

Perianth absent, the male flower reduced to a stamen, the female flower reduced to its ovary. Cyathium composed of 4-5 fused bracts, mostly bearing a gland and a petaloid appendage, plus numerous single stamens, plus a single ovary, short stipitate and often exserted. Herbs with milky juice.

- a. Leaves alternate below, opposite to verticillate above.
- b. Upper leaves and bracts with a broad, white margin 6. E. marginata
- bb. Leaves green.
- c. Leaves serrulate 1. E. Helioscopia
- cc. Entire.
- d. Stem leaves ovate 5. E. Peplus
- dd. Linear to lanceolate.
- e. Stem leaves broadly cordate at base 4. E. lucida
- ee. Attenuate at base.
- f. Bearing densely leafy, sterile branches above. 2. E. Cyparissias
- ff. Stem simple or bearing only floriferous branches from the upper axils E. Esula
- aa. Leaves all opposite.
- p. Leaves entire 7. E. Geyeri
- gg. Denticulate 8. E. serpyllifolia

1. E. HELIOSCOPIA L. -- Wartweed, Sun-Spurge (Réveil-le-matin) -- Leaves serrulate. Stem leaves alternate, spatulate. Inflorescence leaves obovate, asymmetrical, verticillate in 3's, with the outer two much larger. Summer. Occasional garden weed: Pleasantdale, etc.--SK, NS-C, S-BC, US, Eur.

2. E. CYPARISSIAS L. -- Cypress-Spurge, Irish Moss (Rhubarbe des pauvres, Petit cyprès) -- Upper part of stem bearing, sterile and densely leafy branches, which may become flower-bearing late in the season. Stem leaves 1-2 cm long, alternate, linear, 1-3 mm wide. Inflorescence subtended by a verticil of numerous leaves. Inflorescence leaves deltoid, opposite. Late spring to late summer. Cultivated and rarely spreading to dry open places.--NF, NS-Man, BC, US, Eur.

3. E. ESULA L. (E. virgata Waldst. & Kit.; Galorrhoeus Esula (L.) Rydb.) -- Leafy Spurge, Wolf's Milk (Embranchée) -- Like the preceding, but larger and devoid of sterile branches, or the branches leafy in the same manner as the stem. Leaves mostly much larger, mostly long attenuate at base. Inflorescence leaves very broadly deltoid and yellowish green. Late spring to fall. Aggressive weed of disturbed soils, sometimes invading the prairie.--NS-PHI, S-BC, US, Eur.

We are not convinced that E. virgata (or E. intercedens Posp., or E. uralensis Fischer) is a tenable segregate; its diagnostic characters are not realistic, at least as far as the specimens examined are concerned.

4. E. LUCIDA Waldst. & Kit. (Galorrhoeus lucidus

(Waldst. & Kit.) Rydb.)-- Much like the preceding, but the leaves still larger, 1-2 cm wide, triangular-lanceolate and cordate at base, subsessile. Inflorescence leaves about semi-circular. Summer. Locally naturalized.--(U), S-Alta, (US, Eur).

Gleason 1952 (and Croizat 1945) would rather place our plants in *E. agerium* Bieb., but we are not convinced that this is a tenable segregate.

5. *E. PEPLUS* L. -- Petty Spurge, Wild Caper -- Stem leaves obovate with thin petioles, alternate, the terminal vertical: 3 or 4 leaves. Inflorescence elaborate, dichotomously branched, with oval, opposite, subsessile leaves. Summer and fall. Local weed of gardens and waste places.--Aka, NF-SPM, NS-S, BC, US, Eur.

Known only from Morden and Fallwort. The reports from Winnipeg and Boissevain are apparently based on a misreading of Groh 1950.

6. *E. MARGINATA* Pursh. -- Snow-on-the-Mountain, Ghost-Weed -- A showy herb because of the broad white margins of the inflorescence leaves. Stem leaves fleshy, alternate, ovate to lanceolate. Inflorescence villous, subtended by a verticil of 3-(4) leaves. Late summer. Cultivated and casually reseeding itself. Otterburne, Saint-Norbert.--C-Man, US.

7. *E. Geyeri* Eng. -- Similar to next, but the leaves entire. Appendages small, white, inconspicuous. Seeds mauve, nearly smooth, round-triangular. Mid to late summer. Pioneer on sand drifts: Saint-Claude, Saint-Lazare, Grande-Clairière.--swMan, US.

8. *E. serpyllifolia* Pers. (*E. glyptosperma* Eng.; *Chamaesyce glyptosperma* (Eng.) Small; *C. serpyllifolia* (Pers.) Small) -- Prostrate to erect annual herb, abundantly and somewhat dichotomously branched. Leaves all opposite, 0.5-1.5 cm long, broadly to narrowly oblong, strongly inequilateral, minutely serrulate, especially towards the tip, not spotted, more or less reticulate, often with a large purple patch in the center. Cyathium small, axillary, solitary, with small appendages. Seed quadrangular with sharp angles, smooth to transversely corrugate, gray to brown-red. Summer. Sandy and gravelly places.--NB-BC, US, (CA).

Usually subdivided into two species: *E. serpyllifolia* with seeds smooth or nearly so, and *E. glyptosperma* with seeds ridged transversally. Both types are equally frequent and sympatric in Canada and intermediates are common; the value of the distinction, if any, is not obvious to us.

Order 24. GUTTIFERALES

Single family and genus with us. Leaves opposite.

38. HYPERICACEAE (ST. JOHN'S-WORT FAMILY)

Flowers perfect with the numerous stamens often fused in 3 or 5 clusters.

1. HYPERICUM L. ST. JOHN'S-WORT

Herbs (ours) with transparent-dotted leaves. Flowers yellow, pentamerous.

- a. Leaves lanceolate 2. H. majus
 aa. Leaves broader, oblong to suborbicular.
 b. Leaves, sepals and petals black-dotted
 along the edge 1. H. formosum
 bb. Not black-dotted 3. H. virginicum

1. H. formosum HBK. var. Nortoniae (M.E. Jones) C.L. Hitchc. (var. Scouleri AA.) -- Leaves and petals, and to a lesser extent the sepals, abundantly black-dotted along the edge. Perennial herb, about 1 dm high, with ovate to suborbicular leaves. Later half of summer. Wet places in the mountains.--swAlta-BC, wUS.

The more western var. Scouleri (Hooker) Coulter is taller, 2-5-(8) dm high, and has narrower leaves.

2. H. majus (Gray) Britton (H. canadense AA.) -- Petals yellow, small, somewhat shorter than the sepals. Stiffly erect herb 1-4 dm high. Leaves more or less lanceolate, not black punctate. Sepals elongating up to 5-7 mm in fruit. Summer. Shores.--NS-BC, US, (Eur).

The only Alberta collection studied was from Grouard.

The only know collection of H. canadense L. for Manitoba was J.G. Feller, Whitemouth (WIN; DAO, photo). It has been revised to H. majus. Similarly a report of H. anagaloides C. & S. by Macoun 1883 was based on Macoun, Cypress Hills, 1880 (CAN; DAO, photo), a collection later revised and correctly reported by Breitung 1954 as H. majus. Again, the range of H. canadense was extended to B.C. by Macoun 1895. But both specimens cited (CAN; DAO, photo) have since been revised to H. majus.

3. H. virginicum L. var. Fraseri (Spach) Fern. (Triadenum Fraseri (Spach) Gleason) Fruit larger, about 1 cm long. Stem 3-6 dm high. Leaves ovate to oblong, shallowly cordate at base, glaucous below. Petals pink to mauve, slightly longer than the sepals. Mid summer. Shores, often boggy shores. Amisk Lake and eastward.--(L)-NF-SPM, NS-ecS, US.

In the more southern and eastern var. virginicum the sepals are 5-7 mm long in fruit and acute at tip while the styles are 2-3 mm long. On the other hand our var. Fraseri has shorter sepals, 3-5 mm long, and rather obtuse or rounded at tip, while the style is shorter, mostly a bit less than 1 mm long.

Order 25. ERICALES

Anthers acuminate at tip or prolonged into a horn, opening by apical pores. Otherwise a rather variable group and transitional between the groups with free petals and superior ovary and the groups with fused petals and inferior

- ovary. Leaves simple, often entire and persistent.
- a. Stamens free.
 - b. Ovary superior.
 - c. Petals free. Herbs.
 - d. Green plants 41. Pyrolaceae
 - dd. Parasitic plants devoid of green colour 42. Monotropaceae
 - cc. Petals fused (except Ledum). Shrubs.
 - 39. Ericaceae
 - bb. Ovary inferior 40. Vacciniaceae
 - aa. Stamens adnate to the corolla 43. Diapensiaceae

39. ERICACEAE

Shrubs, mostly with persistent and rather thickish or leathery leaves. Flowers mostly with fused sepals, and also mostly with fused petals. Ovary superior.

- a. Leaves opposite.
 - b. Leaves small, less than 1 cm long.
 - c. Flowers in a terminal corymbose cluster.
 - 4. Loiseleuria
 - cc. Flowers axillary 7. Cassiope
 - bb. Leaves larger 5. Kalmia
- aa. Leaves alternate.
 - d. Flowers solitary in the leaf axils.
 - 11. Gaultheria
 - dd. Flowers more or less aggregated in usually terminal inflorescences.
 - e. Inflorescence a terminal cluster or corymb overtopping the foliage.
 - f. Leaves linear, 2 mm wide or less.
 - g. Leaves green below 6. Phyllodoce
 - gg. Covered below with a dense rus-ty felt 1. Ledum
 - ff. Broader leaves.
 - h. Inflorescence not punctate, but glabrous 8. Andromeda
 - hh. Inflorescence glandular-punctate to puberulent or pilose.
 - i. Inflorescence densely glandular-punctate, but not pubescent 2. Rhododendron
 - ii. Densely glandular-puberulent or pilose 1. Ledum
 - ee. Inflorescence lateral, or leafy, or more or less overtopped by the leaves.
 - j. Flowers in axillary clusters at leafless nodes on old wood ... 2. Rhododendron
 - jj. Inflorescence more or less terminal.

- k. Leaves deeply cordate at base 10. Epigaea
 kk. Rounded to cuneate at base.
 l. Leaves scaly-punctate below 9. Chamaedaphne
 ll. Not punctate.
 m. Leaves pubescent on both faces with glandular hairs 3. Menziesia
 mm. Glabrous on both faces 12. Arctostaphylos

1. LEDUM L.

LABRADOR TEA

Petals free. Flowers white, in terminal umbels.

- a. Leaves felty-tomentose below 1. L. palustre
 aa. Glaucous and glandular-dotted below... 2. L. glandulosum

1. L. palustre L. var. latifolium (Jacq.) Mx. (L. groenlandicum Oeder) -- Labrador-Tea (Thé du Labrador, Bois de savane) -- Leaves strongly revolute and covered below with a very thick rust-coloured felt, but green and glabrous above. Leaves lanceolate, mostly 5-10 mm wide. Flowers white and making the shrub very conspicuous in the bogs at flowering time. Late spring and early summer.--G, K-Aka, L-SPM, NS-BC, US -- Var. decumbens Aiton (L. decumbens (Aiton) Lodd.) -- Generally smaller and lower, the leaves linear, 1-2 mm wide, sparsely glandular above. Spring. Arctic and alpine tundras.--G-Aka, L, Q-nO-nMan-nBC, (Eur).

The bog phase grades northward into the tundra phase.

The report of var. decumbens by Anderson 1949 and Szczawinski 1962 for Newfoundland is probably to be interpreted in the sense of Labrador, a territory which we have listed separately here in accordance with traditional botanical practice, but which is also administratively part of Newfoundland.

2. L. glandulosum Nutt. var. glandulosum -- Trapper's Tea -- Leaves densely dotted with yellow glands below and also usually very white below with a dense and minute pubescence. Twigs white-puberulent. Leaves nearly flat, ovate to lanceolate, deep green and glabrous above. Inflorescence finely puberulent. Early summer. Moist woods.--swAlta-BC, US.

In the western U.S.A. occurs a var. columbianum (Piper) C.L. Hitchc. with strongly revolute and narrower leaves, etc. It was also reported by Szczawinski 1962 from Vancouver, but this report is held to be questionable as the original 1901 collection has never been confirmed, is out of range by more than 150 miles, and might have been a cultivated plant.

2. RHODODENDRON L.

ROSE BAY

Petals unevenly fused, two of them being fused at least half their length, the other 3 much less united, thus the flower is slightly asymmetrical.

- a. Flowers borne on the old wood, below the foliage 1. R. albiflorum
 aa. Inflorescence terminal 2. R. lapponicum

1. R. albiflorum Hooker -- White Rhododendron -- Flowers borne on the old wood in clusters of 1-3 in the axils of last year's leaves. Herbage glandular-hirsute. Leaves lanceolate, entire, deciduous. Flower white to creamy, fairly large. Before mid-summer. Mountain forests.--swAlta-BC, nwUS.

2. R. lapponicum Wahl. -- Except the purple corolla, densely covered throughout with crowded glandular dots, some clear yellow, some reddish brown. Low prostrate shrub with persistent leaves, the blade oblong-lanceolate, revolute, soon drooping. Spring. Arctic and alpine tundra.--G-Aka, L-NF, Q-nMan, swAlta-BC, US, Eur.

3. MENZIESIA Sm.

Petals fused into an urceolate corolla. Fruit a septical capsule. Shrubs with deciduous leaves.

1. M. ferruginea Sm. var. glabella (Gray) Peck (M. glabella Gray) -- Fool's Huckleberry -- Flowers in an umbel at the ends of last year's shoot. Foliage mostly carried on paired branches borne just below the inflorescences. Leaves obovate to oblanceolate, serrulate. Flowers 4-merous, creamy to pinkish. Early summer. Moist mountain forests.--wAlta-BC, (nwUS).

Var. glabella has leaves obtuse or rounded at summit, densely puberulent below, the pubescence obscurely mixed with some sessile glands. The upper face of the leaves has pubescence similar to var. ferruginea, but mixed with a less abundant and very fine puberulence. Calyx and ovary finely puberulent and glandular-ciliate.

The more costal var. ferruginea tends to leaves more acute at summit, but differs mainly on minor rearrangements of kinds of pubescence. Leaves not puberulent and sometimes glabrous, but commonly bearing a scanty and coarse pubescence of long hairs mixed with glandular hairs and sessile glands; also glandular-ciliate. Calyx and ovary glandular and glandular-ciliate, but not puberulent.

A Laggan collection (CAN; DAO, photo) dated 1913 fits var. ferruginea but it has never been confirmed and it is so far out of range that we are inclined to suspect a mixture of labels in this case. Our experience of herbaria

would indicate that the probability of a mixed label is about one in 1000 to 10,000 specimens. It varies greatly from herbarium to herbarium and also with the period in time in each herbarium. In most cases label mixtures are so obvious as to constitute no serious source of error.

4. LOISELEURIA Desv.

Flower similar to the preceding, campanulate with fused petals. Capsule septicial. Leaves opposite. Scales of the flower buds enlarging, becoming green and persistent.

1. L. procumbens (L.) Desv. -- Mayflower, White Flower -- A prostrate shrub with small opposite leaves that are rather similar to those of Empetrum. Leaves tomentose dorsally and on the ventral face of the petiole. Peduncles and calyces glabrous and deep red. Corolla pinkish, small. First half of summer. Drier and rocky tundras.--G-(F)-K-Aka, L-SPM, NS, Q, nMan-nS, wBC, US, Eur.

The various reports for Alberta, Campbell 1900, Hultén 1948 and, doubtfully, Boivin 1966 are likely all unjustified, even if the possibility of its occurrence in the northern parts of the province is not exactly improbable. Campbell's report is presumably based on a misidentification; see comment under Coronopus didymus, part II. Boivin's report is based on Hultén's, which reads "Alberta (54°N.)" and which in turn is likely to be a misreading of Hooker 1834 repeated by Macoun 1884 of 'Mount Edgcombe, lat. 54°'. The said mountain is a feature of the Alaska Panhandle in the vicinity of 54°N, not of the Rockies of Alberta.

5. KALMIA L. AMERICAN LAUREL

Corolla rotate with 10 depressions in which the anthers are held under pressure from the tensed filaments.

1. K. polifolia Wang. var. polifolia (K. polifolia sphalm.) -- Gold Withy, Bog Laurel -- Internodes flattened in alternating planes. Leaves opposite, persistent, lanceolate to linear, 2-3 cm long, strongly revolute, almost white and seemingly glaucous below, but actually densely covered with minute stellate hairs, the midrib prominent and usually beset with purple, clavate hairs. Flower pinkish red. Late spring and early summer. Common in bogs.--K-Mack-(Y)-Aka, L-SPM, NS-S, (BC), US -- Var. microphylla (Hooker) Rehder -- Lower and with shorter and broader leaves. Mostly about 1 dm high. Leaves around 1 cm long and more or less oblong, only slightly revolute, the midrib glabrous. Alpine meadows and subalpine forests.--K-Y-(Aka), Alta-BC, wUS.

West of us the distinction of our two varieties becomes meaningless as most of the B.C. material is intermediate, the leaves being usually long and narrow but glandless on the midrib.

6. PHYLLODOCE Sal.

Foliage rather similar to that of Picea, linear, persistent, coriaceous and likewise borne on raised leaf bases. Flower urceolate and the capsule septicial. Low shrubs.

- a. Flowers yellowish 3. P. glanduliflora
 aa. Pink to purple.
 b. Calyx glabrous 2. P. empetriformis
 bb. Densely glandular 1. P. caerulea

1. P. caerulea (L.) Bab. -- Mountain Heath -- Leaves closely glandular-serrulate. Peduncles, calyx and capsule densely glandular. Corolla glabrous, purple. Summer. Late snow patches.--G-K-(Mack, Aka), L-NF, NS, Q, nMan, neUS, Eur.

2. P. empetriformis (Sm.) D. Don -- Heather, Pink Mountain-Heather -- Calyx glabrous; plant otherwise densely glandular as in P. caerulea. Corolla glabrous, pink. Early to mid summer. Marshy meadows around timberline.--(Mack)-Y-(Aka), swAlta-BC, US.

X. P. intermedia (Hooker) Rydb. -- Hybrid with P. glandulifera. Calyx somewhat glandular. Corolla pinkish, glabrous to slightly glandular. Local.--swAlta-BC, (US).

3. P. glanduliflora (Hooker) Cov. -- Yellow Mountain-Heather -- Corolla, calyx, peduncles and capsules densely glandular. Leaves serrulate, glandular-ciliate. Corolla yellowish. First half of summer. High in the mountains, mostly around late snow patches.--Mack-Aka, swAlta-BC, nwUS.

7. CASSIOPE D. Don

Dwarf shrubs with small imbricated leaves and solitary axillary flowers.

- a. Leaves with a deep and obvious dorsal groove
 1. C. tetragona
 aa. Leaves level on the back 2. C. Mertensiana

1. C. tetragona (L.) D. Don var. saximontana (Small) C.L. Hitchc. -- White Heather, Moss-Plant -- Leaves thick, short, densely imbricate into squarish branchlets. Leaves 3-5 mm long, densely short ciliate. Flower white, on a finely glandular peduncle. First half of summer. Rocky alpine and subalpine slopes.--Y, swAlta-seBC, (nwUS).

The typical phase is more northern, has longer pedicels, mostly over 1 cm long, and tends to slightly larger flowers, 5-7 mm long.

2. C. Mertensiana (Bong.) G. Don var. Mertensiana -- Quite similar to the preceding, but the leaves not grooved on the back and not ciliate. Peduncles densely puberulent. Mid summer. Open forest and alpine prairies around timber-

line.--Aka, swAlta-BC, US.

The more southern var. gracilis (Piper) C.L. Hitchc. has ciliate leaves and glabrous peduncles.

8. ANDROMEDA L.

ANDROMEDA

Flower and fruit as in Menziesia, Chamaedaphne, etc., but the leaves persistent and the inflorescence a terminal bracteolate umbel.

1. A. Polifolia L. var. Polifolia -- Crystal-Berry, Gold-Withy -- Leaves much as in Kalmia polifolia, but alternate. About 1 dm high and glabrous throughout. Leaves 1-3 cm long, narrowly elliptic to narrowly lanceolate, strongly white-glaucous below. Flower pinkish. Late spring to early summer. Bogs.--G, K-Mack-(Y-Aka), Q-BC, Eur -- Var. glaucophylla (Link) DC. (A. glaucophylla Link) -- Plant generally larger, the leaves very finely and very densely white tomentose below, lanceolate to linear.--(G)-F-K, L-(NF)-SPM, (NS-NB)-Q-S, US.

9. CHAMAEDAPHNE Moench

LEATHER-LEAF

Sepals nearly free, subtended by 2 bractlets. Corolla and fruit as in the preceding. Flowers solitary in the axils of the upper leaves, forming a leafy terminal raceme.

1. C. calyculata (L.) Moench (var. angustifolia (Aiton) Rehder, var. latifolia (Aiton) Fern.) -- Gold-Withy, Leather-Leaf (Faux-bleuets) -- Leaves densely scaly-punctate in clear-white, yellow and red brown, more so on the lower face. Twigs densely puberulent. Leaves elliptic to lanceolate, serrulate, those of the inflorescence gradually smaller. Flowers white, drooping. Early summer. Common in muskegs--K-Aka, L-SPM, NS-BC, US, Eur.

10. EPIGAEA L.

Calyx similar to the preceding, with 2 subtending bracts and 5 practically free sepals. Flower with an elongate tube and flaring throat.

1. E. repens L. var. glabrifolia Fern. -- Mayflower, Trailing Arbutus (Fleur de mal) -- Leaves deeply cordate at base, ovate to oblong. Creeping and barely woody, coarsely glandular-hispid throughout, especially on the branchlets. Flowers white, in a few-flowered terminal raceme. Late spring. Coniferous woods.--(L)-NF-SPM, (NS-NB)-Q-(O)-sMan, US.

In our variety the leaves are glabrous below at maturity, except sometimes on the midnerve, while in the more southern var. repens they are variously pubescent (usually pilose) below at maturity.

11. GAULTHERIA L. WINTERGREEN

Calyx becoming thick and fleshy, growing around the capsule into a pseudo-berry. Flower otherwise similar to that of Andromeda, etc. Low shrubs, not very woody.

- a. Leaves small, entire 3. G. hispida
 aa. Larger, serrulate.
 b. Leaves cuneate at base 1. G. procumbens
 bb. Leaves rounded at base 2. G. humifusa

1. G. procumbens L. -- Ivyberry, Checkerberry (Thé des bois, Thé rouge) -- Only 1 dm high or less, with the 3-5 leaves clustered near the top of the erect stem. Long stoloniferous. Leaves narrowly obovate, 1.5-4.0 cm long. Flowers white, few, nodding. Berry bright red. All summer. Sandy coniferous woods.--NF-SPM, NS-seMan, eUS.

2. G. humifusa (Graham) Rydb. -- Mountain-Teaberry -- Leaves serrulate, the teeth setiferous on the younger leaves. Stoloniferous and very low. Leaves about 1 cm long, oval to suborbicular, the margin finely penciled in white. Flower pinkish. Fruit reddish. Mid summer. Wet mountain slopes.--swAlta-BC, wUS.

3. G. hispidula (L.) Muhl. (Chiogenes hispidula (L.) T. & G.) -- Teaberry (Petit thé, Oeufs-de-perdrix) -- Flowers small, only 2 mm long, and 4-merous. Extensively creeping. Leaves numerous, broadly ovate, subsessile, (0.3)-0.5-(1.0) cm long and ciliate with a few coarse hairs. Berry white. Spring. Forming tangled mats in mossy woods.--K, L-SPM, NS-BC, US.

12. ARCTOSTAPHYLOS Adanson

Fruit a berry developing in the usual manner from the ovary.

- a. Leaves serrulate 1. A. alpina
 aa. Leaves entire 2. A. Uva-Ursi

1. A. alpina (L.) Sprengel var. alpina -- Foxberry, Poison-Berry (Herbe à caribou, Raisin d'ours) -- Leaves thin, impressed above and rugose below. Stem prostrate and mat forming. Leaves more or less marcescent, obovate to spatulate, long cuneate, finely ciliate towards the base and along the petiole. Flower yellowish. Fruit red to blackish. Early spring. Rocky and gravelly arctic or alpine tundras. --G-Aka, L-SPM, Q-(nO)-nMan, swAlta-nBC, (neUS), Eur -- Var. rubra (Rehder & Wilson) Bean (A. rubra (Rehder & Wilson) Fern.; Arctous erythrocarpa Small) -- Leaves very rugose, little or not at all marcescent, not ciliate or barely so. Berry remaining scarlet at maturity.--(F)-K-Aka, (NF), Q-(O)-nMan-nAlta-BC, (Eur).

2. A. Uva-Ursi (L.) Sprengel (var. adenotricha Fern. & Macbr., var. coactilis Fern. & Macbr.) -- Kinnikinick, Bearberry (Raisin d'ours, Sac à commis) -- Leaves finely tomentose-ciliate, also more or less tomentose along the mid-nerve. Widely spreading, carpeting shrub. Leaves thick, spatulate, entire, persistent. Flowers white to pinkish. Berries dull red. Late spring and early summer. Forming carpets over dry or sandy ground.--(G), K-Aka, L-SPM, NS-BC, US, Eur.

Var. adenotricha and var. coactilis are less common phenotypes, rather than geographically restricted varieties.

40. VACCINIACEAE (HUCKLEBERRY FAMILY)

Like the Ericaceae, but the ovary inferior and the fruit a juicy berry. Petals and sepals fused.

1. VACCINIUM L. BLUEBERRY

Fruit a berry with numerous small seeds.

- a. Peduncles much longer than the leaves ..
..... 8. V. Oxycoccus
- aa. Peduncles much shorter.
 - b. Leaves persistent, retuse at tip .
..... 7. V. Vitis-idaea
 - bb. Deciduous and not retuse.
 - c. Flowers in terminal bracteolate racemes 6. V. angustifolium
 - cc. Flowers solitary in the axils of normal leaves, or 1-3 in a small leafless terminal glomerule.
 - d. Leaves entire 1. V. uliginosum
 - dd. Serrulate.
 - e. Twigs round, puberulent ..
..... 2. V. caespitosum
 - ee. Twigs narrowly winged-decurrent, usually glabrous.
 - f. Berries red; peduncles up to 3 mm long 3. V. scoparium
 - ff. Berries blue to black; peduncles usually longer, up to 1 cm.
 - g. Low, the leaves mostly 1-2 cm long ... 4. V. Myrtilus
 - gg. Taller, the leaves mostly 3-4 cm long ..
..... 5. V. membranaceum

1. V. uliginosum L. var. uliginosum (var. alpinum Big.) -- Ground-Hurts, Bog Bilberry (Bleuet trainard, Bleuet magané) -- Leaves entire, obovate. Stem trailing, with erect branches 1-5 dm high. Leaves obovate, around 1 cm

long, thickish, paler below. Flowers white to pinkish, 1-3 in a small leafless glomerule terminating last year's shoot. Fruit blue. Late spring to mid summer. Wetter arctic and alpine habitats.--(G)-F-Y-(Aka), L-(NF-SPM), NS-(PEI)-NB-Man-(S-Alta)-BC, US, (Eur).

The more western var. occidentale (Gray) Hara has narrower leaves, 2-3 times as long as large. Many other segregates have been proposed, including a smaller V. microphyllum (Lange) Löve, but all these phenotypes are sympatric and grade into one another.

2. V. caespitosum Mx. -- English Blueberry, Dwarf Bilberry (Bleuets, Bleuets maganés) -- Much like the preceding and growing in similar habitats. Leaves 1-3 cm long, typically narrowly obovate, varying from narrowly obovate to narrowly lanceolate, serrulate, thin. Late spring. Cold woods.--K-Aka, L-NF, NS, NB-O-(Man)-S-BC, US, (Eur).

3. V. scoparium Leiberg -- Grouseberry, Whortleberry -- Low shrub, broom-like, with numerous rather stiffly erect branches. Mostly about 1 dm high. Leaves small, less than 1 cm long at flowering, sometimes up to 1.5 cm later. Peduncles 2-3 mm long. Fruit red, drying blue. Late spring. Dry coniferous forest at higher altitudes.--swAlta-BC, (US).

4. V. Myrtilus L. -- Dwarf Bilberry (Myrtille) -- Rather intermediate between the previous and the next. About 2 dm high and the branches widely divergent. Leaves broadly ovate to elliptic, subcordate to broadly rounded at base. Peduncle 3-6 mm long. Berry red, turning blue or black. Early summer. Common and abundant in mountain coniferous woods.--G, swAlta-BC, (wUS, Eur).

The only known Greenland collection is from Alangorsuak (CAN; DAO, photo) and represents probably an introduction rather than a range disjunction. Unless it be a case of mixed labels.

5. V. membranaceum Douglas -- Bilberry, Mountain Huckleberry -- Tallest of the solitary-flowered species. Erect, 2-10 dm high. Leaves 2-5 cm long, elliptic to broadly lanceolate. Peduncles 5-10 mm long. Berries dark blue to black. Early summer. Light mountain woods.--swMack,--(cO), swAlta-seBC, (US).

6. V. angustifolium Aiton var. angustifolium (var. laevifolium House; V. boreale Hall & Aalders; V. Lamarckii Camp; V. pennsylvanicum Lam., var. angustifolium (Aiton) Gray) -- Blueberry (Bleuets, Bleuets de savane) -- Flowers in short leafless racemes borne at the end of last year's shoot. Commonly 3-4 dm high. Twigs and leaves glabrous. Leaves 1.0-3.5 cm long, mostly lanceolate, finely serrate. Berry delicious, blue with a heavy bloom. Late spring. Bogs and acid rocks or soils.--K, L-NF-(SPM), NS-(PEI-NB)-Q-O-(seMan, US) -- F. nigrum (Wood) Boivin (V. Brittonii Porter; V. nigrum Britton) -- Fruit black, without bloom.--

(NF, NS-NB)-Q-O-(seMan, US) -- Var. myrtilloides (Mx.) House (V. canadense Kalm; V. myrtilloides Mx.; Cyanococcus canadensis (Kalm) Rydb.) -- Twigs and leaves pubescent, the latter usually entire. (Flowering some two weeks later?). Shadier and wetter places.--(Mack, L-NF), NS-(PEI)-NB-BC, US.

Usually subdivided into two or more species. Although we have had much field experience with this entity, we have never been able to detect more than one species in the field and var. myrtilloides has always remained an arbitrary distinction best made in the herbarium with a good hand lens or binocular. Intermediates occur between our two varieties; some show an intermediate morphology, others present unusual combinations of the diagnostic characters. The various kinds of intermediates have been decorated with binomials. Diploid and tetraploid forms occur and have been named respectively V. boreale and V. Lamarokii.

7. V. Vitis-idaea L. var. minus Lodd. (Vitis-idaea punctata Moench) -- Partridge-Berry, Redberries (Graines rouges, Pommes de terre) -- Leaves sparsely glandular-pubescent below with small brown hairs. Low shrub with thick, persistent leaves, some of which are retuse at tip. Flowers in bracteolate terminal racemes. Fruit red. Late spring to early summer. Bogs and acid woods.--(G)-F-Aka, L-SPM, NS-BC, US, (Eur).

In the Old World var. Vitis-idaea the leaves average larger, not always a clear cut distinction.

8. V. Oxycoccus L. var. Oxycoccus -- (var. ovalifolium Mx.; Oxycoccus ovalifolius (Mx.) Porsild; O. palustris Pers.; O. quadripetalus Gilibert) -- Cranberry, Marshberry (Atocas, Grisettes) -- Small shrub, little woody, with thin wiry stems half buried in Sphagnum. Leaves 5-8 mm long, persistent, mostly elliptical. Flowers red or pink in clusters of 1-4 at the end of branches or stems. Peduncle 2.0-3.5 cm long, finely puberulent. Corolla deeply lobed. Berry 8-10 mm across, at first punctate, turning red, then black. Early summer. Sphagnum bogs.--K-Mack, L-NF, NS-PEI-(NB)-Q-BC, US, Eur -- Var. microphyllum (Lange) Rouss. & Raym. (var. ovalifolium AA.; V. microcarpum (Turcz.) Hooker; V. Oxycoccus AA.; Oxycoccus microcarpus Turcz.; O. ovalifolius AA.) -- Generally smaller. Leaves (2)-3-4-(5) mm long, mostly ovate. Peduncles 1-2 cm long, often glabrous or nearly so. Fruit somewhat smaller.--(G), K-Aka, I-SPM, NS-PEI, Q-BC, US, Eur.

We have examined the type of Michaux' var. ovalifolium in 1950 and we have photos of the Linean material to compare. Both belong to var. Oxycoccus as interpreted here. And our usage conforms to that of Gleason, Hitchcock, Porsild, Scoggan, etc. But there has been some divergence of opinion and the opposite interpretation prevails with Breitung, Fernald, Roland, etc.

Our two varieties are often treated as species, but

the diagnostic characters are not quite constant and various recombinations of characters occur here and there. He who would here accept two species will eventually be led to accept four, then perhaps eventually eight!

41. PYROLACEAE (WINTERGREEN FAMILY)

Similar to the Ericaceae. Herbaceous or nearly so.
Petals free.

- a. Stem leafy in the lower half 1. Chimaphila
aa. Leaves all or nearly all in a basal rosette ..
..... 2. Pyrola

1. CHIMAPHILA Pursh.

Flowers in a terminal corymb. Stem leafy, lacking a basal rosette.

1. C. umbellata (L.) Barton var. cisatlantica Blake (var. occidentalis (Rydb.) Blake) -- Pipsissewa, Prince's Pine (Herbe à peigne, Herbe à clef) -- A small shrub, practically herbaceous, with a few large and persistent leaves. Leaves oblanceolate, serrate above the middle. Flowers pink. Early summer. Pine woods, uncommon.--(Aka), NF-(SPM), NS-BC, US.

In Old World var. umbellata the leaves have obtuse to subacute teeth. The American phase is weakly distinguishable by its acute to subacuminate teeth. Also the neogean plants tend to average larger with leaves a bit longer and the nerves more rugose than the paleogean.

We have found the characters of var. occidentalis, mainly the weaker venation, to be too elusive and we have not been able to distinguish this taxon other than by its geography.

2. PYROLA L.

Flowers in a raceme. Plants scapose with a basal rosette.

- a. A single terminal flower 1. P. uniflora
aa. Flowers in a terminal raceme.
b. Style straight and vertical on the top of the ovary.
c. Raceme conspicuously secund 2. P. secunda
cc. Not at all secund 3. P. minor
bb. Style curved and strongly deflexed at the base.
d. Leaves denticulate.
e. Pedicel much longer than the subtending bract 6. P. picta
ee. Bract much longer 7. P. bracteata
dd. Leaves crenulate to subentire.

- f. Calyx lobes deltoid, 1.0-1.5 mm long.
 g. Leaves small, thick 4. P. virens
 gg. Leaves larger, thin ... 5. P. elliptica
 ff. Calyx lobes elongate, triangular to lanceolate, 1.5-4.5 mm long.
 h. Flowers pink to crimson.
 8. P. asarifolia
 hh. Flowers white to yellowish green 9. P. rotundifolia

1. P. uniflora L. (Moneses uniflora (L.) Gray) -- Scent-Flower, Jockey-Club -- Small herb with a single terminal white flower. Leaves 8-18 mm long, ovate to round, crenate. First half of summer. Dense coniferous woods.--K-Aka, L-SPM, NS-BC, US, Eur.

2. P. secunda L. var. secunda (var. obtusata Turcz.; Orthilia secunda (L.) House) -- Raceme secund; style straight and long exsert. Leaves broadly ovate, crenulate. Calyx lobes semi-orbicular. Petals greenish. First half of summer. Woods.--G-Aka, L-SPM, NS-BC, US, Eur.

There occurs in Mexico a var. elatior (Lange) Boivin with narrower, more acute and thicker leaves.

The neogean plant shows a broader amplitude of variation than the paleogean and the smaller neogean plants with smaller and more rounded leaves and a sparser inflorescence have been described as var. obtusata. To apply var. obtusata to the whole of the neogean population is certainly unrealistic as most of the American plants fit well within the range of variation of the Eurasian type. To try to segregate the smaller extremes is too arbitrary and somewhat meaningless when our plants obviously form a single population.

3. P. minor L. (var. parviflora Boivin) -- Winter-green, Wood Lily -- Style shortest, 2 mm long or less. Leaves (1)-2-3-(4) cm long, broadly ovate to orbicular, mostly shorter than their petiole. Flowers whitish. Early summer. Wet coniferous woods.--(G), K-Aka, L-NF-(SPM), NS-(PEI)-NB-BC, US, Eur.

Northward and eastward the leaves are commonly smaller, but this tendency proved to be insufficiently marked to allow taxonomic recognition.

4. P. virens Schweigger (P. chlorantha Sw.) -- Blades small, mostly 1-2-(3) cm long, thickish and mostly shorter than their petiole. Flowers greenish. Early summer. Uncommon in dry Conifer forests.--(K)-Mack-(Y-Aka, L-SPM), NS-(PEI-NB)-Q-BC, US, Eur.

5. P. elliptica Nutt. -- Shinleaf, Wild Lily-of-the-Valley -- Leaf thin and large, broadly obovate to elliptic, the blade 3-6 cm long. Flowers white, darkening in drying. Towards mid-summer. Aspen woods.--NF, NS-BC, (eEur).

6. *P. picta* Sm. -- Leaf nervation outlined with a double white line for the central nerve and simple white lines along the main lateral nerves. Leaf denticulate, otherwise rather variable in size and shape. Calyx lobes 1.5-2.5 mm long, deltoid to triangular. Flowers greenish-white to yellowish. First half of summer. Rare, in dry coniferous woods: Waterton.--Alta-BC, US.

7. *P. bracteata* Hooker -- Bract slightly longer than, to twice as long as, the pedicel. Leaves elliptic to suborbicular, denticulate through the nerves being short-excurrent. Nerves sometimes lightly outlined in white. Calyx lobes 3.0-4.5 mm long, lanceolate. Flowers pink to crimson. Anthers yellow to pink. Early summer. Damp coniferous woods.--swAlta-BC, US.

8. *P. asarifolia* Mx. (var. incarnata (DC.) Fern., var. purpurea (Bunge) Fern.; *P. californica* Kriisa; *P. uliginosa* T. & G.) -- Pink Wintergreen -- The common species with pink to crimson flowers. Leaves round to reniform, crenulate to subentire. Nerves ending at the bottom of the sinuses. Bracts about as long as, to much shorter (especially the upper) than, the pedicels. Calyx lobes 1.5-3.5 mm long, triangular. Petals pink to rose, deepening in drying. Anthers pink to crimson. First half of summer. Woods.--K-Aka, L-NF, NS-BC, US, Eur.

The leaf shape varies in a continuous manner and segregates such as var. purpurea or P. uliginosa appear to be both arbitrary and sympatric.

9. *P. rotundifolia* L. (var. americana (Sweet) Fern.; *P. americana* Sweet; *P. grandiflora* Radies, var. canadensis (H. Andres) Pors.) -- Wintergreen, Wild Lily-of-the-Valley (Muguet des bois, Verdure d'hiver) -- Much like the preceding but the flowers white or nearly so, drying yellowish or greenish or dirty green. Leaves suborbicular. Calyx lobes 3-4 mm long, lanceolate, pinkish. Anthers yellow, sometimes pink. Early summer. Mostly dry woods.--G-Aka, L-SPM, NS-BC, US, Eur.

Usually subdivided into 3 taxa of which P. americana and P. grandiflora are American while the largely Eurasian P. rotundifolia is also reported as cisatlantic towards the northeast. We have been unable to detect here any essential difference except that the more northern specimens (P. grandiflora or var. pumila (Horn.) Hooker) tend to be smaller. The amphiatlantic P. rotundifolia is supposed to differ from the cisatlantic P. americana in a number of characters of floral mensurations, but our Eurasian specimens at DAO did not conform to this dichotomy and we were unable to find any tangible characters other than the amplitude of variation in the length of the anthers which is lesser in Eurasian (2.0-3.0 mm) than in American specimens (1.7-3.5 mm). Hence the present consolidation.

42. MONOTROPACEAE (INDIAN PIPE FAMILY)

Parasitic herbs, fleshy and devoid of green colour.
Leaves reduced to fleshy scales. Ovary superior.

- a. Petals free 1. Monotropa
aa. Petals fused into a campanulate corolla .. 2. Pterospora

1. MONOTROPA INDIAN PIPE

Petals free. Sepals vestigial or missing. Anthers awnless. Plants odd-coloured and often mistaken for mushrooms.

- a. A single terminal flower 1. M. uniflora
aa. Flowers in a terminal raceme 2. M. Hypopithys

1. M. uniflora L. -- Indian-Pipe, Ghost-Flower -- A waxy-white and almost translucent simple herb with a nodding flower of similar texture, the whole plant turning jet black in drying. Sometimes pinkish; becoming somewhat woody in fruit. Late summer and early fall. Parasitic on roots of Conifers.--(Aka), L-SPM, NS-BC, US, (CA), Eur.

2. M. Hypopithys L. (ssp. lanuginosa (Mx.) Breitung, var. latisquama (Rydb.) Kearney & Peebles; Hypopithys latisquama Rydb.) -- Pinesap (Sucepin) -- The whole plant orange-coloured or similarly tinted. Pubescent. Drying brownish black. Flowers in a nodding terminal raceme. Late summer or early fall. Parasitic on roots of Conifers, not so common as the preceding.--Aka, NF-SPM, NS-O, swS-BC, US, CA, Eur.

We have been unable to detect any constant differences that could justify the distinction of a transatlantic var. Hypopithys from a western var. latisquama and an eastern ssp. lanuginosa.

2. PTEROSPORA Nutt. PINE-DROPS

Petals fused into an urceolate corolla. Anthers awned. Sepals present, fused at base.

1. P. andromeda Nutt. -- Brownish herb, simple and densely glandular-pubescent. Up to 1 m tall. Flowers on elongate recurved pedicels in an elongate raceme. Flowers yellow and purple. Mid summer. Parasitic on Conifers: Rockies, Cypress Hills.--(seAka), PEI, swQ-O, swS-BC, US, (CA).

Rare, highly sporadic and perhaps producing flowering stems only at intervals of many years. Hence rarely collected and we see no reason to dispute the accuracy of the general distribution given above.

43. DIAPENSIACEAE (DIAPENSIA FAMILY)

Like the Ericaceae, but the stamens adnate to the corolla.

1. DIAPENSIA L.

No staminodia. Flower solitary.

1. *D. lapponica* L. -- Moss-Lily, Ground Ivoryflower
 -- Dwarf shrub, low and much branched into a loose or compact cushion. Glabrous. Leaves linear, entire, crowded, marcescent. Flower yellowish green, marcescent, subtended by 3 bracts, solitary and borne on a long, exserted peduncle. Mid summer. Dry tundra.--G-Aka, L-SPM, NS, Q, nMan, US, Eur.

Order 26. CELASTRALES

Petals free, subtended by the small fused calyx. Ovary superior, usually with a disk. Stamens as many as the petals and alternating with them. Leaves simple.

a. Leaves evergreen 44. Empetraceae
 aa. Leaves deciduous 45. Celastraceae

44. EMPETRACEAE (CROWBERRY FAMILY)

Low shrubs with evergreen leaves. Ovary superior and maturing into a berry similar to that of Vaccinium.

1. EMPETRUM L. CROWBERRY

Leaves acicular, subverticillate. Flower trimerous, bracteolate.

1. *E. nigrum* L. var. purpureum (Raf.) DC. (var. hermaphroditum (Lange) Sørensen) -- Blackberry, Crowberry (Graisnes noires, Crottes de corneille) -- Carpet-making shrub with some leaves alternate, some opposite, most subverticillate. Leaves linear-oblong, (3)-5-(7) mm long, minutely glandular-ciliate. Flower small, purple. Fruit purple, turning black. Late spring. Bogs, tundras and rocky places.--(G)-F-Y-(Aka), L-(NF-SPM), NS-(PEI)-NB-Alta-(BC), US, (Eur).

In our variety the flowers are perfect or rarely polygamous and the branchlets are finely glandular or sometimes lightly brownish-tomentose. The anthers are marcescent and normally persist at the base of the fruit; the floral type is thus readily determined in most herbarium specimens. In the paleogean var. nigrum the branchlets and leaves are glabrous while the flowers are dioecious and the fruit is black.

45. CELASTRACEAE (STAFF-TREE FAMILY)

Seeds surrounded by a fleshy or membranous aril.

a. Leaves alternate 1. Celastrus
 aa. Opposite 2. Pachystima

1. CELASTRUS L. STAFF-TREE

Woody climbers by twining stems. Flower functionally unisexual, 5-merous.

DIAPENSIA

1. C. scandens L. -- Bittersweet (Bourreau des arbres)
 -- The woody stems becoming quite thick and hard, eventually strangling the host shrub or tree. Leaves ovate to elliptic, serrate, abruptly acuminate. Flowers small, yellowish-green, mostly in a terminal raceme. Fruit orange, opening by three valves and exposing the bright red arils. The mature fruits used for decoration. Early summer. Woods, mostly sand dunes and galerie-forests; Estevan and eastward. --NB-seS, US.

2. PACHYSTIMA Raf.

Non climbing, but a low shrub with opposite evergreen leaves. Flower 4-merous.

1. P. myrsinites (Pursh) Raf. -- Mountain-Box, False Box--Low shrub with numerous small leaves, 1-3 cm long, ovate to lanceolate, serrulate, subsessile, leathery. Flowers reddish, small, axillary. Fruit not seen. Late spring. Coniferous woods.--Alta-BC, US.

Order 27. SANTALALES

Ovary inferior and the perianth reduced to a single verticil of fused parts. Stamens opposite the perianth lobes. Parasitic plants.

a. Parasitic on branches of Conifers 46. Loranthaceae
 aa. Terrestrial and not so obviously parasitic 47. Santalaceae

46. LORANTHACEAE (MISTLETOE FAMILY)

Parasitic plants, devoid of roots and growing on branches of trees and, when present in abundance, deforming them into witch-brooms. Leaves reduced, opposite. Fruit sticky.

1. ARCEUTHOBIMUM Bieb.

Leaves opposite, connate and reduced to a small sheath at each node. Flowers dioecious, much reduced and insignificant.

a. Plant light green 1. A. americanum
 aa. Plant blackish 2. A. pusillum

1. A. americanum Nutt. -- Growing on the branches of Pinus Banksiana and usually shorter than the needles. Stem branched, often tufted.--Man-BC, US.

2. A. pusillum Peck -- Dwarf Mistletoe -- Growing hidden among the needles of Picea mariana. Stem usually simple and shorter than the needles, often a mere 1-3 mm in length. --NF, NS-Man, US.

47. SANTALACEAE (SANDALWOOD FAMILY)

Similar to the Mistletoes, but terrestrial and not al-

ways parasitic on roots of other plants. Leaves alternate. Fruit indehiscent, a nut or slightly fleshy drupe. A single genus with us.

1. COMANDRA Nutt. BASTARD TOAD-FLAX

Long stoloniferous herbs with alternate leaves. Sepals and stamens 5.

- a. Inflorescence terminal 1. C. umbellata
 aa. Flower axillary 2. C. livida

1. C. umbellata (L.) Nutt. var. umbellata (C. Richardsiana Fern.) -- Calyx lobes whitish and more or less giving their color to the flowering corymbs. Otherwise a rather inconspicuous plant. Glabrous. Stem (1)-2-(3) dm high, nearly simple. Leaves lanceolate, entire, thin, paler and somewhat glaucous below, often slightly revolute at margin. Calyx lobes 2-3 mm long, triangular to oblong. Fruit greenish, 3-6 mm across. Late spring. Common in open, grassy places.--l-NF, NS-BC, US -- Var. angustifolia (A.DC.) Torrey (C. pallida A.) -- Like the preceding, but the leaves thickish, slightly fleshy, somewhat glaucous on both faces. Nervation indistinct or nearly so, not rugose. Calyx lobes mostly larger, (2)-3-4 mm long. Fruit bigger, 5-8 mm across.--Man-Alta, US -- Var. pallida (A. DC.) G.N. Jones -- Generally somewhat taller and commonly 3-4 dm high. Branches usually numerous, elongated and bearing leaves that are much narrower than the stem ones, the latter as in var. angustifolia. Flowers in a corymb or more often in a panicle. Calyx and ovary connected by a well defined neck about 2 mm long. Calyx lobes 3-4-(5) mm long. Fruit with a neck 1-2 mm long.--swAlta-BC, US.

Our treatment is different in one way or another from any of the current floras. We have been unable to maintain Comandra Richardsiana as a consistent segregate. But we have distinguished the prairie phase from both the eastern phase and the mountain one, while most authors will lump this prairie phase now with the eastern, now with the western type.

Most specimens of the prairie phase will be found identified as C. pallida, but reading the description of De Candolle, studying photos of his specimens and considering the geographical origin of the type collection, it becomes clear that such usage must be erroneous.

C. pallida has also been reported by many authors, Hultén 1944, 1950, Anderson 1946, Forsild 1951, Scoggan 1957, from the Dawson area of Yukon, but we have yet to see the cited specimens and are not therefore in a position to decide upon their varietal appartenance. There is also a Mackenzie collection of var. angustifolia labelled "MacTavish, on Anderson River near Port Hope" (CAN) which we consider to be questionable as to locality because it is so far removed from the rest of the range and has never been confirmed.

2. C. livida Rich. (Geocaulon lividum (Rich.) Fern.) --
A simple herb usually bearing a single red fruit borne half
way up on a long axillary peduncle. Glabrous. Leaves ovate to
elliptic-lanceolate, entire. Flowers green to reddish, few or
solitary in a single or a few axillary inflorescences. Fruit a
red and fleshy drupe. Late spring. Usually in wet places or
coniferous woods.--K-Aka, L-NF, NS, NB-BC, US.

Order 28. RHAMNALES

Similar to the Santalales, but the petals present and the
stamens opposite them or, if the petals are absent, the stamens
alternate with the calyx lobes.

- a. Foliage stellate-pubescent 49. Flacagnaceae
aa. Pubescence, if any, not stellate.
b. Inflorescence axillary or terminal 48. Rhamnaceae
bb. Inflorescence borne opposite a leaf 50. Vitaceae

48. RHAMNACEAE (BUCKTHORN FAMILY)

Flower perigynous with a well developed disk. Petals ge-
nerally clawed and more or less hooded over the stamens.

- a. Inflorescence axillary 1. Rhamnus
aa. Inflorescence terminal 2. Ceanothus

1. RHAMNUS L.

BUCKTHORN

Fruit fleshy, indehiscent. Petals reduced or lacking.

- a. Spinescent, the terminal buds opposite and flanking
a short spine 2. R. catharticus
aa. Not spiny; terminal bud solitary.
b. Leaves serrate 1. R. alnifolius
bb. Entire or nearly so 3. R. Frangula

1. R. alnifolius L'Hér. (R. alnifolia sphalm.) -- Dwarf
Alder -- Colonial shrub, decumbent at base, the flagellate
branches leafy at tip only. Leaves ovate to elliptic-lanceola-
te, usually short acuminate, all alternate. Flowers small,
greenish, few, without petals. Fruit a black berry. Late
spring. Marshy woods and bogs.--NF, NS-BC, US.

Nearly all latin names of trees and shrubs are of the fe-
minine gender, but there are a few exceptions and Rhamnus is
one of them. So are Acer, Ceanothus, Ribes, Viburnum, etc.

2. R. CATHARTICUS L. -- Buckthorn (Epine noire, Bois noir)
-- Small tree or shrub with lateral branches ending in a short
sharp spine flanked by two opposite buds. Leaves ovate, serru-
late, most of the leaves opposite or subopposite and usually
with a few of the lower leaves alternate. Petals small, gree-
nish or deep red. Berries black. Late spring. Sometimes plan-
ted and readily naturalizing itself in the nearby bush.--NS-PEI-
(NB)-Q-S, US, Eur.

3. R. FRANGULA L. -- Black Dogwood, Black Alder (Bourgène, Aulne noir) -- A shrub with alternate leaves, except that those of the upper 1-2 pairs are opposite or subopposite. Leaves ovate, entire, shining below. Petals small, whitish. Fruit hardly fleshy, purple-black. First half of summer. Well naturalized in one ravine in Brandon.--NS-Man, US, Eur.

2. CEANOTHUS L. NEW JERSEY TEA

The petals long-clawed and conspicuously hooded over the stamens. Fruit a capsule separating at maturity into 3 dehiscent 1-seeded carpels. Leaves with 3 main nerves, parallel to converging, and about equally strong.

- a. Leaves lanceolate 1. C. ovatus
 aa. Leaves ovate to elliptic 2. C. velutinus

1. C. herbaceus Raf. (C. ovatus Desf.) -- Lanceolate leaves with 3 main nerves. Low branchy shrub. Leaves glabrous to velvety, glandular-serrate, the glands dark purple. Flowers white, umbellate, most of the umbels closely inserted on a short rachis, forming a terminal corymb borne on a long peduncle. Early summer. Semi-open sandy places.--swQ-seMan, US.

2. C. velutinus Douglas var. velutinus -- Snow-Brush, Deer-Brush -- Strongly resin-scented. Leaves persistent into the following summer, the new leaves not appearing until flowering time, the old leaves falling off in the latter part of the summer. Soft puberulent on the twigs and lower surface of the leaves. Flowers white, in numerous umbels, gathered in ill-defined panicles. Early summer. Light woods on dry soils.--swAlta-BC, US.

The more western var. laevigatus (Hooker) T.&G. is glabrous.

49. ELAEAGNACEAE (OLEASTER FAMILY)

Shrubs with the lower leaf surfaces and other parts densely covered with scale-like stellate hairs which give the plant a silvery or otherwise unusual appearance.

- a. Leaves opposite 2. Shepherdia
 aa. Leaves alternate.
 b. Calyx lobes 2 1. Hippophae
 bb. Calyx lobes 4 3. Elaeagnus

1. HIPPOPHAE L.

SEA BUCKTHORN

Calyx lobes 2; stamens 4.

1. H. RHAMNOIDES L. -- Sea-Buckthorn, Willow-Thorn (Argousier, Epine luisante) -- Winter buds bilobed. Spinescent shrub. Leaves linear, green above, white-stellate below with some admixture of brown stellate hairs. Fruit brown-stellate. Mid-spring. Sometimes cultivated and locally escaped in the coulée of the Saskatchewan at Edmonton.--cAlta, Eur.

2. SHEPHERDIA Nutt.

Calyx lobes 4; stamens 8. Leaves opposite.

- a. Twigs brown-stellate 1. S. canadensis
 aa. Twigs silvery-stellate 2. S. argentea

1. S. canadensis (L.) Nutt. -- Soopolalie, Bitter Berries
 -- The opposite leaves white-stellate below and dotted with numerous red-brown stellate hairs. Not spiny. Leaves oblong, green and nearly glabrous above. Flowers small, brownish. Fruit a fleshy drupe, bright red, nearly glabrous. Early spring. Usually in wet places and mostly in open woods.--K-Aka, (L)-NF, NS, NB-BC, US.

2. S. argentea Nutt. -- Buffalo-Berry, Bullberry (Graines de boeuf) -- Ferociously spiny shrub with stiff, right-angled branching, the branches mostly opposite. Leaves oblong-lanceolate, densely stellate-pubescent, grayish-green above, grayish-white below. Flowers small, densely brown-stellate. Fruit as in the preceding. Early spring. Steep coulée banks.--sMan-Alta, US.

3. ELAEAGNUS L.

OLEASTER

Calyx lobes 4; stamens 4.

- a. Twigs brown-stellate 1. E. commutata
 aa. Twigs white-stellate 2. E. angustifolia

1. E. commutata Bernh. (E. argentea Pursh) -- Wolf-Willow, Silver-Berry (Bois d'argent) -- A common and showy silvery-leaved shrub. Stoloniferous and forming large colonies in the prairie, mostly about 1 m high. Leaves elliptic, silvery-white on both faces, but whiter below and with a few red-brown scales. Flower silvery outside, yellowish-green inside. Fruit silvery-white. Early summer. Prairies, usually on chernozems.--K-Aka, Q-BC, US.

2. E. ANGUSTIFOLIA L.-- Russian Olive, Oleaster (Olivier de Bohème, Olivetier) -- Spiny shrub, most spines being paired with a leafy shoot borne at the same node. Leaves lanceolate, green above, shining silvery below. Flowers white-silvery outside, green inside. Fruit silvery, the size of a small olive. Early summer. Sometimes planted and commonly naturalized on river shores further south, more locally so with us.--O-Man, (Alta)-BC, US, Eur.

50. VITACEAE

(VINE FAMILY)

Climbing shrubs, ours climbing by tendrils borne opposite the leaf.

- a. Leaf simple 1. Vitis
 aa. Leaf compound 2. Parthenocissus

1. VITIS L.

GRAPE

Petals fused and falling off as a unit before anthesis.
Climbing shrubs bearing panicles of edible fruits called "grapes".

1. *V. riparia* Mx. (*V. palmata* AA.; *V. vulpina* AA.) -- Grape, Frost-Grape (Vigne, Vigne des battures) -- Woody climber with palmately-nerved leaves. Climbing to the top of the trees, its trunk up to 2-3 cm in diameter. Leaves alternate, broadly cordate, more or less 3-5 lobed, coarsely toothed. Fruit black with a bluish bloom. Early summer. Galerie-forests.--NS, NB-sMan, US.

2. PARTHENOCISSUS Planchon

Petals free and remaining until after anthesis.

1. *P. quinquefolia* (L.) Planchon (*Psedera quinquefolia* (L.) Greene) -- Virginia-Creeper (Vigne vierge) -- A woody climber with a large digitate leaf. Climbing into trees by means of branched tendrils that end in adhesive disks 1.5-3.5 mm wide. Leaf long-petioled, with 5 leaflets, the latter short-petioled, ovate to broadly oblanceolate, coarsely dentate. Early summer. Floodplain forests.--(NS-NB)-Q-O-(sMan, US, CA) -- *F. macrophylla* (Lauche) Boivin (*P. inserta* (Kerner) K. Fritsch) -- Tendrils merely twining, not producing adhesive disks.--(NS)-PEI-(NB)-Q-O-(Man, US).

Order 29. LOGANIALES

Sepals fused and the petals also fused. Stamens borne on the corolla and alternating with the corolla lobes. Ovary superior. Flower actinomorphic.

51. OLEACEAE

(OLIVE FAMILY)

Stamens only 2.

a. Leaves compound 1. *Fraxinus*
aa. Simple 2. *Syringa*

1. FRAXINUS L.

ASH

Fruit a paddle-shaped samara. Flowers much reduced, the calyx minute and the petals lacking.

a. Leaflets 5-7 1. *F. pennsylvanica*
aa. Leaflets 9-13 2. *F. nigra*

1. *F. pennsylvanica* Marsh. var. *Austinii* Fern. -- Ash, River-Ash, (*Frêne, Frêne rouge*) -- River shore tree with opposite and compound leaves, mostly with 7 leaflets. Buds gray-brown. Branchlets short-velvety, the rachises and lower surface of the leaflets more or less pubescent. Leaflets lanceolate, serrate, the lower with a short petiole. Samara flat and

broader above, terete and much narrower below. Early spring. Shores and floodplains.--NS, NB-Man, US -- Var. subintegerrima (Vahl) Fern. (var. lanceolata (Borkh.) Sarg.; F. campestris Britton) -- Green Ash (Frêne vert) -- Twigs, rachises and leaflets glabrous.--NS-PEI, Q-S, US.

Reports by Scoggan 1957 of var. Austinii from Saskatchewan and of var. subintegerrima from Alberta would seem to be creditable to a lapsus calami, according to Scoggan (verbatim).

2. F. nigra Marsh. -- Black Ash, Swamp Ash (Frêne noir, Frêne gras) -- Tree with large jet-black buds. Much as in the preceding, but the leaflets more numerous and sessile. Samara flat throughout, oblong-lanceolate and not particularly wider above than below. (Early spring?). Marshy woods.--NF, NS-Man, US.

2. SYRINGA L.

LILAC

Fruit a capsule. Corolla showy.

1. S. VULGARIS L. -- Lilac (Lilas; Arbre de lilas) -- Shrub with a showy panicle of sweet-scented tetramerous flower. Leaves opposite, glabrous, deltoid-ovate and entire, the base truncate to subcordate. Early summer. Sometimes planted and rarely persisting on moister sites: Moose Jaw.--NF-(PEI-NB)-Q-O, S, US, Eur.

Order 30. APOCYNALES

Much as in the Loganiales, but the two carpels fused by their styles only.

- a. Flower of a standard type 52. Apocynaceae
 aa. Flower very complex, with corona, horns and pol-
 lina 53. Asclepiadaceae

52. APOCYNACEAE

(DOGBANE FAMILY)

A typical and unspecialized pentamerous flower with a calyx and corolla of fused parts and a bicarpellate ovary.

1. APOCYNUM L.

DOGBANE

Herbs with very abundant white latex, opposite leaves and twinned pendent fruits.

- a. Corolla 5-6 mm long, pink, or white with pink lines 1. A. androsaemifolium
 aa. Corolla 2-4 mm long, greenish-white, without pink lines 2. A. cannabinum

1. A. androsaemifolium L. var. incanum A. DC. (var. glabrum A.; A. scopulorum Greene) -- Dogbane, Flytrap (Herbe à puce, Gobe-mouche) -- Dichotomously branched, the stem 3-7 dm high, overtopping the branches. Main leaves mostly ovate or su-

orbicular, 5-6 cm long, cuneate to rounded at base, more or less pubescent below, short petiolate. Flowers campanulate, mostly drooping or pendent. Calyx lobes deltoid or lanceolate, 1/3 or 1/4 the length of the corolla tube. First half of summer. Open places, mostly on hillsides.--Mack-Aka, NF, NS-BC, US, (CA) -- Var. Woodsonii Boivin -- Generally smaller and with erect fruits. Mostly 2-4 dm high. Leaves about 2-4 cm long, pubescent below, often subcordate at base: Waterton,--swAlta-BC, US -- Var. pumilum Gray -- Like the last, but glabrous throughout. Cypress Hills.--seAlta-BC, US.

There has been some tergiversation as to the application of var. androsaemifolium. It was originally described as having leaves glabrous on both faces by Linnaeus and the name was used in that sense until Woodson, *Rhodora* 34: 30-31. 1932 pointed out that the glabrous phase was known only from the western parts of North America, well outside the area of origin of the material available to Linnaeus. Woodson concluded that the typical phase cannot be anything but the common and pubescent eastern plant later described as var. incanum by De Candolle. However it was pointed out by Boivin 1966 that glabrous plants do occur also in eastern Canada and the glabrous specimen of the Hortus Cliffortianus cannot be ignored. We have accordingly returned to the older practice of distinguishing a var. incanum from the typical and glabrous var. androsaemifolium.

1. X. A. medium Greene -- Very variable hybrid of our two species. Commonly with narrower leaves than the above and rounded to cuneate at base, often petiolate, but usually glabrous. Calyx lobes most often as long as the corolla tube. Flowers variable, mostly large and white to pink-lined, but usually tubular with erect lobes.--NF, NS, NB-BC, US.

2. A. cannabinum L. var. hypericifolium Gray (nec (Aiton) Gray; A. cannabinum Ait.; A. sibiricum Jacq., var. cordigerum (Greene) Fern., var. salignum (Greene) Fern.) -- Indian Hemp (Chanvre sauvage) -- Coarser, about 1 m high, with opposite branching and the branches overtopping the stem at anthesis. Glabrous throughout. Stem leaves mostly 6-8 cm long, sessile, subcordate. Branch leaves smaller and narrower. Flowers 2-4 mm long, tubular, yellowish-white, with long calyx lobes. Late spring to mid-summer. Shores and open places.--Mack, NF, NS, NB-BC, US -- f. arenarium (F.C. Gates) Boivin (A. sibiricum Jacq. f. arenarium (F.C. Gates) Fern.) -- Half smaller and decumbent at base. Shores subjected to violent spring floods.--NF, NS, NB-O, S-Alta, (US).

Usually subdivided into two species, each with two varieties, but as pointed out by Boivin 1966 the distinction is not realistic and the entity currently distinguished as A. cannabinum var. glaberrimum A.DC. is not substantially distinct from the typical phase of A. sibiricum. Hence the present usage.

53. ASCLEPIADACEAE (MILKWEED FAMILY)

Pollen grains adnate into pollinia in the manner of the

Orchidaceae. Pollinia attached in 2's to black translators. Anthers and stigmas fused together to form a platform termed "gynostegium". Otherwise as the Apocynaceae and equally productive of an abundant milky juice.

1. ASCLEPIAS L.

MILKWEED

Complex flower with a supplementary pseudo-corolla termed a "corona". This corona is formed of 5 large, petaloid, conspicuous hooded appendices which arise from the back of the largely hidden filaments of the anthers. Each hood bears inside a secondary appendix termed a "horn", from its obvious shape.

- a. Leaves filiform, verticillate 5. A. verticillata
- aa. Leaves broader and essentially alternate to opposite.
 - b. Flower purplish.
 - c. Glabrous or nearly so 1. A. incarnata
 - cc. Velvety puberulent throughout.
 - d. Hoods very long and showy, over 1 cm long 4. A. speciosa
 - dd. Hoods less than half as long 3. A. syriaca
 - bb. Flower greenish to yellowish-white.
 - e. Stem coarsely spreading-hirsute... 7. A. lanuginosa
 - ee. Stem finely recurved-puberulent.
 - f. Hoods overtopping the gynostegium by about half their length... 2. A. ovalifolia
 - ff. Hoods much lower, about reaching the level of the gynostegium 6. A. viridiflora

1. A. incarnata L. var. incarnata -- Swamp-Milkweed -- With a showy terminal umbel (or corymb of umbels) of deep purple flowers. Glabrous except in the inflorescence. Leaves lanceolate to narrowly lanceolate, opposite or sometimes verticillate in the inflorescence. Flowers less than 1 cm long. Fruit glabrous and spineless. Mid summer. Shores and ditches. -- NS-sMan, US.

Mentioned for Saskatchewan by Britton 1913 and Groh 1947, but not in the more recent floras. Source of report is not known to us.

In our variety the stem is glabrous and the leaves are glabrous or nearly so below. In Nova Scotia, and more locally inland, there occurs a var. pulchra (Ehrh.) Pers. more or less pubescent on the stem and both faces of the leaves; the latter are also often larger.

2. A. ovalifolia Dcne. -- The common prairie species, the flowers whitish and the stems usually less than 5 dm high. Finely recurved pubescent throughout. Leaves very variable, mostly ovate and opposite. Umbels loosely flowered. Peduncles green, 1.5-3.0 cm long. Fruit spineless. First half of summer. Well drained prairies, often on sandy soil. -- wO-Alta, US.

3. A. syriaca L. var. syriaca -- Milkweed, Silkweed (Cottonier, Cochons de lait) -- A coarse sticky herb with dense globular clusters of purple flowers. About 1 m high and densely short glandular-pubescent throughout. Leaves 1-2 dm long, about oblong, opposite. Peduncles purple, 2-3 cm long. Fruit densely covered with soft spine-like projections. First half of summer. Floodplains. -- NS-sMan, US.

In var. syriaca the stem leaves are mainly subcordate at base. To the south of us it is largely replaced by a var. kansana Palm. & Stey. with leaves rather truncate at base and fruits covered with thinner and \pm filiform spine-like projections.

Saskatchewan is included in the range given by Fernald 1950, but we found no corresponding specimen at HUH in 1965.

A. syriaca x speciosa was listed by Löve 1959 for southern Manitoba on the basis of J.P. Bernard, Otterburne (MSM; DAO, photo). This specimen is not obviously different from typical A. syriaca.

4. A. speciosa Torrey -- Very conspicuous flowers, with the hood elongated to 10-15 mm. Much like the preceding, but more densely pubescent, becoming white-lanate in the inflorescences. Leaves ovate to oblong. Peduncles 2-3 cm long. Over all length of the flower around 2 cm. Pods reputedly spiny, like the preceding, but none of our material is fruiting. Early to mid-summer. Wetter spots in the prairie; occurring in widely scattered colonies, often along roadsides, but seems to be native. -- sMan-sBC-US.

5. A. verticillata L. -- Leaves linear-filiform and mostly verticillate in whorls of about 5-6. Stem 1-6 dm high, more or less pubescent in lines. Leaves glabrous to puberulent, strongly revolute, numerous. Peduncles 1 cm long or less. Flowers small, greenish-white, in a terminal corymb or panicle of umbels. Fruit glabrous and spineless. Mid-summer. Prairies on chernozems; rare, from Estevan eastward. -- swO-sMan-sES, US, (CA).

6. A. viridiflora Raf. var. viridiflora (var. lanceolata (Ives) Torrey, var. linearis (Gray) Fern.; Acerates angustifolia (Nutt.) Dcne.; Acerates lanuginosa AA.; Acerates viridiflora (Raf.) Eaton, var. lanceolata (Ives) Gray, var. linearis Gray) -- Green Milkweed. -- Hoods not developing horns. Exceptionally variable. 2-6 dm high. Puberulent throughout. Leaves lanceolate to long-linear, mostly opposite. Umbels mostly 2-3, rather densely flowered, axillary, or one of them sometimes terminal. Peduncles 1.0-1.5 cm long. Flowers greenish-white. Fruit spineless. First half of summer. Sandhills. -- O-S-(sAlta), US -- Var. obovata (Ell.) Torrey (A. viridiflora AA.) Leaves broader, ovate to oblong-lanceolate. -- (O)-Man-S-(Alta), US.

Var. obovata is of doubtful value. It might be nothing more than an ecological variant.

7. A. lanuginosa Nutt. (Acerates lanuginosa (Nutt.) Dcne.)

-- Inflorescence a single terminal umbel. Otherwise similar to the preceding, but coarsely hirsute throughout. Leaves \pm lanceolate, alternate to subopposite. (Early summer?). Sandhills of the Agassiz delta. -- swO-scMan, US.

A rather rare plant in Canada, it has been collected only at Sidney, Aweme, Pointe Pelée and Grand Bend.

Order 31. RUBIALES

Like the Loganiales, but the ovary inferior. Leaves opposite or verticillate.

a. Herbs 54. Rubiaceae
aa. Shrubs 55. Caprifoliaceae

54. RUBIACEAE

(MADDER FAMILY)

Leaves either verticillate or opposite and stipulate.

Mostly woody plants with entire leaves, but ours all herbs.

a. Leaves opposite 1. Houstonia
aa. Leaves verticillate.
b. Flowers in an open cyme 3. Galium
bb. In an involucreted head 2. Asperula

1. HOUSTONIA L.

BLUETS

Small herbs with 4-merous, opposite leaves and interpetiolar stipules, that is stipules alternating with the leaves, there being only 2 stipules for each pair of leaves, instead of the normal pair of stipules to each leaf.

1. H. longifolia Gaertner var. longifolia -- Bluets -- Tufted perennial, the erect stems up to 2 dm high. Leaves 1-3 cm long, \pm lanceolate, glabrous or sometimes very minutely scabrous along the margin. Flower 5-8 mm long, funnelform, pale blue. Late spring and very early summer. Dry and sandy prairies. -- sQ-seS, US -- Var. Musci Boivin -- Basal leaves sparsely and irregularly ciliate along the petiole and towards the base of the blade. -- sMan-cAlta.

A study of the genus published in Rhodora 61: 157-180, 183-207. 1959 dealt primarily with the U.S. species. We found the Canadian material to fall readily into two species, an eastern H. caerulea L. and a more widespread H. longifolia. The latter could be further subdivided on minutiae of pubescence into four geographical variations as follows:

a. Basal leaves glabrous and eciliate or at most very finely scabrous var. longifolia
aa. More or less ciliate.
b. Ciliate with hairs 0.3-0.5 mm long; stem nearly always glabrous var. ciliolata
bb. Ciliation of shorter hairs; stem glabrous or more commonly hirsute.

- c. Stem glabrous at least along the internodes; rosette leaves irregularly and sparsely ciliate var. Musci
 cc. Lower part of the stem hirsute on the internodes and along the lines of decurrence; leaves uniformly short-ciliate...var. Soperi

Two varieties occur in the U.S.A. Var. longifolia has the basal leaves quite glabrous or at most finely scabrous with minute hairs less than 0.1 mm long and barely detectable with the hand lens; stems mostly glabrous or sometimes more or less hirsute along the lines of decurrence, especially in the vicinity of the nodes. This first variety also occurs in Canada in Quebec (Richmond Co.), Ontario (Kenora, Middlesex, Rainy River and Simcoe Cos.), Manitoba (Macdonald, Marquette, Neepawa, Provencher and Springfield districts) and Saskatchewan (Melville, Rhostern and Yorkton districts).

Var. ciliolata (Torrey) stat. n., H. ciliolata Torrey, Fl. N. US. 1: 173.1824; H. canadensis W. Basal and stem leaves regularly ciliate with longer hairs. Stem nearly always glabrous. This second variety is much more restricted in its Canadian distribution; we know it only from the following Ontario counties: Bruce, Frontenac (Westbrook), Lincoln, Northumberland and Welland.

The last two varieties are strictly Canadian in their distribution and by their morphology they seem to be intermediate between the first two varieties. Yet it is remarkable that these two Canadian varieties are absent from the area of overlap of the first two varieties.

Var. Musci var. n. Folia rosettae sparse et irregulariter ciliata, saepius ad basas et secundum petiolum. Caulis glaber vel ad basas ± hirsutus secundum lineas, praecipue ad nodos, glaber tamen in internodiis. Type: Boivin, Moss, Turner & Alex 10176, Bruderheim, 2 miles north, Pinetum Banksianae on fixed sand dunes, Aug. 13, 1952 (DAO); Paratypes: Manitoba: H. Marshall 34, Brandon, (DAO); Boivin & Dore 3263, Shilo, (DAO); F. Fyles, Treesbank, (DAO); H. Groh, Aweme, "Bluets", (DAO); Frankton & Bibbey 97, Shilo (DAO); Boivin & Alex 9290, Saint-Lazare, (DAO); J.J. Rowe 510, East Gate, Riding Mountain National Park, "Bluets", (DAO); Love & Love 5546, Pointe du Bois, (DAO); Boivin & alii 10658, Brokenhead, (DAO); Boivin, Laishley & Schindler 13042, Réserve Forestière Whiteshell, côté nord du lac Falcon, (DAO); SASKATCHEWAN: A.J. Breitung 591, McKague, (DAO); A.J. Breitung s.n., McKague, (DAO); G.V. Selleck 76, Esterhazy, (DAO); A.J. Breitung 3475, 12 mi. n. of Meadow Lake (DAO); R.C. Russell 54447, Macdowall (DAO); Ledingham & Hudson 910, Price Albert (DAO), Boivin & Breitung 5114, Nisbet Provincial Forest (DAO); Senn, Groh & Russel 2803, St. Louis (DAO); ALBERTA: E.H. Moss 4002, near Edmonton, (DAO); E.H. Moss 10257, north of Ft. Saskatchewan (DAO).

So named after the late E.H. Moss, author of an excellent manual on the flora of Alberta.

Var. Soperi var. n. Folia rosettae breviter ciliata pilis 0.2-0.3 mm. Caulis ad basam hirsutus secundum lineas et in internodiis. Type: J.H. Soper 538, Turkey Pt., sandy banks along edge of dry upland woods, July 4, 1938 (DAO); Paratypes: ONTARIO: T.W. Burgess, Burford (DAO); Victorin, Rolland & Dominique 46377, Normandale, (DAO); Victorin, Rolland & Dominique 46424, Saint Williams, (DAO); W.G. Dore 44-27, Walsingham, (DAO); J. Dearness, West of Simcoe (DAO).

2. ASPERULA L.

Much like Galium with a well defined tube to the corolla.

1. A. ARVENSIS L. -- Quinsywort (Rapette) -- Inflorescence a glomerule of pale blue flowers subtended by an involucre of very long ciliate and narrowly oblanceolate bracts. Nearly glabrous annual with a red taproot. Leaves in 6's or 8's. (Early summer?) Rare adventive: Delta. -- O-Man, BC, (US), Eur.

Only 2 other localities in Canada: Hamilton and Essondale.

3. GALIUM L.

BEDSTRAW

Fruit geminate, yet born of a single flower. Herbs, often catchy, with verticillate leaves.

a. Ovary and fruit densely pubescent.

b. Leaves in 4's 3. G. boreale

bb. Leaves in 6's-8's.

c. Main leaves verticillate in 8's 1. G. Aparine

cc. Main leaves verticillate in 6's..... 2. G. triflorum

aa. Ovary glabrous.

d. Flowers yellow; leaves strongly revolute, with merely the midnerve showing below..... 4. G. verum

dd. White or greenish; leaves flat to merely narrowly revolute along the margin.

e. Flowers in many-flowered cymes, on peduncles usually less than 5 mm long 5. G. palustre

ee. Flowers in terminal cymes of (1)-2-3-(5) flowers on peduncles usually 5-10 mm long 6. G. trifidum

1. G. Aparine L. (var. echinospermum (Wallr.) Farw., var. Vaillantii (DC.) W.G.J. Koch; G. Vaillantii DC.) -- Cleavers, Goosegrass (Gratteron, Herbe collante) -- Annual with the stem leaves mostly 7-8 to a node. Very catchy from being retrorse-scabrous, forming tangles. Leaves linear-oblanceolate, mostly 2-3 cm long. Flowers white in few-flowered axillary cymules. Ovary and fruit densely covered with hooked hispid hairs. All summer. Moist wooded river banks; sometimes weedy. -- (G, Aka, NF, NS, NB)-Q-(O-Man)-S-BC, US, (SA, Eur, Afr, Oc) -- F. spurium (L.) Boivin (var. intermedium (Mér.) Briquet; G. spurium L.) -- Has smooth fruits. Local: Carlea, Waterton. -- sS-swAlta, (US, Eur).

2. G. triflorum Mx. (G. asprellum AA.) -- Trailing Cockspur -- A common forest species with rather large leaves in 6's. In small tufts, the base of the stem rather weak and the stems becoming prostrate and radiating in a rosette of stems. Herbage smooth to scabrous. Leaves largest, lanceolate, commonly 1 cm wide. Flowers in axillary cymes and terminal panicles. Ovary and fruit hispid with hooked hairs. First half of summer. Common in deciduous forests. -- G, K-Aka, L-SPM, NS-BC, US, CA, Eur.

3. G. boreale L. (G. septentrionale R. & S.) -- Crosswort -- Ovary and fruit densely hispid, but the hairs not hooked. Stems stiffly erect and smooth to slightly scabrous. Leaves in 4's, the main ones conspicuously 3-nerved with white and parallel nerves. Flowers white or nearly so, in dense terminal panicles. Early summer. Common in prairies and quite showy at flowering time. -- (G), Mack-Aka, NS, NB-BC, US, Eur.

4. GALIUM VERUM L. -- Bedstraw, Our Lady's Bedstraw (Grappelle, Herbe à la Vierge) -- The yellow flowers small but numerous and growing in rather large and dense colonies that are quite noticeable at flowering time. Leaves linear, strongly revolute, the main ones in 6's or 8's. Flowers in terminal panicles. First half of summer. Sometimes cultivated and locally naturalized at Holland and Calgary. -- NF-(SPM, NS), Q-Man, Alta-BC, (US, Eur, Afr).

5. Galium palustre L. -- A fine and weak herb, rather catchy and forming tangled masses in wet places. Stem usually slightly scabrous, glabrous at the nodes. Stem leaves linear to oblanceolate, some of them in 4's, but usually also a few in (5)-6's. Flowers numerous, in many-flowered cymes and more or less forming a terminal panicle. Pedicels usually less than 5 mm long. Corolla lobes 4, up to 1 mm long. First half of summer. Wet places. Reported for southern Manitoba and northern Alberta. -- (Y, NF-SPM, NS-NB)-Q-O-(sMan, nAlta, US, Eur, Oc).

Reports from our area (and from Yukon) need to be confirmed. The only sheet we have seen from west of Ontario was from Manitoba (DAO) and it has been revised to G. trifidum. The same may possibly apply to other reported western collections.

6. G. trifidum L. (G. labradoricum Wieg.) -- Dyer's Cleavers, Goosegrass (Tissavoyanne rouge) -- Much like the preceding and not always clearly distinct, but rather fewer-flowered. Usually somewhat scabrous. Stem leaves nearly always all in 4's. Inflorescence more diffuse, the flowers solitary or in cymes of 2-3-(4) flowers on very widely divergent pedicels, the latter commonly 5-10 mm long in fruit. Corolla lobes 3-(4), 0.5-1.5 mm long. First half of summer. Wet shaded places. -- (G, K)-Mack-(Y)-Aka, L-(NF)-SPM, NS-PEI-(NB)-Q-O-(Man)-S-(Alta)-BC, US, (Eur) -- F. halophilum (Fern. & Wieg.) Boivin -- Glabrous or nearly so and slightly fleshy. Seashores. -- L-NF-(SPM), NS-PEI-(NB)-Q, nMan, (US).

Usually subdivided into a series of microspecies which appear to us to be so many arbitrary distinctions within a mor-

phological and geographical continuum.

55. CAPRIFOLIACEAE (HONEYSUCKLE FAMILY)

Shrubs with opposite leaves, the stipules nearly always lacking. Leaves entire or commonly toothed to lobed or even compound.

- a. Leaves compound 1. Sambucus
- aa. Leaves simple.
 - b. Leaves entire.
 - c. Flowers twinned and sessile at the end of a common peduncle 5. Lonicera
 - cc. Flowers not in 2's but in small axillary clusters 3. Symphoricarpos
 - bb. Leaves serrated to lobed.
 - d. Low and almost herbaceous, with leaves small, less than 2 cm long 4. Linnaea
 - dd. Quite woody and larger-leaved.
 - e. Flower rotate; stigma sessile 2. Viburnum
 - ee. Flower funelform; style rather long 6. Diervilla

1. SAMBUCUS L.

ELDER

Shrubs with opposite and pinnate leaves. Flower similar to Viburnum, but the stigma borne on a style. Fruit a 3-seeded berry.

1. S. racemosa L. var. pubens (Mx.) Watson (S. pubens Mx.) -- Catberry, Elder (Sureau rouge, Sirop rouge) -- The one common shrub with opposite and pinnate leaves. Mostly 1-3 m high. Twigs with large brownish pith. Leaflets broadly lanceolate, mostly 5. Inflorescence a panicle 3-5 cm wide, with a well defined axis, stronger than its branches. Flowers white, darkening in the herbarium. Fruits bright red and small. Early summer. Moist spots in open woods, Saskatoon eastward. -- NF, NS-cS, US -- F. xanthocarpa Cock. -- Fruit yellow. Local: Delta. -- Man, (US) -- Var. arborescens (T. & G.) Gray (var. melanocarpa (Gray) McMinn.; S. melanocarpa Gray) -- A coarser shrub, 2-6 m high. Leaves more often glabrous. Inflorescence broader. Fruit dark red and somewhat purplish. -- Aka, wAlta-BC, wUS.

There is a fair amount of morphological overlap between our two varieties and a substantial proportion of the specimens could not be assigned to one variety or the other on the basis of their morphology alone. We have however interpreted all the more western references to S. pubens as applicable to var. arborescens.

There is also a fair amount of overlap in the diagnostic characters of our varieties and the eurasian var. racemosa. These are three very weak varieties at best, although they are often treated as so many species.

S. canadensis L. has been reported for our area from Shoal Lake. However all 3 collections (WIN; DAO, photo) examined

from that area have been revised to S. racemosa var. pubens.

2. VIBURNUM L.

Flower regular, rotate, small and 5-merous, the stigma sessile and the fruit reduced to a single-seeded berry (i.e.: a drupe).

- a. Leaves dentate, pinnately veined.
 - b. Finely serrate 1. V. Lentago
 - bb. Coarsely toothed 2. V. Rafinesquianum
- aa. Leaves lobed, palmately veined.
 - c. Inflorescence on a short side branchlet bearing a single pair of leaves 3. V. edule
 - cc. Flowering branchlets longer and bearing 2 pair of leaves 4. V. Opulus

1. V. Lentago L. -- Nannyberry, Wild Raisin (Alisier, Bourdaine) -- Inflorescence about 4-rayed and nearly sessile at the end of a branch which is naked below, but bears 2-4 pairs of leaves closely inserted just below the inflorescence. Leaves ovate, finely serrate, abruptly acuminate. Flowers small, white, in large corymbs. Fruit blue. Late spring. Deciduous woods, especially galerie-forests. -- NB-seS, US.

2. V. Rafinesquianum Schultes var. Rafinesquianum (V. affine Bush var. hypomalacum Blake; V. pubescens AA.) -- Shrub with opposite leaves, coarsely dentate and soft villous below. Leaves ovate. Flowering shoot elongate. Inflorescence on a long peduncle, with about 7 primary rays. Fruit nearly black. Early summer. Dry woods. -- Q-sMan, US.

The more southern var. affine (Bush) House has the leaves glabrous below or at most pubescent along the main nerves. We know it in Canada only from the Grand Bend on Lake Huron.

3. V. edule (Mx.) Raf. (V. eradiatum (Oakes) House; V. pauciflorum La Pylaie) -- Pimbina, Squashberry (Pimbina, Pimbina) -- Rather inconspicuous shrub with few-flowered inflorescences of small flowers, borne on a short lateral shoot which bears only one pair of leaves and matures very few fruits, often only one. Leaves vaguely pentagonal, somewhat 3-lobed and coarsely serrate. Fruit bright red-orange. Late spring to early summer. Common forest species, especially in boggy woods. -- K-Aka, L-SPM, NS, (NB)-Q-BC, US.

Supposed to range as far as northeast Asia according to Fernald 1950, but Hultén 1949 makes no such mention and it is not included in the Flora U.R.S.S. (vol. 23).

4. V. Opulus L. var. americanum Aiton (ssp. trilobum (Marsh.) R.T. Clausen; V. trilobum Marsh.) -- Pimbina, Squashberry (Pimbina, Quatre-saisons des bois) -- Remarkable by its large inflorescences of dimorphic flowers, the peripheral ones being many times larger, sterile and very showy. Leaves deeply 3-lobed and more or less dentate. Inflorescence on a long peduncle. Flowers white, the sterile ones asymmetrical, the outer lobes being larger and about twice as long as the inner

one. Early summer. Open woods. -- NF-(SPM, NS-NB)-Q-S-(Alta-BC), US.

Typically the transatlantic var. Opulus has filiform stipules attenuate at tip; petiole bearing towards its summit one or more coarse glands, these sessile, discoid, concave and mostly 1.0-1.5 mm wide; leaves uniformly velvety-pubescent below. Our cisatlantic variety has shorter stipules, 5 mm long or less, and capitate at tip; glands smaller, capitate, stipitate, 0.2-1.0 mm wide and mostly convex; leaves glabrous to velvety below, commonly pubescent only along the nerves. However both varieties are highly variable in respect to all the characters mentioned and, undoubtedly, geography plays an important role in the determination of many specimens.

Early reports by Macoun 1884 of V. acerifolium L. and V. cassinoides L. from Saskatchewan have long since been discounted.

3. SYMPHORICARPOS Duhamel SNOWBERRY

Flower campanulate, not twinned, regular or nearly so; style elongate. Fruit a 2-seeded berry.

- a. Stamens and style included; berry drying white 1. S. albus
 aa. Longer and more or less exerted; berry drying purplish black 2. S. occidentalis

1. S. albus (L.) Blake (var. laevigatus (Fern.) Blake, var. pauciflorus Robbins; S. pauciflorus (Robbins) Britton; S. racemosus Mx.) -- Snowberry (Graine d'hiver) -- Shrub with nearly round, entire leaves and fat waxy-white berries drooping at the end of the branches. Forms large colonies. Glabrous or pubescent. Leaves ovate to orbicular, mostly 1-2 cm long, sometimes lobed on leading shoots. Flowers ± 5 mm long, mostly whitish, subsessile, borne in short axillary or terminal racemes. Corolla lobes usually shorter than the tube, the style and stamens usually not exerted from the tube. Early summer. Common, especially in and around bluffs. -- sMack, Aka, NS-(PEI)-NB-BC, US.

Nearly glabrous specimens (var. laevigatus) are sporadic throughout the range, but they become the more common type west of us. They also tend to bear larger fruits, up to 1.0-1.5 cm across.

Since the days of Hooker it has been traditional to divide our material into a smaller S. albus and a larger S. occidentalis. Both are common in our area, they will often grow together; they seem to occupy about the same kind of habitats, and they intergrade to a limited extent. It might be better to treat them as varieties of a single species. The range of S. occidentalis is essentially included within that of the somewhat more widely distributed S. albus.

2. S. occidentalis Hooker -- Wolfberry (Graine de loup)--

Tending to be more vigorous and larger-flowered than the first. Leaves sometimes small, more commonly about 3-5 cm long. Inflorescences tending to be more heavily flowered. Corolla mostly 7-8 mm long and mostly pink or pinkish. Corolla lobes mostly longer than the tube. Berry \pm 6 mm wide, waxy-white like the first when fresh, but discolouring in drying. First half of summer. Mostly around Aspen bluffs. -- Mack, Q-BC, US.

4. LINNAEA L.

TWIN-FLOWER

Peduncle forked and each branch bearing a drooping flower. Corolla regular, funnel-shaped. Stamens only 4; the flower otherwise 5-merous.

1. L. borealis L. var. longiflora Torrey (var. americana (Forbes) Rehder; L. americana Forbes) -- Twinflower, Pink Bells -- Trailing shrub with forked erect peduncles, each bearing two flowers. Almost herbaceous, the stem and branches wiry. Leaves roundish, usually with 2 pairs of low teeth. Peduncle very long, with a pair of bracts at the fork. Corolla pink. Early summer. Coniferous woods. -- G, K-Aka, L-SPM, NS-BC, US -- F. canadensis House -- Flowers white; a local form. -- O, Alta-BC, (US).

Var. borealis is Eurasian and Alaskan; it has shorter corolla, mostly 7-10 mm long, with a shorter tube flaring more abruptly. Not always a clear-cut distinction. Our American plants are usually further subdivided on corolla size into a larger var. longiflora west of the Rockies and a smaller and more eastern var. americana. Actually both American varieties have about the same range of variation and the difference between the two is only one of frequency, longer flowers being decidedly more frequent west of the Rockies. This may be expressed succinctly as follows:

Var. americana: flowers (8)-10-12-(15) mm long.

Var. longiflora: flowers (9)-12-15-(16) mm long.

Throughout this flora we have systematically denied taxonomic recognition to taxa with an essentially statistical basis such as the above. We have insisted on a minimum of morphological discontinuity as a sine qua non basis for the recognition of a taxon.

5. LONICERA L.

HONEYSUCKLE

Flowers borne 2 together at the end of a common peduncle. Ovaries free to fused. Corolla elongate, more or less zygomorphous, but free from its twin, even when the ovaries are fused. Leaves entire.

- a. Flowers in a short terminal spike subtended by a pair of connate leaves.
- b. Leaves thickish, usually sessile and glaucous above 7. L. dioica
- bb. Leaves thin, not glaucous above, the middle ones short-petioled 8. L. hirsuta

- aa. Flowers all axillary; no connate leaves.
- c. Ovaries fused, ripening into a single berry 1. L. caerulea
- cc. Ovaries free, ripening into a pair of berries.
- d. Involucre of 4 large and showy bracts 6. L. involucrata
- dd. Involucre small relative to the ovary or fruit.
- e. Branchlets fistulose except at the nodes, the brown pith merely lining the empty core.
- f. Leaves and peduncles glabrous 3. L. tatarica
- ff. Lower leaf faces and peduncles densely pilose 2. L. Morrowii
- ee. Branchlets solid, the white pith filling the core.
- g. Leaves glabrous or lightly long pilose below 4. L. utahensis
- gg. Densely puberulent at least below 5. L. oblongifolia

1. L. caerulea L. var. villosa (Mx.) T. & G. (L. caerulea sphalm.; L. villosa (Mx) R. & S. var. Solonis (Eaton) Fern.; Xylosteum caeruleum (L.) Dum.-Cours.) -- Fly-Honeysuckle -- Ovaries fused. Leaves oblong, usually more or less villous at least below. Flowers yellow, appearing with the leaves. Ovary subtended by a pair of elongate bracts, about 5 mm long. Berry blue. Second half of spring. Common in bogs. -- seK, L-SPM, NS-Alta, US.

The eurAsian var. caerulea is generally somewhat taller, it tends to be less pubescent and the corolla lobes are a bit shorter than the tube. In our variety the corolla lobes are somewhat longer than the tube.

Many other american varieties have been described but as far as we can determine they run freely into one another and are essentially sympatric, except perhaps a more western var. caurina (Fern.) Boivin which is reputed to have red berries. But we have yet to see any mature fruits of the latter.

2. L. MORROWII Gray -- Quite similar to the more common L. tatarica, but more pubescent. Twigs and peduncles densely pubescent. Leaves lightly to densely pubescent above, densely pubescent to grayish-tomentose below. Inner bracts about as long as the ovary. Flowers pubescent, white, turning orange-yellow, thus seeming to be of two different colors when the shrub is in full bloom. Berries orange to red. Late spring. Sometimes planted and apparently escaped in the coulée of the South Saskatchewan at Saskatoon. -- Q-O, S, US, Eur.

2X. L. BELIA Zabel -- Hybrid with the next and much more lightly pubescent to nearly glabrous. Flowers pink, turning yellow. Inner bracts shorter than the ovary. Sometimes planted

and exceptionally escaped or persistent: Wolseley. -- NB-O, S, US, Eur.

3. L. TATARICA L. (L. tartarica sphalm.; Xylosteum tataricum (L.) Med.) -- Honeysuckle, Twin Sisters (Chèvrefeuille) -- Glabrous throughout and commonly planted. Leaves oblong to cordate. Inner bracts less than half as long as the ovary. Flowers whitish pink, glabrous outside. Berries red or yellow. Late spring. Often planted and readily escaping, although not aggressive. -- NB-S-(Alta), US.

4. L. utahensis Watson -- Red Twinberry -- Inner bracts of the ovary minute or lacking, the outer ones present. Leaves oblong to cordate, usually ciliate and somewhat pilose below. Otherwise glabrous. Flowers cream-yellow, appearing with the leaves. Berry red. Late spring. Wet coniferous woods. -- swAlta-sBC, US.

5. L. oblongifolia (Goldie) Hooker (Xylosteum oblongifolium Goldie) -- Fly-Honeysuckle -- Leaves broadly oblanceolate. Densely puberulent throughout, including the corollas, but the leaves sometimes nearly glabrous above. Outer bracts lacking, the inner very short. Flower pale yellow, often pink tinged. Berry deep red, drying blue. Late spring. Edge of bogs and wet open woods. -- (NB)-Q-acS, US.

6. L. involucrata (Rich.) Banks var. involucrata (Distegia involucrata (Rich.) Cock.) -- Fly-Honeysuckle, Black Twinberry -- Very showy in fruit with each pair of large deep purple berries subtended by 4 large purple bracts. Leaves ovate to obovate, often acuminate, glabrous above, pilose to glabrous below. Bracts glandular, smaller and only slightly purplish at flowering time. Corolla yellow, glandular. Early summer. Occasional in wet coniferous woods. -- K, Y-Aka, Q-BC, US.

Our typical variety is usually 2 m high or less, the herbage glabrous or somewhat pubescent, the flowers 1.0-1.5-(2.0) cm long, the stamens equalling the tube or slightly exserted. On the other hand, the californian var. Ledebourii (Esch.) Jepson is generally taller, more pubescent, the flowers 1.5-2.0 cm long and the stamens included.

7. L. dioica L. var. glaucescens (Rydb.) Butters (L. glaucescens Rydb.) -- Red Honeysuckle -- Shrub climbing by its loosely twining stems. Leaves thickish, glaucous above, the middle ones subsessile, the upper two connate into a huge saucer-shaped involucre, oblong to suborbicular, subtending the terminal spike. Inflorescence a peduncled terminal spike of verticillate flowers, with 3 pairs of sessile flowers to a verticil. Flowers longest, yellow and somewhat pinkish tinged. Berry red. Late spring and early summer. Woods. -- Mack, Q-BC, US.

Leaves villous below, glabrous above. The more eastern var. dioica has eciliate leaves glabrous on both faces.

Two more phenotypes, var. dasygma (Rehder) Gleason and var. orientalis Gleason, are also distinguished sometimes. The typically glabrous ovary is densely glandular in var. orientalis, a variant known to occur in Canada mainly in southern Ontario, but also sporadically from southwestern Quebec to Narcisse,

Manitoba, and Saskatoon, Saskatchewan. Intermediates with sparsely or irregularly glandular ovary are more common than well characterized glandular specimens. And this glandulosity is in no way linked to the variation in leaf pubescence. From this we can conclude that var. orientalis is a sporadic variation of no particular significance. In var. dasygna the ovary is not only glandular like var. orientalis but also pubescent. It is a rather uncommon phenotype which occurs sporadically and seems to be of no more significance than var. orientalis itself.

8. L. hirsuta Eaton var. Schindleri Boivin -- Hairy Honey-suckle -- This variety is intermediate to the previous species from which it differs by its thinner leaves, not glaucous above, the middle ones with a petiole 5-10 mm long. Early summer. Rocky woods at Falcon Lake. -- Q-seMan.

As pointed out by Scoggan 1957, earlier Manitoba reports were based on misidentifications. A similar explanation probably accounts for Fernald 1950 extending the range to Saskatchewan.

Var. Schindleri var. n. foliis superne glabris vel fere glabris, ad basas et ad nervum medium tantum paullum pilosum. Type: Boivin, Laishley & Schindler 13058, Lac Falcon, Réserve Forestière Whiteshell, près d'un ruisseau de montagne, 24 juin 1959 (DAO). Paratypes: QUEBEC: J. Richard, canton Rémigny (QFA); Dutilly & Lepage 35179, rivière Nottaway (DAO); ONTARIO: Taylor, Hosie & Fitzpatrick 1192, Sault Ste. Marie (DAO); Bartlett & F. Richards 464, Mamainse Point (DAO); C.E. Garton 1831, Little Pigeon Bay (DAO).

Throughout most of their overlapping range, L. dioica and L. hirsuta are easily distinguished. In the first the leaves are glabrous on both faces, or at least above, and the twigs are glabrous. In the latter the young twigs are glandular and pubescent and the leaves are hirsute or velvety below, pilose or lightly strigose over the whole of the upper surface, except the involucreal leaves which are most often glabrous above. In L. dioica the more eastern var. dioica grades into our var. glaucescens in which the leaves are villous below, glabrous above. True, the odd specimen of var. glaucescens may be slightly pubescent above towards the base of the limb or near the mid-nerve, but such variants are easily referred to var. glaucescens by their rather thick leaves, sessile or nearly so and strongly glaucous above.

A more puzzling intermediate occurs in the northern part of the range of L. hirsuta in which var. interior Gleason, the normal phase of the species in eastern Canada, grades into a var. Schindleri fairly intermediate to L. dioica. By its large and thin leaves, dark green and little if at all glaucous, by its middle leaves borne on petioles 5-10 mm. long, this intermediate is clearly related to L. hirsuta. But its young twigs are less pubescent than in L. hirsuta, or even completely glabrous and leaves are glabrous or nearly so above, thus verging towards L. glauca.

It is a pleasure to associate the name of this new variety

with the name of a resident amateur naturalist from Falcon Lake. His kind help made it possible to locate rapidly quite a few of the highly localized plants of southeastern Manitoba.

6. DIERVILLA Duhamel

Flower rather like that of Lonicera, but each flower borne on its own peduncle.

1. D. Lonicera Miller, var. Lonicera -- Bush-Honeysuckle, Life-of-Man (Herbe bleue, Chèvrefeuille d'Acadie) -- The inferior ovary linked to the calyx by a thin neck 3-4 mm long. Low shrub. Leaves large, ovate-lanceolate, serrate, acuminate, glabrous or nearly so. Inflorescence terminal. Flower yellow, often red-tinged. First half of summer. Dry woods. -- NF-SPM, NS-ecS, US.

As early as 1833 Hooker reported this to range west to the Rockies and the report has been accepted by various later authors. It has not been confirmed by more recent collections as they are all from central Saskatchewan and eastward. A single sheet from Alberta, McVickar, L. Slave Lake, 1911 (TRT; DAO, photo) proved to be Lonicera involucreta.

The magnilacustral var. hypomalaca Fern. has the leaves abundantly pilose below.

Order 32. VERBENALES

Like the Loganiales, but the corolla more or less zygomorphic and the stamens usually reduced in number, most often to 4 or 2, and fewer than the corolla lobes. Ours are all herbs with opposite leaves.

- a. Flowers alternate to very crowded 56. Verbenaceae
 aa. Flowers obviously opposite in a lax spike 57. Phrymaceae

56. VERBENACEAE (VERVAIN FAMILY)

Calyx actinomorphic. Rather similar to the Labiatae, but the ovary not lobed and the style terminal. Corolla 5-lobed, but the stamens only 4 and dimegueth or even only 2.

1. VERBENA L.

VERVAIN

Corolla barely zygomorphic.

- a. Leaves serrate.
 b. Inflorescence lax; flowers white..... 1. V. urticifolia
 bb. Inflorescence dense; flowers blue 2. V. hastata
 aa. Leaves deeply divided 3. V. bracteata

1. V. urticifolia L. (V. urticaefolia sphalm.) -- White Vervain, Bur-Vine -- Resembling the next, but the inflorescence more open, the spike lax and more elongate and the flowers white. Leaves narrowly ovate. Mid summer. Dry and more or less open places: Gainsborough. -- NB-s0, seS, US.

2. Verbena hastata L. -- Simpler's Joy, Iron-weed -- Stiffly erect perennial herb with a terminal panicle of dense spikes of small blue flowers. Leaves lanceolate. Fruit included in the calyx. Mid to late summer. Wet places, usually near shores, west to Wadena and Roche-Percée. -- NS, NB-seS, BC, US.

A sight record for Alberta by Groh 1949 has never been confirmed and is discounted as improbable.

3. V. bracteata Lag. & Rodr. (V. bracteosa Mx.) -- Sprawling annual with heavily bracted terminal spikes. Hirsute. Stem leaves deeply trilobed to pinnatifid, the lobes serrate. Spikes dense. Bracts overtopping the flowers and fruits. Flower blue. All summer. Light or disturbed soils, often weedy. -- O-BC, US, (CA).

57. PHRYMACEAE

(LOPSEED FAMILY)

A single species of a rather unusual type and doubtful position. Calyx zygomorphic, with 5 lobes, the lower two minute, the upper 3 prolonged into subulate hooks.

1. PHRYMA L.

LOPSEED

A square-stemmed herb with opposite leaves and bilabiate flower, rather resembling a Labiate, but the ovary unilocular and one-seeded, maturing into a single achene.

1. Phryma leptostachya L. -- Lopseed -- Long stiff spikes of flowers that are at first strictly erect, becoming stiffly spreading at anthesis and maturing into closely pendant, catchy fruits. Leaves few, large and thin, broadly ovate, coarsely and irregularly serrate, pubescent. First half of summer. Alluvial woods: Pembina Hills, Portage. -- NB-Man, US, (CA, Eur).

The Far Eastern plants are supposed to be slightly different, var. oblongifolia (Koidz.) Honda (= var. asiatica Hara), a point we have not had the opportunity to check.

The Rutaceae of the order Rutales are not definitely represented in our area. Ruta graveolens L. was reported from Twin Butte, Alta., in the Prov. B.C. Rep. Prov. Mus. 1941: Cll. 1942, and was repeated by Groh 1944 and 1950, but we have not yet checked this point and have no idea if the plant was correctly identified and represented cultivated or escaped material.

Order 33. SAPINDALES

Stamens not on the corolla, but rather perigynous. Shrubs and trees mostly with the leaves compound or sometimes palmately lobed.

a. Leaves opposite 58. Aceraceae
aa. Leaves alternate 59. Anacardiaceae

58. ACERACEAE

(MAPLE FAMILY)

Flowers dioecious with the petals minute and free or lacking. Carpels 2. Leaves opposite.

1. ACER L.

MAPLE

Fruit a pair of asymmetrical samaras, each like a half pro-peller.

- a. Leaf compound 4. A. Negundo
 aa. Leaf simple.
 b. Palmatifid, the lobes rhomboid 3. A. saccharinum
 bb. Palmately lobed, the lobes deltoid
 to triangular.
 c. Inflorescence a racemose panicle.... 1. A. spicatum
 cc. Inflorescence a corymb 2. A. glabrum

1. A. spicatum Lam. -- Whitewood, White Maple (Plaine bâ-tarde, Fouereux) -- Tall shrub with palmately lobed leaves. The lobes 5, those of the lower pair often obscure. Margin serrate. Twigs grayish-pubescent. Leaves pubescent below. Early summer. Aspen-Birch forests. -- (L)-NF-SPM, NS-ecS, US.

2. A. glabrum Torrey var. Douglasii (Hooker) Dippel -- Mountain Maple -- Similar but glabrous and the inflorescence co-rymbose. Late spring. Coniferous forests at the lower altitu-des. -- Aka, sWAlta-BC, US.

Var. glabrum from the southern Rockies has smaller leaves, 6 cm wide or less, and more deeply lobed, palmatifid leaves.

3. A. SACCHARINUM L. -- Silver-Maple, Soft Maple (Plaine blanche, Erable blanc) -- Tree with palmatifid leaves. Leaves strongly glaucous below. Lobes rhomboid, broadest near the mid-dle, narrower at base, irregularly and coarsely serrate. Flow-ers in glomerules. Very early spring. Often planted and ex-ceptionally escaped: Portage, Moose Jaw. -- NB-S, US.

Planted here and there as a shade tree, susceptible of es-caping to river shores. Despite many previous Manitoba reports, this tree is not native to the province and every time we tried to follow a lead we always ended up with cultivated trees. In 1951 we came across a single young shoot on the shores of the Assiniboine at Portage-La-Prairie, but in 1959 it had disappear-ed. The following year we found it to be naturalized in the ex-tensive galerie-forest of the Moose Jaw Creek at Moose Jaw.

4. A. Negundo L. var. Negundo -- Sugar-Maple, Box-Elder, Manitoba Maple (Erable, Erable à Giguère) -- A tree with leaf-green and glabrous twigs. Leaves compound, most commonly with 3 leaflets. The latter ovate to lanceolate, entire to irregu-larly few-lobed. Inflorescence a panicle. Ovary red, becoming green before the fruit is half grown, the wing becoming green before the fruit is half grown, the blade of the wing becoming green before its dorsal nerve. First half of spring. Galerie-forests; commonly planted, as are also its varieties. -- NS-sMan, US. -- F. sanguineum L. Martin -- Young fruit at first purple, the rib of the wing turning green around mid June, the blade remaining purple for another 2-3 weeks. Local: Brandon, Letellier. -- O-Man -- Var. violaceum (Kirchner) Jaeger -- Like the first, but the twigs strongly glaucous. Escaped in Alberta, indigenous further east. -- Mack, NS, NB-sS-nAlta, US -- F. Dorei

Boivin -- Young fruits purple-red, not becoming green until mid-summer, the dorsal nerve being first to turn green. Occasional. -- Q-sMan, US -- Var. interius (Britton) Sarg. (Negundo interius (Britton) Rydb.) -- Twigs finely and densely grayish-puberulent. -- Mack, (O) - Man-Alta, US -- F. Loeveorum Boivin (f. sanguineum AA.) -- Twigs as in var. interius, fruits as in var. Dorei -- FEI, Man-S.

Var. interius occurs as a native from southeastern Alberta to Lake Superior, naturalized further north and east. Eastern reports for the other varieties are also based on naturalized plants.

59. ANACARDIACEAE

(CASHEW FAMILY)

Petals present, 5, free. Carpel solitary. Leaves alternate.

1. RHUS L.

SUMACH

Shrubs with compound leaves. Fruit a drupe.

- a. Leaves pinnate 1. R. glabra
 aa. Leaves trifoliolate.
 b. Leaflets sessile 2. R. aromatica
 bb. Leaflets petioled 3. R. radicans

1. R. glabra L. (var. borealis AA.) -- Sumac, White Sumac (Vinaigrier) -- Shrub with long, pinnate leaves. Glabrous. Leaflets numerous, lanceolate, opposite, serrate. Twigs often glaucous. Inflorescence terminal, a large panicle of green flowers or reds drupes. Mid summer. Dry and open woods on the Coteau de Prairie and in southeastern Manitoba. -- swQ-ecS, BC, US, (CA).

2. R. aromatica Aiton var. trilobata (Nutt.) Gray (R. canadensis Marsh. var. trilobata (Nutt.) Gray; R. trilobata Nutt.) -- Squawbush, Skunkbush -- Trifoliolate-leaved shrub with terminal clusters of reddish drupes. Leaflets irregularly lobed or toothed, commonly trilobed, the terminal leaflet abruptly long cuneate at base. Fruit minutely glandular-viscous. Early spring. River flats and steep banks of coulees. -- S-Alta, US, (CA).

In the more eastern var. aromatica the terminal leaflet is 4-7 cm long and bears 7-13 teeth while the bracts are glabrous dorsally in the upper half. In our var. trilobata the leaflets are smaller and cut into only 3-5-(7) teeth while the bracts are uniformly densely pubescent dorsally. The difference in the size of the leaflets may be only a climatic reaction, if we are to judge by a Saunders collection of material cultivated at Ottawa (DAO) and originating from Letnbridge.

3. R. radicans L. var. Rydbergii (Small) Render (R. Toxicodendron AA.; Toxicodendron desertorum Lunell; T. Rydbergii (Small) Greene) -- Poison-Ivy, Poison-Oak (Herbe à puce, Bois de chien) -- Rather inconspicuous low shrub with 3 large leaflets on a long erect petiole. Leaflets ovate, entire to coar-

sely toothed. Flowers in a small panicle between the leaf bases. Fruit a small pale green drupe, glabrous. Late spring. Common, abundant and almost ubiquitous in forests, shores and sand dunes. -- NS-BC, US.

The slightest contact with any part of this shrub may cause a very itchy and painful dermatite that can easily degenerate into a hospital case. In some parts of its range this shrub is very virulent, but in our region it seems to be almost innocuous, perhaps because of the drier or cooler climate.

Our variety is a low shrub and strictly non-climbing. The typical phase occurs in southwestern Quebec and southern Ontario and southward; it will climb up to the nearest tree by means of adventive rootlets in the manner of Vitis.

ERRATA GRAVIORA

- Page 5, line 11 from bottom. Instead of: nichr
read: niche
- Page 10, last line. Instead of: 0.05
read: 0.5
- Page 15, line 19 from bottom. Instead of: mm
read: m
- Page 22, line 20 from bottom. Instead of: aqualinum
read: aquilinum
- Page 22, line 10 from bottom. Instead of: mm
read: m
- Page 26, line 22. Instead of: cm
read: dm
- Page 30, line 5 from bottom. Instead of: virgianum
read: virginianum
- Page 38, line 8. Instead of: mm
read: m
- Page 70, line 4 from bottom. Insert the single letter
n so the sentence will read in part: a
series of n generation segregates.

ADDITIONS AND CORRECTIONS

The following were accidentally omitted or came to our attention after the corresponding text had been given its final form for printing.

Page 62 -- A report of typical Potentilla flabellifolia from Alberta by Hitchcock 1961 was repeated by Boivin 1966. It could not be substantiated by specimens at NY or WTU and may represent only a lapsus calami.

Page 74 -- The range of Thermopsis rhombifolia should probably be amended to eliminate BC., as the reports (Ulke 1934, Eastham 1947, Taylor 1966 and Boivin 1966) and specimens from that province are likely to represent errors of identification or mislabels or cultivated plants. None has ever been confirmed and most are far out of range and by as much as 400 miles. The Field report carries the unlikely habitat of "open woods" and there was no specimen under that name in 1964 at TRT where Ulke's herbarium is preserved; the original sheet may have been revised since. The Summerland specimen (UBC; DAO, photo) is dated 1935 and carries no habitat data; it is impossible to eliminate the possibility of its being cultivated material. Further if it were native it would be surprising that such a showy plant would have escaped the attention of the many visiting botanists and the numerous resident research botanists at Summerland. The Goat Mt., Erikson (V; DAO, photo), collection carries no habitat data, but the many sheets at UBC from the same area by the same collector are all annotated "garden grown". Another sheet at UBC (photo at DAO) was revised in 1964 from Lupinus nootkatensis to Thermopsis montana Nutt. and appears to be the basis of the inclusion of the latter in the list by Taylor 1966. We have revised it to T. rhombifolia. It is a mere fragment of inflorescence labelled C.V. Copley, Ingenika River, soil gravelly bench, very wet, springy, lat. 56, 46; long. 126, 25, June 18-26, 1914 (UBC; DAO, photo). The habitat is wrong and the specimen is out of range by some 10 degrees of longitude. Thus we are left without convincing vouchers for either species of Thermopsis from British Columbia.

Page 79 -- Add the following which keys out to M. wolgica.
5. MELILOTUS ELEGANS Salzm. -- Legume strongly ridged transversally. Glabrous or nearly so. Flowers yellow, about 4 mm long. Pedicel about 2 mm long. Calyx slightly shorter, 1.5-2.0 mm long, its lobes triangular. Legume \pm 3 mm long, obovoid, glabrous, turning black. Summer. Rarely escaped to waste places; Brandon. -- sMan, (Eur, Afr).

Like M. indica and M. wolgica, a casual escape from experimental plantings.

Page 107 -- Add after Populus balsamifera.

4 X. P. Jackii Sarg. (P. manitobensis Dode) -- Hybrid with P. deltoides. The leaves not so white below, more coarsely serrate, deltoid-cordate and caudate. Local, especially in sand dunes. -- swQ-Alta, (US).

Our western plants could be treated as a nothomorph of the

eastern type, but the morphological distinction to be established



Page 141 -- The range of Mirabilis hirsuta var. hirsuta should be extended to include B.C. as it was collected at Kere-meos in 1963. The species is native in our area, but occurs east and west of us only as a railway introduction.

Page 173 -- Arceuthobium americanum has been reported from White Otter Lake in western Ontario by J. Kuijt, Nat. Mus. Bull. 186: 138. 1963 quoting an earlier (1956) report by Horde & Quirke. The corresponding voucher, McPhee & Miller 4240, White Otter Lake, on Pinus banksiana, 1-IX-1955 (Sault Ste. Marie Forestry; DAO, photo), was in 1967 revised by Kuijt to A. pusillum. We concur.

Page 173 -- The range of Arceuthobium pusillum should be extended westward to the region of Hudson Bay Junction in east-central Saskatchewan according to J. Kuijt (see above) in the same paper. The relevant voucher specimen (not seen) is reportedly preserved at UBC.

Page 173 -- The report by Boivin 1966 of Alaska for Arceuthobium Douglasii Eng. was a lapsus calami for Alberta and was based on the earlier report by Hitchcock 1964. However A. Douglasii is restricted in Canada to the valleys of the Kootenay and the Okanagan and, pending checking of the relevant specimens, we are withholding judgement on its presence or absence in Alberta.

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PROVANCHERIA

1 - Dédicace: L'abbé L. Provancher, 1820-1892. -

L. Cinq-Mars

L'Herbier de l'avenir. - Louis-Marie Lalonde, o.c.s.o.

Mise au point sur les Violettes (Viola spp.) du Québec. -

L. Cinq-Mars

2 - Flora of the Prairie Provinces. Part I. -

B. Boivin
