

TAXONOMY AND ECOLOGY OF THE VASCULAR PLANTS OF  
BLACK BUTTE OREGON

by

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## TAXONOMY AND ECOLOGY OF THE VASCULAR PLANTS OF BLACK BUTTE, OREGON

The main objectives of this study were to collect, identify, and write keys and descriptions to the vascular plants on Black Butte. The secondary objectives were to describe, in general, the distribution and occurrence of these plants, and to provide a record of this area, which previously had not been collected or studied, before it is further changed by the actions of man.

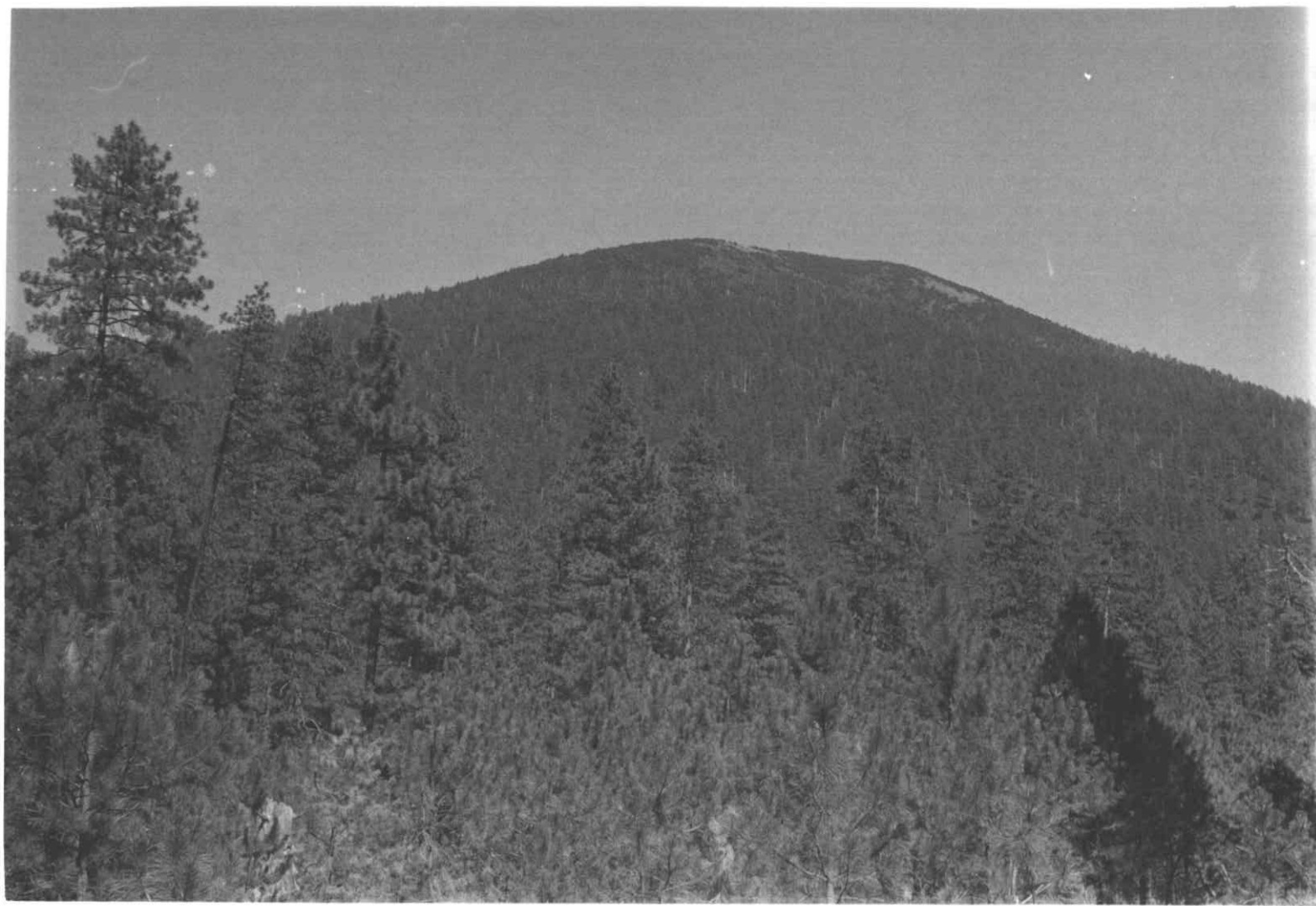
Black Butte is located on the boundary between Jefferson and Deschutes Counties, Oregon, about eight air miles northwest of the town of Sisters, Oregon, in the Deschutes National Forest.

The Butte rises from 3000 feet elevation at Metolius Springs to 6436 feet, and is just east of the Cascade Mountains in a rain shadow formed by these mountains. Having a very symmetrical shape, well-defined exposure changes can readily be seen, and lying in an area where water becomes a critical factor in the environment, definite breaks can be found in the plant groupings. On Black Butte occur two well-defined, broad zones of vegetation and several smaller plant groupings which repeat themselves both on the Butte and in the surrounding area.

The first reconnaissance trips taken to Black Butte were in July and September of 1959. Actual work was begun in March, 1960, and continued until September, 1960. Collecting and data-gathering trips were taken every two weeks throughout the flowering season, and each trip lasted from two to seven days. Collections of plants and notes of ecological interest were made by collecting around the base of the Butte from various roads which encircle it and along various transects

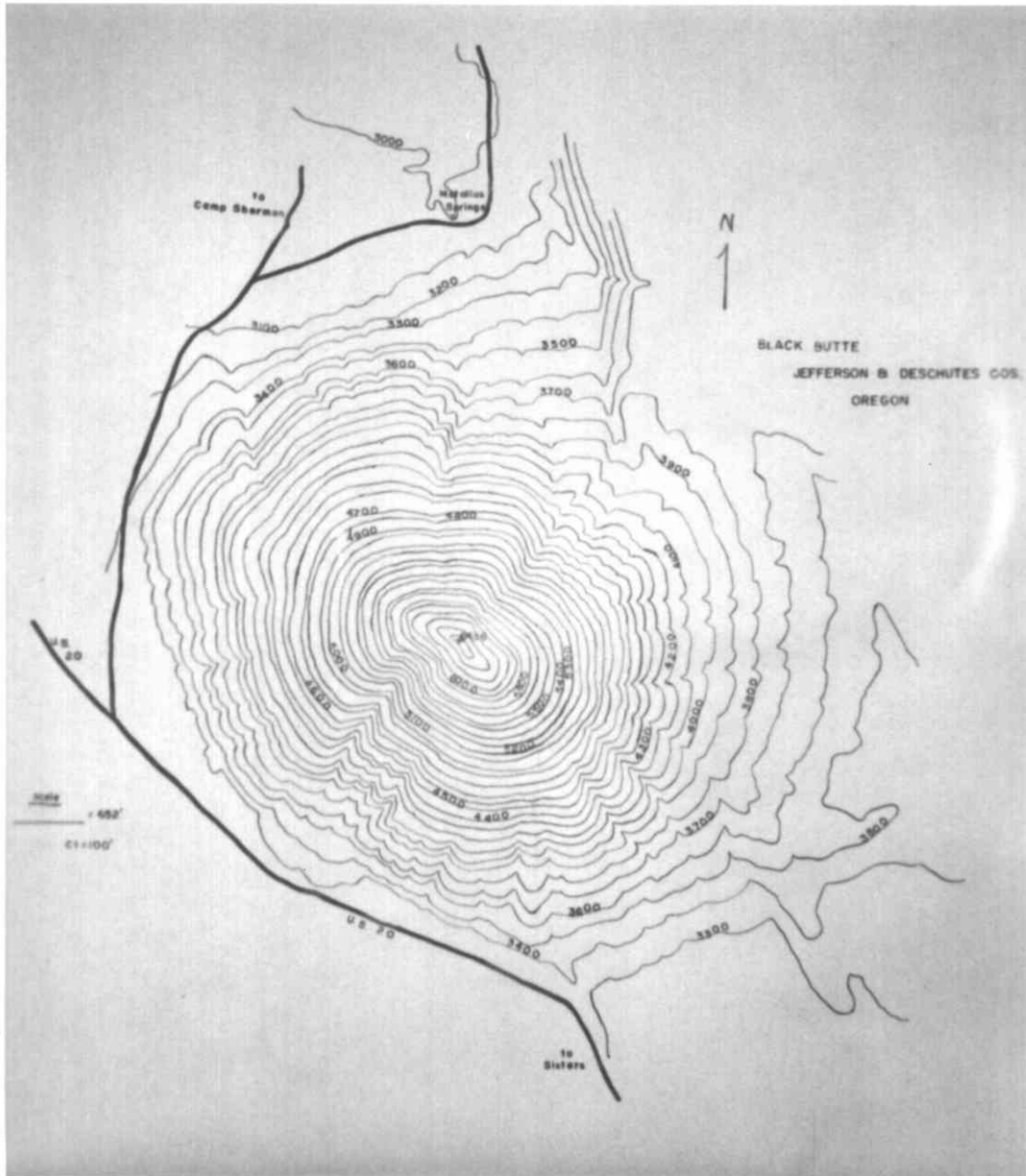
**Plate 1**

**Northwest exposure of Black Butte**



**Plate 2**

**Map of study area taken from an advanced survey  
map of the Three Sisters area.**



which extended from the base to the top of the Butte and down the other side. Each transect was taken at a slightly different directional axis so that by September practically all of the Butte had been covered. Notes as to the occurrence, distribution, condition and relative numbers of plants were taken along with information as to the habitat, associated species, soil, elevation, exposure, location and date which was recorded and kept with each specimen collected. In this way it was possible to collect plants in various stages of development at different elevation levels from the top of the Butte to the bottom and from several exposures. Likewise it was possible to note changes in the structure of different plant communities with changes in elevation and exposure.

The plant specimens collected in this study are on file as vouchers in the Oregon State College Herbarium.

#### DESCRIPTION OF AREA

##### Geology and Soils

Black Butte is one of two craterless cones located just east of the crest of the Cascade Mountains (the other cone is Odell Butte) which are considered by geologists to be formed of recent pyroxene andesites. Black Butte measures about four miles across at its base and is composed of pale gray, olivine-bearing basaltic andesite lavas. The conduit for this volcano is thought to be a north-south fault that passes through Metolius Springs and along the upper part of the Metolius River Canyon.

The soils found on Black Butte are quite uniform, of recent volcanic origin, and for the most part would be classified as regosols. Most of the soil is well drained due to its sandy texture. The soil mantle on the Butte is shallow on the ridges but considerably deeper in the bottoms of the ravines. On the southwest and south slopes near the summit large stones occur in the soil, some of them eight or ten inches in diameter. Also, on these slopes and around the summit more pumice seems to be present in the soil. At the southwest base of the Butte is a low-lying drainage area which often has water standing on it during the early spring. This soil is darker and contains a greater amount of organic matter than any other area on the Butte.

#### Climate

Black Butte lies east of the Cascade Mountains and in a rain shadow formed by these mountains (Plate 3). Since no precipitation or temperature records have been kept on Black Butte, no specific statements can be made as to average precipitation or temperature. Records have been kept at Sisters, Oregon, (Table 1) which is only eight miles away. Care, however, must be taken in drawing any conclusions from these data since local conditions can vary greatly, but it can safely be said that the Butte lies in an area of rather extreme temperature ranges, with lows of 0° F. and below and highs of 90° F. and higher not uncommon. Precipitation on Black Butte occurs mostly as snow and averages between 16 and 40 inches annually. Two feet of snow remained on the north and northeast slopes in April



**Plate 3****Precipitation isoline map of Oregon**

# Oregon

average annual precipitation in inches

from Climate of Oregon, Yearbook of Ag., 1941, p. 1035

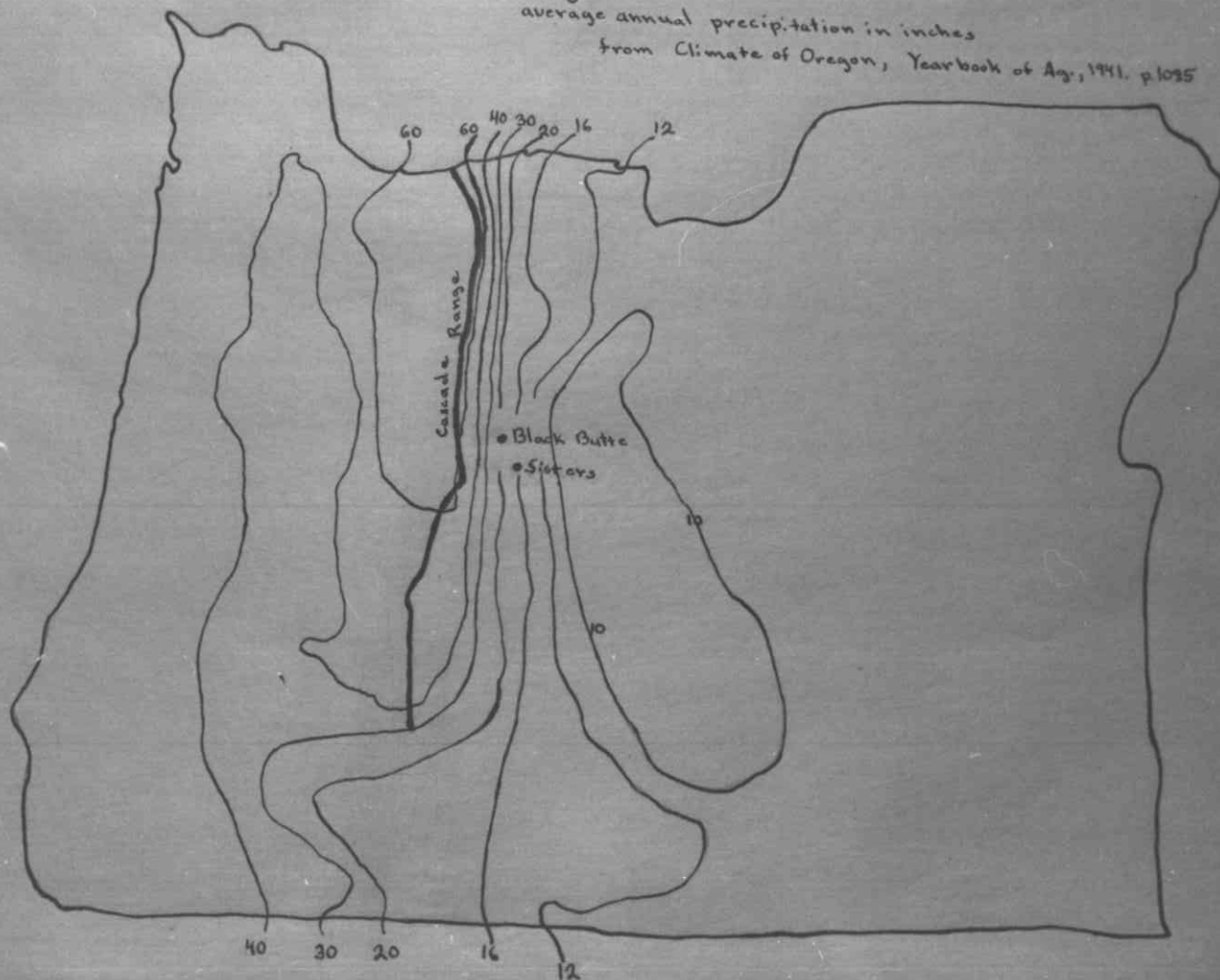


TABLE I CLIMATOLOGICAL DATA FOR SISTERS, OREGON

13 Year Record — 1921-1934

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Ann.
Av. precip. in inches	2.64	1.94	1.16	.85	1.09	.68	.68	.32	.86	1.05	3.24	2.14	16.65
Av. temp.	No available temperature record was kept for this period.												

Recent Records (No recent records were kept until September, 1958.)

Average precipitation in inches

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Ann.
1958									.28	.36	2.99	1.07	
1959	2.57	1.84	.75	.12	.46	.34	.05	.11	.53	.81	.45	.59	8.62
1960	1.55	2.22	3.31	1.02	.54	.02	.05	.17	.19	(not yet recorded)			

Average temperature (°F.)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Ann.	Extremes	
														High	Low
1958									54.4	47.8	38.9	38.0			
1959	33.7	32.8	38.7	43.7	45.8	56.7	63.8	58.8	53.0	47.5	38.4	31.4	45.4	100 7/22	-11 1/4
1960	26.0	31.3	38.8	43.3	46.9	57.3	66.0	59.1	56.0					99 7/18	-12 2/27
														(so far recorded)	

and early May, 1960. At this time the snow was gone from the south and southwest slopes and the ground was nearly dry. Patches of snow were present in the shade of trees on the north and northeast slopes at about the 5700-6400 foot level as late as June 16, 1960. Snowfall was observed on the summit of the Butte as late as May 21, 1960, and as early as August 26, 1960.

#### Historical Factors

A remnant of the Old Santiam Toll Road built in 1865 by Linn County residents for travel from the Willamette Valley to their range lands in central Oregon is located near Black Butte. In connection with this road, a grant of land was received and used to promote a railroad that was to have run from Newport, Oregon, to Boise, Idaho. This railroad was never completed, but had it been it would have run near Black Butte. There is, however, a remnant of the Brooks Scanlon railroad embankment along the southeast base of Black Butte which was used for lumbering as late as 1956.

Since in the past most of central Oregon was used for grazing purposes, it is quite likely that grazing was practiced on and around Black Butte; however, it is now National Forest land and no grazing is currently permitted. The only grazing on the Butte at the present is by deer.

Fire has played an important part in the history of the vegetation of the Butte as old fire scars are seen on almost every large living tree suggesting that ground fires have swept over most of the Butte many times in the past. Several single lightning strikes and

one small fire near the summit in 1947 are recorded in the Forest Service office in Sisters, Oregon, but no extensive fires are on record for the Butte indicating that the fire scars that are seen on the trees were made before the Forest Service began keeping records for the Black Butte area.

A Forest Service lookout was established in 1922 on the summit of Black Butte. The lookout has been manned every fire season since then as a primary lookout because of the vast area which can be observed from it. This station includes a small cabin and a 80 foot tower topped by a glassed in observation house.

In recent years, some selective logging has been carried out around the base of the Butte up to about the 4500 foot level on the northeast, east, south and southeast slopes.

A check of herbarium specimens and records indicates that no one has made any extensive botanical collections before on Black Butte.

#### VEGETATION DESCRIPTION

The vegetation of Black Butte is well divided into two fairly distinct zones: the Montane and the Subalpine. These are very similar to the Montane subalpine formation described by Weaver and Clements (18), but for the purpose of this discussion they will be referred to as zones. Within the two zones appear smaller subdivisions which are similar to those recognized by Daubenmire (5). For this tentative classification, the terminology of Daubenmire will be used;

by his definitions the subdivisions recognized on the Butte are associations and unions. It must be remembered, in considering the zones, associations and unions, that these tend to grade into one another and that in some areas the boundaries between them are well-defined while in others they are indistinct. In general, however, the boundaries between these different groupings on Black Butte are quite well-defined.

The vegetation classification used here is tentative, but it is felt that some type of classification must be used in order that the vegetation on Black Butte may be compared with the vegetation which occurs in the surrounding areas.

#### Montane Zone

This zone is characterized by the dominant tree Pinus ponderosa Dougl. over most of the area; however, in part of the area this species is mixed with the following species: Pinus monticola Dougl., Pinus contorta Dougl., Libocedrus decurrens Torr., Larix occidentalis Nutt., Abies grandis Lindl., Abies concolor Lindl. and Pseudotsuga mansiei (Mirb.) Franco. This broad vegetation zone extends on Black Butte from 3000 feet to about 5600 feet. The upper limit of the zone varies, as might be expected, with the exposure one is considering. On the south, southwest and west exposures it ends between 5600 and 5700 feet, on the north and northeast exposures between 5500 and 5600 feet and on the east and southeast exposures between 5600 and 5800 feet. Within this zone appear several characteristic associations that have been designated as follows:

Pinus / Purshia / Festuca

Pinus / Ceanothus / Pteridium

Pinus / Castanopsis / Arctostaphylos / Ceanothus

Pinus / Bromus / Malva

Pinus / Carex / Calamagrostis

Pseudotsuga / Pachistima / Chimaphila

Pinus / Populus.

Pinus / Purshia / Festuca Association (Plate 4)

This association is characterized by the dominant tree Pinus ponderosa Dougl. and by the understory union of the shrub Purshia tridentata (Pursh) DC. and the grass Festuca idahoensis Elmer.

This union occurs in the more gravely out-wash soils around the base of the Butte from about 3000 feet to about 3500 feet.

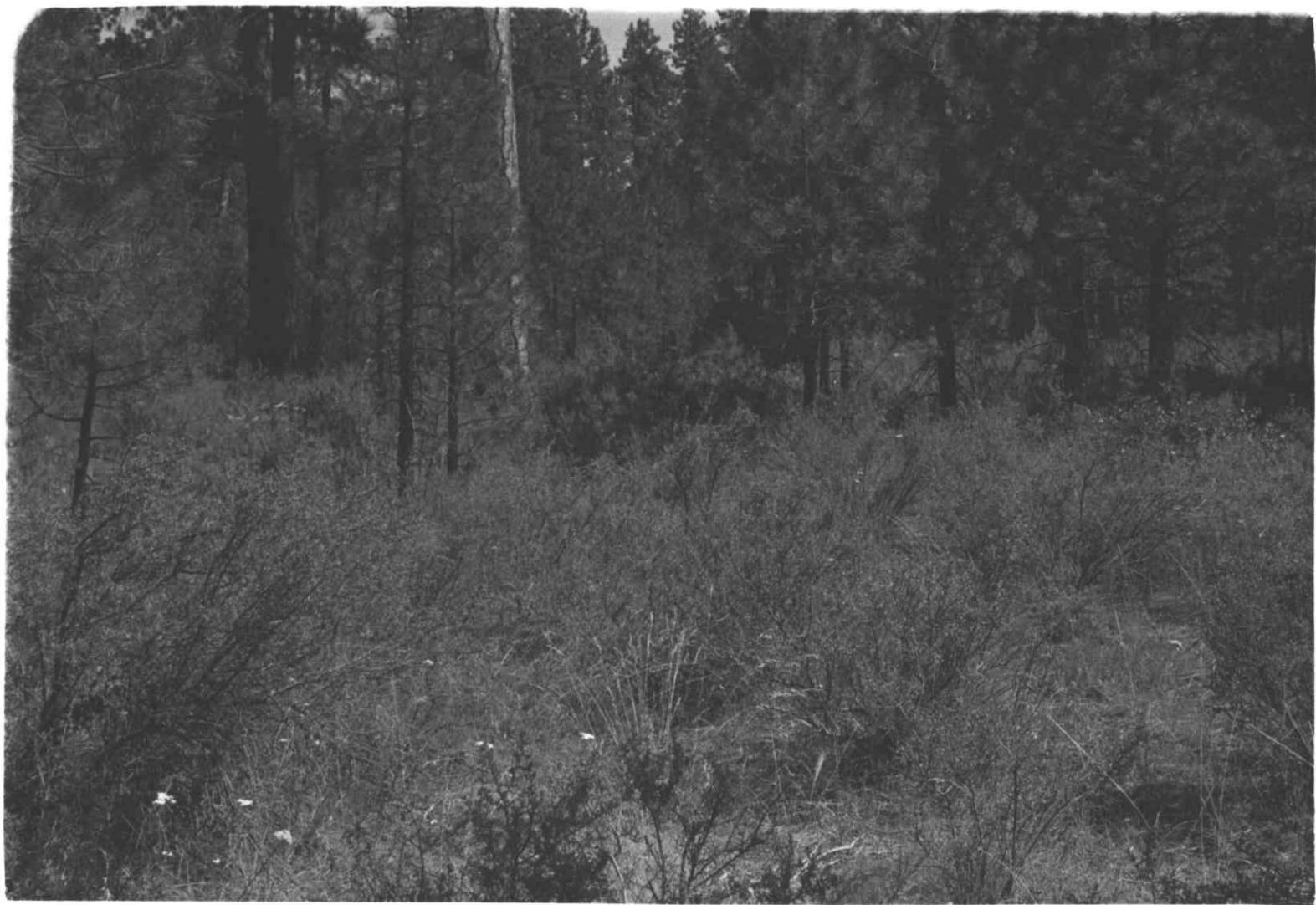
Other species found in the Pinus / Purshia / Festuca Association are as follows:

Achillea millefolium L. var. lanulosa (Nutt.) Piper  
Antennaria rosea Greene  
Bromus breviaristatus Buckl.  
Carex inops Bailey  
Chrysothamnus viscidiflorus (Hook.) Nutt.  
Clarkia rhomboidea Dougl.  
Cryptantha affinis (Gray) Greene  
Epilobium paniculatum Nutt.  
Festuca occidentalis Hook.  
Fragaria virginiana Druch. ssp. platypetala (Rydb.) Staudt  
Gayophytum diffusum Torr. & Gray  
Haplopappus bloomeri Gray  
Horkelia fusca Lindl.  
Lathyrus lanszwertzii Kell. ssp. aridus (Piper) Bradshaw  
Lathyrus nevadensis S. Wats.  
Lupinus caudatus Kell.  
Lupinus lepidus Dougl. ssp. medius Detl.  
Lupinus leucophyllus Dougl.

**Plate 4**

**Pinus / Purshia / Festuca Association found around  
the base of Black Butte from about 3000 to 3500 feet.**





*Machaeranthera shastensis* Gray var. *glossophylla* (Piper)  
 Cronq. & Keck  
*Madia minima* (Gray) Keck  
*Montia perfoliata* (Donn) Howell var. *depressa* (Gray) Jepsen  
*Paeonia brownii* Dougl.  
*Penstemon peckii* Pennell  
*Plagiobothrys hispidus* Gray  
*Polygonum douglasii* Greene  
*Rumex acetosella* L.  
*Sitanion hystrix* (Nutt.) J. G. Smith  
*Stipa elmeri* Piper & Brodie.

Pinus / Ceanothus / Pteridium Association (Plate 5)

This association is characterized by the dominant tree Pinus ponderosa Dougl. and by the union of the shrub Ceanothus velutinus Dougl. and the herb Pteridium aquilinum (L.) Kuhn. var. pubescens Underw.. This union occurs on the slopes and ridges above the Purshia tridentata / Festuca idahoensis union around the Butte from about 3100 to about 4800 feet on the west, east, south and southwest exposures, but only to about 4400-4600 feet on the northwest, north and northeast exposures. The upper limit of this union is not an even line and is interdigitated with other unions.

Other species occurring in the Pinus / Ceanothus / Pteridium Association are as follows:

*Abies grandis* Lindl.  
*Antennaria geyeri* Gray  
*Apocynum pumilum* (Gray) Greene  
*Arctostaphylos patula* Greene  
*Balsamorhiza deltoidea* Nutt.  
*Berberis nervosa* Pursh  
*Berberis repens* Lindl.  
*Bromus carinatus* Hook. & Arn.  
*Bromus orcuttianus* Vasey  
*Calamagrostis rubescens* Buckl.  
*Carex inops* Bailey  
*Castanopsis chrysophylla* (Dougl.) A. DC.  
*Castilleja hispida* Benth.

## Plate 5

Pinus / Ceanothus / Pteridium Association found  
from 3100 to about 4800 feet on the west, east, south  
and southwest exposures and from 3100 to about 4400 to  
4600 feet on the northwest, north and northeast  
exposures.



- Ceanothus prostratus* Benth.  
*Chimaphila umbellata* (L.) Nutt. var. *occidentalis* (Rydb.)  
 Blake  
*Clarkia rhomboidea* Dougl.  
*Collinsia parviflora* Dougl.  
*Comandra pallida* A. DC.  
*Cynoglossum occidentale* Gray  
*Epilobium angustifolium* L.  
*Epilobium paniculatum* Nutt.  
*Fragaria virginiana* Druch. ssp. *platypetala* (Rydb.) Staudt  
*Gayophytum diffusum* Torr. & Gray  
*Haplopappus blocmeri* Gray  
*Hieracium albiflorum* Hook.  
*Hieracium scouleri* Hook.  
*Kelloggia galioides* Torr.  
*Lathyrus lanszwertzii* Kell. ssp. *aridus* (Piper) Bradshaw  
*Lathyrus nevadensis* S. Wats.  
*Larix occidentalis* Nutt.  
*Libocedrus decurrens* Torr.  
*Lilium washingtonianum* Kell.  
*Lithospermum ruderales* Dougl.  
*Lotus douglasii* Greene  
*Lupinus caudatus* Kell.  
*Machaeranthera shastensis* Gray var. *glossophylla* (Piper)  
 Cronq. & Keck  
*Melica aristata* Thurber ex Bolander  
*Microsteris gracilis* (Dougl.) Greene ssp. *humilis* (Greene)  
 V. Grant  
*Mimulus nanus* Hook. & Arn.  
*Montia perfoliata* (Donn) Howell var. *depressa* (Gray) Jepson  
*Orobancha fasciculata* Nutt.  
*Osmorhiza chilensis* Hook. & Arn.  
*Paeonia brownii* Dougl.  
*Penstemon cinereus* Piper  
*Phacelia heterophylla* Pursh  
*Phacelia mutabilis* Greene  
*Poa ampla* Merr.  
*Poa compressa* L.  
*Polygonum douglasii* Greene  
*Prunus demissa* (Nutt.) D. Dietr.  
*Prunus emarginata* (Dougl.) Walp.  
*Pseudotsuga menziesii* (Mirb.) Franco  
*Pterospora andromedea* Nutt.  
*Pyrola dentata* Smith var. *integra* Gray  
*Rubus parviflorus* Nutt.  
*Rubus vitifolius* Cham. & Sch.  
*Rumex acetosella* L.  
*Salix scouleriana* Barratt  
*Sitanion hystrix* (Nutt.) J. G. Smith  
*Smilacina racemosa* (L.) Desf.  
*Stephanomeria lactucina* Gray

*Stipa californica* Merr. & Davy  
*Stipa occidentalis* Thurber  
*Trifolium eriocephalum* Nutt.  
*Vicia americana* Muhl.  
*Viola purpurea* Kell..

Pinus / Castanopsis / Arctostaphylos / Ceanothus Association

This association is characterized by the dominant tree Pinus ponderosa Dougl. and the understory union of the shrubs Castanopsis chrysophylla (Dougl.) A. DC., Arctostaphylos patula Greene and Ceanothus velutinus Dougl.. This union is rather loose and poorly defined on Black Butte. It occurs from about 4400 to 5600 feet on the west, southwest, south, southeast and east exposures and from about 4400 to 5000 feet on the northwest, north and northeast exposures. The three shrub species mentioned are not always found together in the same profusion but seem to alternate with one another depending upon the ecological conditions which prevail. Of these species, Ceanothus velutinus seems to have the widest range and occurs abundantly on all exposures listed within the 4400-5600 foot level. Castanopsis chrysophylla occurs in a more scattered distribution, forming dense thickets in certain areas on the southwest, west and east exposures but being only sparsely scattered on the north exposure and practically absent on the south and southeast exposures. Arctostaphylos patula is wide spread, much like Ceanothus velutinus, but seems to be quite closely related to old fire areas on the Butte (observations concerning this point will be taken up in more detail in the appendix to the vegetation description). It too forms dense

tangles much like Castanopsis chrysophylla but on the south, east and southwest exposures.

Other species which occur in the Pinus / Castanopsis /

Arctostaphylos / Geanothus Association are as follows:

Abies concolor Lindl.  
Abies grandis Lindl.  
Arctostaphylos nevadensis Gray  
Arenaria macrophylla Hook.  
Bromus carinatus Hook. & Arn.  
Bromus orcuttianus Vasey  
Carex inops Bailey  
Clarkia rhomboidea Dougl.  
Collomia grandiflora Dougl.  
Dactylis glomerata L.  
Epilobium paniculatum Nutt.  
Gayophytum diffusum Torr. & Gray  
Larix occidentalis Nutt.  
Lathyrus lanszwertzi Kell. ssp. aridus (Piper) Bradshaw  
Melica aristata Thurber ex Bolander  
Pachistima myrsinites (Pursh) Raf.  
Pinus contorta Dougl. ex Loud.  
Polygonum douglasii Greene  
Pseudotsuga menziesii (Mirb.) Franco  
Pteridium aquilinum (L.) Kuhn. var. pubescens Underw.  
Sitanion hystrix (Nutt.) J. G. Smith  
Symphoricarpos mollis Nutt.  
Viola purpurea Kell..

#### Pinus / Bromus / Melica Association

This association is characterized by the dominant tree Pinus ponderosa Dougl. and by the understory union of the grasses Bromus orcuttianus Vasey and Melica aristata Thurber. This union occurs at about 5000 to 5500 feet on the south and southeast exposures of Black Butte in open, old stands of Pinus ponderosa.

Other species occurring in the Pinus / Bromus / Melica Association are as follows:

Abies concolor Lindl.  
Abies grandis Lindl.

*Achillea millefolium* L. var. *lanulosa* (Nutt.) Piper  
*Agoseris aurantiaca* (Hook.) Greene  
*Bromus carinatus* Hook. & Arn.  
*Ceanothus velutinus* Dougl.  
*Clarkia rhomboidea* Dougl.  
*Cirsium americanum* (Gray) Daniels  
*Corallorhiza maculata* Raf.  
*Delphinium menziesii* DC.  
*Fritillaria atropurpurea* Nutt.  
*Lathyrus lanszwertzi* Kell. ssp. *aridus* (Piper) Bradshaw  
*Lithospermum ruderales* Dougl.  
*Osmorhiza chilensis* Hook. & Arn.  
*Prunus emarginata* (Dougl.) Walp.  
*Pteridium aquilinum* (L.) Kuhn. var. *pubescens* Underw.  
*Pterospora andromedea* Nutt.  
*Sitanion hystrix* (Nutt.) J. G. Smith  
*Stipa californica* Merr. & Davy  
*Stipa occidentalis* Thurber  
*Symphoricarpos mollis* Nutt..

Pinus / Carex / Calamagrostis Association (Plate 6)

This association is characterized by the dominant tree Pinus ponderosa Dougl. and by the understory union of the sedge Carex incens Bailey and the grass Calamagrostis rubescens Buckl.. This union occurs over a fairly large area on the west exposure and again in smaller scattered patches on the north, northeast and east exposures of the Butte from about 5000 to 5500 feet. It occurs, much like the Bromus / Melica union, in old, relatively open stands of Pinus ponderosa.

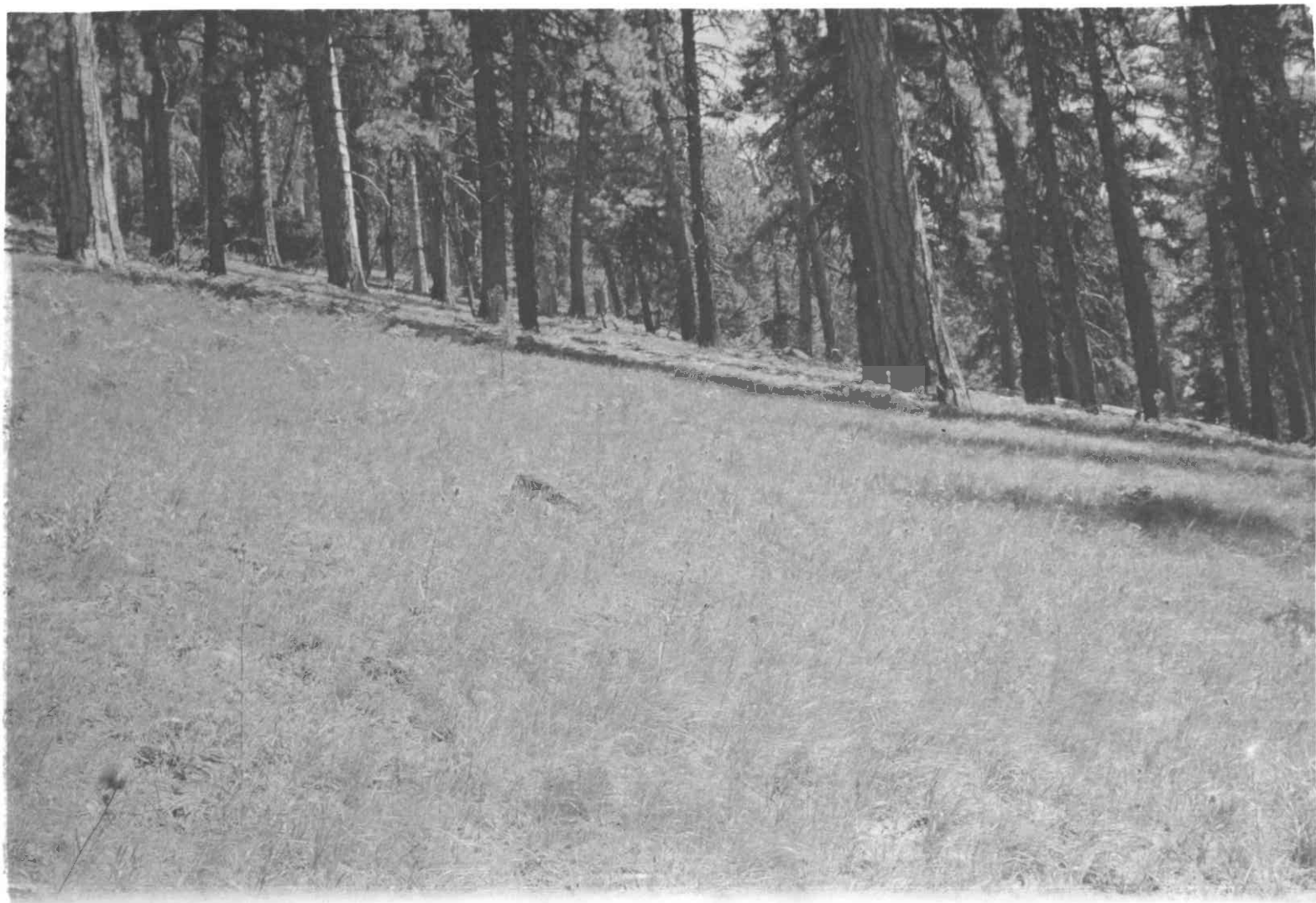
Other species which occur in the Pinus / Carex / Calamagrostis Association are as follows:

*Abies grandis* Lindl.  
*Agoseris aurantiaca* (Hook.) Greene  
*Agoseris glauca* (Pursh) Raf. var. *monticola* (Greene)  
 Q. Jones ex Cronq.  
*Agoseris retrorsa* (Bentham) Greene  
*Aquilegia formosa* Fischer  
*Arctostaphylos patula* Greene



**Plate 6**

**Pinus / Carex / Calamagrostis Association found  
from about 5000 to 5500 feet on the west, north, northeast  
and east exposures of Black Butte.**



*Bromus carinatus* Hook. & Arn.  
*Bromus oreuttianus* Vasey  
*Castanopsis chrysophylla* (Dougl.) A. DC.  
*Ceanothus velutinus* Dougl.  
*Cirsium americanum* (Gray) Daniels  
*Delphinium menziesii* DC.  
*Elymus glaucus* Buckl.  
*Fritillaria atropurpurea* Nutt.  
*Fragaria virginiana* Druch. ssp. *platypetala* (Rydb.) Staudt  
*Hackelia californica* I. M. Johnston  
*Hieracium albiflorum* Hook.  
*Hieracium scouleri* Hook.  
*Ipomopsis aggregata* (Pursh) V. Grant  
*Lathyrus lanszwertzi* Kell. ssp. *aridus* (Piper) Bradshaw  
*Lithospermum ruderales* Dougl.  
*Melica aristata* Thurber ex Bolander  
*Osmorhiza chilensis* Hook. & Arn.  
*Penstemon euglaucus* English  
*Pseudotsuga menziesii* (Mirb.) Franco  
*Pteridium aquilinum* (L.) Kuhn. var. *pubescens* Underw.  
*Stipa californica* Merr. & Davy  
*Symphoricarpos mollis* Nutt.  
*Vicia americana* Muhl..

*Pseudotsuga* / *Pachistima* / *Chimaphila* Association

This association is characterized by the dominant tree

*Pseudotsuga menziesii* (Mirb.) Franco; however, this species is often heavily mixed with *Abies grandis* Lindl. and *Pinus ponderosa* Dougl. as well as some *Larix occidentalis* Nutt.. The understory union of this association is composed of the low shrub *Pachistima nuttallii* (Pursh) Raf. and the herb or subshrub *Chimaphila umbellata* (L.) Nutt. var. *occidentalis* (Rydb.) Blake. This union occurs on the north and northeast exposures from about 5000 to 5600 feet.

Other species which occur in the *Pseudotsuga* / *Pachistima* / *Chimaphila* Association are as follows:

*Arctostaphylos nevadensis* Gray  
*Arenaria macrophylla* Hook.  
*Arnica latifolia* Bong.

*Calamagrostis rubescens* Buckl.  
*Carex inops* Bailey  
*Chimaphila menziesii* (R. Brown) Spreng.  
*Goodyera oblongifolia* Raf.  
*Habenaria elegans* (Lindl.) Bolander  
*Penstemon nemorosus* (Dougl.) Trautv.  
*Pinus contorta* Dougl. ex Loud.  
*Pinus monticola* Dougl.  
*Pyrola aphylla* Smith  
*Pyrola chlorantha* Sw.  
*Pyrola picta* Smith  
*Pyrola secunda* L..

### Pinus / Populus Association

This association is characterized by two trees, *Pinus contorta* Dougl. and *Populus tremuloides* Michx.. No attempt has been made to derive unions from the complex understory. This association is found in a low-lying drainage area at the southwest base of Black Butte. During the early spring the area is filled either with standing or running water but is dry during the fall. In this association occur many understory species the majority of which are as follows:

*Abies grandis* Lindl.  
*Adenocaulon bicolor* Hook.  
*Agrostis diegeonsis* Vasey  
*Alnus rhombifolia* Nutt.  
*Amelanchier florida* Lindl.  
*Anaphalis margaritacea* (L.) Benth. & Hook.  
*Anemone lyallii* Britton  
*Antennaria howellii* Greene  
*Antennaria rosea* Greene  
*Aquilegia formosa* Fischer  
*Arctostaphylos nevadensis* Gray  
*Arctostaphylos uva-ursi* (L.) Spreng.  
*Aster adscendens* Lindl.  
*Aster occidentalis* (Nutt.) Torr. & Gray  
*Botrychium silaifolium* Presl  
*Campanula scouleri* Hook.  
*Cardamine pennsylvanica* Muhl.  
*Carex athrostachya* Olney  
*Carex microptera* Mack.  
*Carex preslii* Steudel

*Carex rostrata* Stokes  
*Castilleja miniata* Dougl.  
*Circaea pacifica* Aschers & Magnus  
*Deschampsia danthonioides* (Trin.) Munro ex Benth  
*Elymus glaucus* Buckl.  
*Epilobium brevistylum* Barbey  
*Equisetum hyemale* L. var. *elatum* (Engelm.) Morton  
*Galium aparine* L.  
*Galium boreale* L.  
*Galium oreganum* Britton  
*Galium triflorum* Michx.  
*Holodiscus discolor* (Pursh) Maxim.  
*Hordeum brachyantherum* Nevski  
*Hypericum scouleri* Hook.  
*Juncus balticus* Willd.  
*Juncus ensifolius* Wiks.  
*Juncus orthophyllus* Coville  
*Linnaea borealis* L. var. *longiflora* Torr.  
*Lonicera ciliosa* (Pursh) Poir.  
*Lonicera involucrata* Banks  
*Lotus crassifolius* (Benth) Greene  
*Lupinus polyphyllus* Lindl.  
*Luzula campestris* (L.) DC.  
*Mentha arvensis* L.  
*Mimulus guttatus* [Fischer] DC.  
*Montia linearis* (Dougl.) Greene  
*Montia sibirica* (L.) Howell  
*Osmorhiza chilensis* Hook. & Arn.  
*Poa palustris* L.  
*Polemonium occidentale* Greene  
*Populus trichocarpa* Torr. & Gray  
*Potentilla glandulosa* Lindl.  
*Potentilla gracilis* Dougl.  
*Prunella vulgaris* L.  
*Pyrola asarifolia* var. *incarnata* (DC.) Fernald  
*Pyrola chlorantha* Sw.  
*Pyrola secunda* L.  
*Ranunculus macounii* Britton  
*Ranunculus occidentalis* Nutt.  
*Ribes inerme* Rydb.  
*Rosa gymnocarpa* Nutt.  
*Rumex crispus* L.  
*Salix geyeriana* Anderson  
*Salix lemmonii* Bebb  
*Scirpus microcarpus* Presl  
*Scutellaria galericulata* L.  
*Senecio pseud aureus* Rydb.  
*Silene menziesii* Hook.  
*Sitanion hansenii* (Scribn.) J. G. Smith  
*Sisyrinchium idahoense* Brickn.  
*Smilacina sessilifolia* (Baker) Nutt.

*Spiraea douglasii* Hook.  
*Stellaria borealis* Bigelow  
*Taraxacum officinale* Weber  
*Trisetum canescens* Buckl.  
*Vaccinium caespitosum* Michx.  
*Veronica scutellata* L.  
*Veronica serpyllifolia* L.  
*Viola cascadiensis* M. S. Baker  
*Viola glabella* Nutt..

### Subalpine Zone

This zone is characterized by two dominant tree species, *Abies lasiocarpa* (Hook.) Nutt. and *Pinus albicaulis* Engelm.. These two species are separated within this zone by exposure differences. *Pinus albicaulis* is the dominant species on the drier southwest, west and northwest exposures (Plate 7). *Abies lasiocarpa* is the dominant species on the moister north, northeast, east and southeast exposures (Plate 8). This zone extends from about 5600 feet to the summit at 6436 feet. Within this zone occur three associations as follows:

*Amelanchier* / *Ribes*

*Ceanothus* / *Arctostaphylos*

*Festuca*.

### *Amelanchier* / *Ribes* Association

This association occurs over a rather open area from about 5600 feet to 6300 feet on the west, southwest and south slopes of the Butte and is characterized by the two shrubs *Amelanchier florida* Lindl. and *Ribes cereum* Dougl.. For the most part this association occurs without an overstory, but at times becomes the understory of *Pinus albicaulis* and thus becomes a union and forms the *Pinus* / *Amelanchier* / *Ribes* Association.

Plate 7

A stand of Pinus albicaulis just below the summit  
on the west exposure of Black Butte.





Plate 8

A stand of Abies lasiocarpa just below the summit  
on the east exposure of Black Butte.



Also within this association occurs a rather unique situation in a small area on the west exposure where Populus tremuloides occurs as a scattered stand of stunted shrub-like trees.

Other species which occur in the Amelanchier / Ribes Association are as follows:

*Aquilegia formosa* Fischer  
*Arabis holboellii* Hornem. var. *secunda* (Howell) Jepson  
*Chamaesaracha nana* Gray  
*Cirsium americanum* (Gray) Daniels  
*Collomia grandiflora* Dougl.  
*Delphinium menziesii* DC.  
*Hackelia californica* I. M. Johnston  
*Haplopappus bloomeri* Gray  
*Hydrophyllum capitatum* Dougl.  
*Ipomopsis aggregata* (Pursh) V. Grant  
*Linum lewisii* Pursh  
*Lomatium dissectum* (Nutt.) Math. & Const. var. *multifidum* (Nutt.) Math. & Const.  
*Lupinus caudatus* Kell.  
*Machaeranthera shastensis* Gray var. *glossophylla* (Piper) Cronq. & Keck  
*Penstemon euglaucus* English  
*Penstemon speciosus* Dougl.  
*Phacelia mutabilis* Greene  
*Prunus emarginata* (Dougl.) Walp.  
*Pteryxia terebinthina* (Hook.) Coult. & Rose  
*Rhamnus purshiana* DC.  
*Smilacina sessilifolia* (Baker) Nutt.  
*Symphoricarpos vaccinoides* Rydb.  
*Vicia americana* Muhl..

#### Ceanothus / Arctostaphylos Association

This association occurs over a large open area on the southwest, south, east and northeast exposures of the Butte from about 5600 feet to 6300 feet. The association is characterized by the two shrubs Ceanothus velutinus Dougl. and Arctostaphylos patula Greene. On the southwest and south exposures it occurs without an overstory, but on the east and northeast exposures it moves in under the Abies

lasiocarpa and becomes a union forming the Abies / Ceanothus / Arctostaphylos Association. On the south and southwest exposures the two shrubs are mixed, possibly with Ceanothus velutinus slightly dominant, but on the east and northeast exposures the shrubs are practically all Arctostaphylos patula. However, fire has seemingly affected the distribution of this species; this is considered in more detail in the appendix to the vegetation description.

Other species which occur in the Ceanothus / Arctostaphylos Association are as follows:

Arctostaphylos nevadensis Gray  
 Arnica cordifolia Hook.  
 Bromus carinatus Hook. & Arn.  
 Carex inops Bailey  
 Chamaesaracha nana Gray  
 Cirsium americanum (Gray) Daniels  
 Collomia grandiflora Dougl.  
 Elymus glaucus Buckl.  
 Hackelia californica I. M. Johnston  
 Holodiscus glabrescens (Greene) Heller  
 Lathyrus lanszwertzi Kell. ssp. aridus (Piper) Bradshaw  
 Linum lewisii Pursh  
 Lomatium dissectum (Nutt.) Math. & Const. var. multifidum  
 (Nutt.) Math. & Const.  
 Lomatium martindalei Coult. & Rose  
 Lomatium triternatum (Hook.) Coult. & Rose  
 Montia perfoliata (Donn) Howell var. depressa (Gray) Jepson  
 Penstemon euglaucus English  
 Penstemon speciosus Dougl.  
 Phacelia heterophylla Pursh  
 Phacelia mutabilis Greene  
 Pteryxia terebinthina (Hook.) Coult. & Rose  
 Sitanion hansenii (Scribn.) J. G. Smith  
 Sitanion hystrix (Nutt.) J. G. Smith  
 Stipa californica Merr. & Davy  
 Vaccinium scoparium Leiberg  
 Viola purpurea Kell..

### Festuca Association

This association occurs on the south, southwest and west

exposures and just over the summit on the north and northeast exposures from about 5700 feet to 6400 feet. It is characterized by a dense stand of the fescues Festuca ovina L., Festuca idahoensis Elmer and Festuca viridula Vasey. For the most part it occurs without an overstory but in some places grades into the other associations mentioned in the Subalpine Zone.

Other species which occur in the Festuca Association are as follows:

Achillea millefolium L. var. lanulosa (Nutt.) Piper  
 Agropyron spicatum (Pursh) Scribn. & Sm.  
 Arabis holboellii Hornem. var. secunda (Howell) Jepsen  
 Arabis platysperma Gray  
 → Balsamorhiza deltoidea Nutt. ←  
 Bromus carinatus Hook. & Arn.  
 Bromus tectorum L.  
 Cirsium americanum (Gray) Daniels  
 Collinsia parviflora Dougl.  
 Crepis acuminata Nutt.  
 Delphinium menziesii DC.  
 Eriogonum compositum Dougl.  
 Eriogonum proliferum Torr. & Gray  
 Eriogonum umbellatum Torr.  
 Eriophyllum lanatum (Pursh) Forbes  
 Haplopappus bloomeri Gray  
 Ipomopsis aggregata (Pursh) V. Grant  
 Linum lewisii Pursh  
 Lithophragma bulbifera Rydb.  
 Lupinus caudatus Kell.  
 Microsteris gracilis (Dougl.) Greene ssp. humilis  
 (Greene) V. Grant  
 Poa alpina L.  
 Pteryxia terebinthina (Hook.) Coult. & Rose  
 Purshia tridentata (Pursh) DC.  
 Senecio canus Hook.  
 Sitanion hystrix (Nutt.) J. G. Smith  
 Stipa californica Merr. & Davy  
 Stipa occidentalis Thurber  
 Taraxacum laevigatum (Willd.) DC..

## Appendix to Vegetation Description

Two rather interesting phenomena in the vegetation seemingly quite closely connected with fire have been noted on Black Butte. The first concerns the presence of fire on various areas of the Butte; the second is related to the absence of fire on other areas.

The relationship between old burns and the distribution of Arctostaphylos patula Greene has already been mentioned. This shrub seems especially influenced by fire and a successional pattern is evident. The species invades areas following a fire that is severe enough to destroy most of the vegetation. Perhaps it can do this because, as some workers have proposed, heat actually helps the germination of its seed, while the seeds of many other species are destroyed by fire. Eventually dense, tangled stands develop in the region covered by the fire (Plate 9). Tree species then gradually move in and the Arctostaphylos dies out (Plate 10) when they become large enough or form dense enough stands to shade the area. Factors other than shade may also be involved, but no evidence as to what these are can be seen as yet. This apparent successional pattern is seen on two quite different sites on Black Butte. It occurs on the north and northeast exposures of the Butte in the Subalpine Zone under Abies lasiocarpa (Hook.) Nutt. and on the south exposure in the Montane Zone under Pinus ponderosa Dougl.. Burned logs, charcoal and deep fire scars on the old living trees of both areas give evidence of rather severe fires at some time in the past. Also, in both exposures there has been a dense reproduction of the respective tree species and a consequent loss of the Arctostaphylos patula. Within

## Plate 9

A dense Arctostaphylos patula thicket formed in a burned area on the southwest exposure of Black Butte.

## Plate 10

Dead Arctostaphylos patula under new growth of Abies lasiocarpa on the northeast exposure of Black Butte.





these same areas, where the trees have not become large or dense as yet, the Arctostaphylos patula is still alive and healthy. Evidence then points to the fact that although Arctostaphylos patula is widespread on the Butte its extensive distribution may be due to fire and the ecological niche of this species may be the rocky ridges and sheltered, sparsely timbered areas of Black Butte. However, this problem needs more careful study before a valid conclusion can be drawn.

The effects of the absence of fire are also visible on Black Butte. Since the organization of the Forest Service and the prevention and control of fires in the area changes in the ponderosa pine forest have been noted (Weaver, 17). One such change is the development of an understory growth of Douglas fir, Pseudotsuga menziesii (Mirb.) Franco, and grand fir, Abies grandis Lindl. (Plates 11 and 12). In the past, since fires occasionally swept through the area, this understory of grand fir and Douglas fir was usually killed and the ponderosa pine persisted because of its thicker bark and greater resistance to fire. Today, however, with the exclusion of fire, the Douglas fir and grand fir are able to grow, and because they are more shade tolerant than ponderosa pine they tend to shade out the ponderosa pine seedlings. As a result of this competition they may, in time, become the predominant species in these areas.

## Plate 11

A dense understory growth of Abies grandis and  
Pseudotsuga menziesii on the north exposure of Black Butte.

## Plate 12

A sparsely scattered growth of Abies grandis and  
Pseudotsuga menziesii on the northeast exposure of Black  
Butte.



## SYSTEMATIC TREATMENT OF THE VASCULAR FLORA

The treatment of the flora of Black Butte includes artificial keys to and descriptions of the 49 families, 156 genera and 253 species found on the Butte. Since this treatment is restricted to the relatively small area of Black Butte, it is of limited use.

Texts of particular help in this study were as follows:

Peck, Morton E. A manual of the higher plants of Oregon.  
Portland, Oregon, Binfords and Mort, 1941. 866 p.

Abrams, Leroy. Illustrated flora of the Pacific States.  
Stanford University, California, Stanford University  
Press, 1940-1959. 4 vols.

## KEY TO THE FAMILIES

- 1. Plants reproducing by spores.....Division I. PTERIDOPHYTA
- 1'. Plants reproducing by seeds.....Division II. SPERMATOPHYTA

## Division I. PTERIDOPHYTA

- 2. Plants with cylindrical, jointed stems; leaves minute, forming sheaths; spores borne in a terminal strobilus.....  
.....3. EQUISETACEAE
- 2'. Plants lacking cylindrical, jointed stems; producing large, compound leaves termed fronds; spores borne on a spike-like, often branched structure or on the underside of the fronds.
  - 3. Spores borne on the underside of the fronds.....  
.....2. POLYPODIACEAE
  - 3'. Spores borne on an often branched, spike-like structure...  
.....1. OPHIOGLOSSACEAE

## Division II. SPERMATOPHYTA

- 4. Seeds naked, usually borne on the scales of woody or berry-like cones; leaves either linear and needle-like or reduced and scale-like.....Class I. GYMNOSPERMAE
- 4'. Seeds not naked, enclosed in carpels which form an ovary...  
.....Class II. ANGIOSPERMAE

## Class I. GYMNOSPERMAE

- 5. Leaves usually scale-like; reproductive structures small, woody

cones lacking bracts, or berry-like...5. CUPRESSACEAE

- 5'. Leaves linear, needle-like; cones large, woody; each scale subtended by a bract.....4. PINACEAE

## Class II. ANGIOSPERMAE

6. Seed leaves only 1; leaves generally parallel-veined; perianth parts usually in multiples of 3....Subclass MONOCOTYLEDONEAE
- 6'. Seed leaves 2; leaves generally netted-veined; perianth parts usually in 5's or 4's.....Subclass DICOTYLEDONEAE

### Subclass MONOCOTYLEDONEAE

7. Plants lacking a showy perianth, the perianth parts often dull colored, scarious and reduced in number.
8. Leaves 2-ranked, a membranous structure (the ligule) at the juncture of sheath and blade; perianth parts reduced to 2 bract-like structures which surround the ovary; culm or stem hollow, with solid, distinct nodes; fruit a caryopsis.....6. GRAMINEAE
- 8'. Leaves 3-ranked, usually lacking a ligule; perianth of 6 perianth parts or (as in Cyperaceae) the ovary surrounded by a bract (the perigynium) or by bristles; culm or stem without distinct nodes; fruit an achene or a capsule.
9. Fruit an achene surrounded by a perigynium or bristles; stem often triangular.....7. CYPERACEAE
- 9'. Fruit a capsule; perianth parts 6; stem round or slightly flattened.....8. JUNCACEAE
- 7'. Plants with a brightly colored perianth, 6-parted.

10. Perianth segments not differentiated into 2 series (calyx and corolla), all segments appearing much alike.

11. Flowers subtended by 2 bract-like structures; ovary inferior; perianth blue.....10. IRIDACEAE

11'. Flowers not subtended by 2 bract-like structures; ovary superior.....9. LILIACEAE

10'. Perianth segments differentiated into calyx and corolla; middle segment of corolla spurred or modified in some way.....11. ORCHIDACEAE

#### Subclass DICOTYLEDONEAE

12. Plants with reduced flower parts; flowers (or at least the male flowers) arranged in catkins; trees or shrubs.

13. Fruit a capsule; seeds small, comose; staminate and pistillate flowers on separate plants, each flower in the catkins subtended by bracts and a cup-like disk or gland.....12. SALICACEAE

13'. Fruit a nut or short winged samara; staminate and pistillate catkins on the same plant.

14. Fruit a nut subtended and surrounded by a spiny involucre.....14. FAGACEAE

14'. Fruit a narrow winged nutlet (samara) borne in a cone-like pistillate catkin....13. BETULACEAE

12'. Plants without reduced flower parts or, if reduced, the flowers not borne in catkins.

15. Petals lacking.

16. Leaves reduced to scales.....16. LORANTHACEAE
- 16'. Foliage leaves present.
17. Fruit a drupe; stamens 5.....15. SANTALACEAE
- 17'. Fruit an achene or a capsule, stamens often 6 or more, but sometimes 5.
18. Fruit a capsule.....23. SAXIFRAGACEAE  
(Heuchera)
- 18'. Fruit an achene.
19. Leaves narrowly linear or compound and divided; fruit a sharp--pointed, smooth, rounded achene.....20. RANUNCULACEAE  
(Myosurus and Anemone)
- 19'. Leaves simple, lanceolate, hastate or ovate to orbicular; stems swollen at the nodes and the nodes usually surrounded by a papery sheath; fruit a winged or smooth, angled achene.....17. POLYGONACEAE
- 15'. Petals present.
20. The petals separate.
21. Trees or shrubs.
22. Leaves palmately veined and lobed, not compound.
23. Leaves alternate.
24. Fruit a true berry; ovary inferior....  
.....24. RIBESACEAE



- 24'. Fruit an aggregate of drupelets; ovary  
superior.....25. ROSACEAE  
(Rubus parviflorus)
- 23'. Leaves opposite.....28. ACERACEAE
- 22'. Leaves pinnately veined, or if palmately veined,  
the margins entire or the leaves compound.
25. Petals concave giving them a dipper-like  
appearance, blue, white or greenish....  
.....30. RHAMNACEAE
- 25'. Petals flat, yellow, pink, rose, red or white.
26. Leaves opposite, simple; petals red.....  
.....29. CELASTRACEAE
- 26'. Leaves alternate.
27. Margins of leaves dentate, with teeth  
ending in spiny projections; petals  
yellow.....21. BERBERIDACEAE
- 27'. Margins of leaves, if dentate, with teeth  
not ending in spiny projections.....  
.....25. ROSACEAE  
(in part)
- 21'. Herbs.
28. Flowers irregular.
29. Stamens 10; leaves pinnately or palmately  
compound; fruit a legume.....  
.....26. LEGUMINOSAE
- 29'. Stamens 5; leaves simple; fruit a 3-valved  
capsule.....32. VIOLACEAE

28'. Flowers regular.

30. Stamens 10 or more.

31. Anthers opening by pores.....

.....36. PYROLACEAE  
(Pyrola and Chimaphila)

31'. Anthers not opening by pores.

32. Leaves opposite.....31. HYPERICACEAE

32'. Leaves alternate, basal or whorled.

33. Plants with bulblets in the leaf  
axils.....26. SAXIFRAGACEAE

33'. Plants without bulblets in the leaf  
axils.

34. Stamens borne on a floral tube, not  
spirally arranged; petals  
always 5, not spurred; calyx  
lobes not leathery.

35. Style 1.....25. ROSACEAE  
(in part)

35'. Styles 2-5, mostly 3.....

.....19. CARYOPHYLLACEAE

34'. Stamens borne on the receptacle,  
spirally arranged; petal number  
variable from 2-10, if 5 then  
spurred, or the calyx lobes  
leathery..20. RANUNCULACEAE

30'. Stamens fewer than 10.

36. Inflorescence a true umbel; fruit a  
schizocarp.....34. UMBELLIFERAE
- 36'. Inflorescence not an umbel, or if umbel-like,  
fruit not a schizocarp.
37. Sepals 2, 4 or 6.
38. Petals 5; sepals 2.....  
.....18. PORTULACEAE
- 38'. Petals 2 or 4; sepals 2, 4 or 6.
39. Ovary inferior; stamens 2 or 8....  
.....33. ONAGRACEAE
- 39'. Ovary superior; stamens 6.....  
.....22. CRUCIFERAE
- 37'. Sepals 5; petals 5...27. LINACEAE
- 20'. The petals united at least below.
40. Flowers on a common, flattened receptacle-like base,  
subtended by involucre bracts, forming a composite  
head.....49. COMPOSITAE
- 40'. Flowers singly arranged, not on a common, receptacle-  
like base.
41. Plants saprophytic, lacking chlorophyll.
42. Corolla regular.....36. PYROLACEAE  
(Pterospora)
- 42'. Corolla irregular.....44. OROBANCHACEAE
- 41'. Plants not saprophytic, or if so, possessing  
green leaves.
43. Corolla irregular.

44. Stems 4-angled; fruit 4 nutlets.....  
 .....41. LABIATAE
- 44'. Stems round or ridged (not 4-angled); fruit  
 a capsule, berry or drupe.
45. Ovary superior; fruit a capsule...  
 .....43. SCROPHULARIACEAE
- 45'. Ovary inferior; fruit a berry or drupe...  
 .....47. CAPRIFOLIACEAE
- 43'. Corolla regular.
46. Ovary inferior.
47. Leaves alternate.
48. Low shrubs; corolla urn-shaped...  
 .....35. ERICACEAE  
   (Vaccinium)
- 48'. Low herbs; corolla campanulate....  
 .....48. CAMPANULACEAE
- 47'. Leaves opposite or whorled.
49. Shrubs or evergreen herbs; fruit a berry  
 or drupe.....47. CAPRIFOLIACEAE
- 49'. Annual or perennial non-evergreen  
 herbs; fruit 2 dry nutlets....  
 .....46. RUBIACEAE
- 46'. Ovary superior.
50. Leaves with apparent parallel-veination;  
 inflorescence borne on a wiry  
 scape.....45. PLANTAGINACEAE

50'. Leaves with netted-veination; inflorescence  
not borne on a scape.

51. Shrubs.....35. ERICACEAE

51'. Herbs.

52. Leaves opposite.

53. Perennial herbs with milky sap;  
seed cmose.....

.....37. APOCYNACEAE

53'. Annual herbs; sap clear; seeds  
not cmose.....

.....38. POLEMONIACEAE  
(Microsteris)

52'. Leaves alternate or sometimes the  
very basal ones opposite.

54. Inflorescence a scorpioid raceme;  
if a capitate cluster, then  
non-glandular and the leaves  
divided.

55. Style 2-parted; fruit a  
capsule; leaves divided..

....39. HYDROPHYLLACEAE

55'. Style entire; fruit 4 nutlets;  
leaves entire.....

....40. BORAGINACEAE

54'. Inflorescence not a scorpioid  
raceme; if a capitate  
cluster, then glandular  
pubescent and the leaves  
entire.

56. Style entire.....

....42. SOLANACEAE

56'. Style 3-parted.....

....38. POLEMONIACEAE

## 1. OPHIOGLOSSACEAE (Adder's-tongue Family)

Spore-bearing herbs arising from rhizomes and fibrous roots; plants dimorphic; stem reduced to a rhizome; leaves 1-several, simple or compound; sporangia borne on a stalk, either a spike-like raceme or a panicle.

### Botrychium Swartz

Herbs arising from short rootstocks; plants stemless; roots fibrous; leaves pinnately compound; spores borne on short, racemose or pinnately arranged branches; sporangia borne in 2 rows.

#### 1. Botrychium silaifolium Presl      Leathery Grape-fern

Herbs arising from short rootstocks; roots fibrous, thick, fleshy; leaves (fronds) 1 or 2, up to 50 cm. long, triangular in outline, pinnately compound, next year's bud very hairy; spore-bearing frond diffusely branched; spores numerous.

## 2. POLYPODIACEAE (Fern Family)

Ferns, evergreen or dying down each fall, producing fronds; sporangia borne usually in sori; sori mostly dorsal or marginal, naked or more often indusiated; dehiscence of sporangia transverse.

Fronds several pinnate.

Fronds small, delicate, dissected; sori round and placed on the veins on the underside of the pinnules.....

.....1. Cystopteris

Fronds coarse; sori clustered under the margins of the pinnules.....3. Pteridium

Fronds only once pinnate.....2. Polystichum

1. Cyatopteris Bernh.

Ferns with fronds growing from rootstocks; fronds quite delicate and dissected; sori roundish, indusiated when young but the indusia pushed aside by mature sporangia.

1. Cyatopteris fragilis (L.) Bernh.      Bladder Fern

Ferns with many fronds from a creeping rootstock; fronds quite delicate; pinna usually dissected and these segments dentate or lobed; sori on the veins on the undersides of the pinnules; indusia pushed aside at maturity so sori appear naked.

2. Polystichum Roth

Ferns with fronds clumped and arising from a rounded caudex; fronds bright green above, only once pinnate, brown chaff at base of fronds; sori round; indusia transparent, round; mature sporangia brownish.

1. Polystichum munitum (Kaulf.) Presl      Western Sword-fern

Fronds clumped and arising from a stout caudex, bright green above, lighter below, with much brown scarious chaff at base and along main rachis, only once pinnate; pinnae bearing many inturned teeth on margins; sori round, closely clustered in 2 straight lines on each side of the midrib of fertile fronds; indusia round, transparent; mature sporangia brownish.



### 3. Pteridium Scop.

Rather coarse, green ferns from creeping, brown rhizomes; stems straw colored; pinnules green; fronds 3-pinnate; sori clustered under margins of the pinnules.

#### 1. Pteridium aquilinum (L.) Kuhn var. pubescens Underw.

##### Western Brake-fern or Bracken Fern

Rather coarse, green ferns; frond rachis straw colored; frond 3-pinnate; pinnules on the underside covered by white hairs; rhizome dark brown, creeping; sori densely clustered on margins of the pinnules.

### 3. EQUISETACEAE (Horsetail Family)

Plants with cylindrical, jointed stems; internodes hollow; cell walls impregnated with silica; leaves minute, forming sheaths; strobili terminal; spores numerous.

#### Equisetum L.

Plants with cylindrical, jointed stems; internodes hollow; cells impregnated with silica; leaves minute; strobili terminal; reproduction by spores with 4 elaters.

#### 1. Equisetum hyemale L. var. elatum (Engelm.) Morton

Plants with cylindrical, jointed stems; stems seldom branched, at the joints of each stem a sheath, which turns gray with age, the stem ridged, each ridge with 1 row of silica projections on it; leaves minute; strobilus terminal; spores numerous.

## 4. PINACEAE (Pine Family)

Trees or rarely shrubs with woody cones tightly closed until seed ripe; seeds winged; cone scales flattened, distinct from bracts.

Cone scales deciduous.....6. Abies

Cone scales persistent.

Bracts of cones exserted.

Leaves deciduous.....2. Larix

Leaves not deciduous.....5. Pseudotsuga

Bracts of cones included.

Leaves in fascicles of 2-5.....1. Pinus

Leaves borne singly.

Trees with sharp-pointed leaves.....

.....4. Picea

Trees with leaves more or less rounded..

.....3. Taxus

1. Pinus [Tourn.] L.

Coniferous evergreens; trees or rarely shrubs; leaves needle-like, in fascicles of 2-5; ovules borne in woody cones with persistent cone scales.

Leaves 2 to a fascicle.....4. P. contorta

Leaves more than 2 to a fascicle.

Leaves 3 to a fascicle.....3. P. ponderosa

Leaves 5 to a fascicle.

Mature ovulate cones under 10 cm...2. P. albicaulis

Mature ovulate cones over 10 cm....1. P. monticola

1. Pinus monticola Dougl.      Western White Pine

Tall, slender trees up to 50 m. with grayish, smooth bark; leaves slender, needle-like, 5 in a fascicle; cones longer than wide at maturity, up to 20 cm. long.

2. Pinus albicaulis Engelm.      White-bark Pine

Trees up to 15 m.; trunk often twisted; bark white; limbs short and rigid; leaves needle-like, in fascicles of 5, mostly about 5 cm. long; male inflorescence reddish; immature ovulate cones greenish brown, older cones reddish or greenish brown, not over 8-9 cm. long.

3. Pinus ponderosa Dougl.      Western Yellow Pine

Large trees up to 70 m. with reddish or brown bark, in older trees the bark cracked and flaking; limbs short and rigid; leaves long, narrow and needle-like, 3 in a fascicle; pollen cones reddish; young ovulate cones greenish brown, mature cones brown with sharp projections on the cone scales.

4. Pinus contorta Dougl. ex Loud.      Coast or Lodge-pole Pine

Trees up to 10 m.; slender, grayish trunk; leaves slender, needle-like, 2 in a fascicle; pollen cones yellowish; ovulate cones, when mature, brownish to blackish; cones mostly persistent on limbs and trunk of tree.

2. Larix [Tourn.] Adanson

Trees with short often gnarled branches; leaves deciduous;

limbs with knob-like projections where the leaves grow each year; cones woody; scales persistent with long, slender, exserted bracts.

1. Larix occidentalis Nutt.      Western Larch or Tamarack

Trees up to 75 m. with gray, flaking bark and short often gnarled limbs; leaves light green and needle-shaped, deciduous; since the leaves fall and grow new each year they build up knob-like projections on older branches 1 cm. or more long; cones small, seldom over 3.5 cm. long, woody and with slender, exserted bracts; bracts single-pointed.

3. Tsuga (Endl.) Carr.

Trees with flexuous branches and drooping leaders; leaves short, needle-like, evergreen, arranged singly on the branches; cones woody; scales persistent.

1. Tsuga mertensiana (Bong.) Sarg.      Mountain Hemlock

Trees up to 40 m. with flexuous branches and drooping leaders; leaves short, needle-like, arranged singly on the branches; young cones pendulous, reddish; mature cones brown to reddish brown; scales persistent; cones up to 7 cm. long.

4. Picea Link

Trees with needle-like, sharp-pointed leaves; brown, woody cones with persistent scales.

1. Picea engelmannii (Parry) Engelm.      Engelmann's Spruce

Trees up to 45 m. with straight, long, downswept branches and

grayish bark; leaves short, needle-like, mostly about 2.5-3 cm., sharp-pointed, arranged singly around the branches in a spiral fashion; mature female cones up to 7 cm.; scales persistent with margins wavy and finely denticulate.

### 5. Pseudotsuga Carr.

Trees with evergreen leaves arranged singly on branches; cones woody; scales persistent; 3-pointed bracts exerted beyond cone scales.

#### 1. Pseudotsuga menziesii (Mirb.) Franco      Douglas Fir

Tall trees up to 80 m. with thick, dark brown bark and slender, spreading limbs; leaves needle-like, mostly around 1.5-2.5 cm. long; staminate flowers reddish; ovulate cones, when mature, brownish, each scale subtended by a long, exerted, 3-pointed bract; cones pendulous from branches.

### 6. Abies [Tourn.] Hill

Trees with soft needles; cones erect on branches, woody; cone scales deciduous.

Leaves with resin ducts easily visible when broken in half;

trees of high elevations.....2. A. lasiocarpa

Leaves with resin ducts not easily visible when broken in half.

Stomata on lower and upper surfaces of the leaf; leaves

mostly erect on branches.....3. A. concolor

Stomata only on lower surface of the leaf; leaves mostly

at right angles to the branches....1. A. grandis

1. Abies grandis Lindl.      Grand Fir

Trees up to 80 m.; bark smooth or with resin blisters; branches long and usually spreading; leaves 2-ranked in appearance forming flat sprays, needle-like, arranged at right angles to the branch and parallel with the ground, stomatal bloom only on underside of the leaf; mature cones up to 18 cm., grayish green; scales deciduous; bracts variously shaped.

2. Abies lasiocarpa (Hook.) Nutt.      Alpine Fir

Trees of higher elevations, up to 25-50 m. tall, slender and spire-like with short branches; leaves arranged singly and erect on branches; 2 resin ducts readily visible with the unaided eye when leaf broken in half; ovulate cones grayish green to purple, erect on branches; scales deciduous at maturity.

3. Abies concolor Lindl.      White Fir

Trees up to 75 m.; bark smooth or with resin blisters, white; branches long, the lower usually spreading; leaves usually erect on branches with stomatal bloom on both sides of the leaf; 2 bands on the bottom, 1 band on the upper surface from leaf base to tip; mature cones up to 12 cm., grayish to green; scales deciduous; bracts variously shaped.

Scheplitz (15) found from hybridization studies done in Germany that Abies grandis Lindl. and Abies concolor Lindl. hybridize quite freely. This may be taking place on Black Butte since it is sometimes difficult to distinguish these two species in this area and specimens which seem to be intergrades are common in some areas on the Butte.

## 5. CUPRESSACEAE (Cypress Family)

Trees or sometimes shrubs; leaves and cone scales opposite or whorled; leaves small in adult foliage, usually scale-like, persistent; cones small, woody or berry-like.

Cones woody.....1. Libocedrus

Cones berry-like.....2. Juniperus

### 1. Libocedrus Endl.

Trees with thick, reddish, stringy bark when old; young trees with flaking, reddish bark; numerous spreading limbs; leaves small, evergreen and scale-like, fitted together in a jointed pattern; mature cones brown, woody.

#### 1. Libocedrus decurrens Torr.      Incense Cedar

Trees up to 45 m. with thick, reddish, stringy bark in old trees; in young trees bark reddish but flaking and not thick; limbs numerous and spreading; leaves small and scale-like, fitted together in a jointed pattern; mature cones brownish or brown-green, woody, small up to 2 cm., consisting of only 3 main scales closely fitted together before maturity.

### 2. Juniperus [Tourn.] L.

Trees or prostrate shrubs with short or appressed leaves; fruit berry-like.

Erect trees.....1. J. occidentalis

Prostrate shrubs.....2. J. communis  
saxatilis

1. Juniperus occidentalis Hook.      Western Juniper

Erect trees up to 10 m.; bark grayish or slightly brownish; branches spreading; leaves a bluish green color, scale-like, very closely appressed, 3-ranked with a large resin duct on the dorsal side; staminate flowers a greenish yellow; ovulate cone a blue, berry-like structure.

2. Juniperus communis L. var. saxatilis Pallas

Prostrate shrubs up to 45 cm. high and forming dense mats; leaves short, up to 12 mm. but not appressed, green below, whitish above with stomata; 3 leaves at a node; staminate flowers greenish yellow; ovulate cone a blue, berry-like structure.

6. GRAMINEAE (Grass Family)

Annual or perennial herbs, or sometimes shrubs or tree-like; stem or culm cylindrical or flattened, usually hollow with conspicuous, solid nodes; leaves parallel-veined, 2-ranked; inflorescence a spike, panicle or raceme made up of flower units termed spikelets; individual flowers termed florets; flower parts reduced; ovary, styles and stamens usually surrounded by 2 bract-like structures termed lemma and palea and these in turn subtended by 2 bract-like structures at the beginning of the spikelet called glumes; fruit a caryopsis.

Key to the Tribes

Spikelets sessile on opposite sides of the rachis; inflorescence a spike; blades with auricles at base.....Tribe 2. HORDEAE



Spikelets not sessile on opposite sides of the rachis; inflorescence other than a spike; blades usually without auricles at base.

Florets reduced to 1 per spikelet.....Tribe 4. AGROSTIDEAE

Florets more than 1 per spikelet.

Glumes shorter than the first floret.....

.....Tribe 1. FESTUCEAE

Glumes longer than the first floret.....

.....Tribe 3. AVENEAE

#### Tribe 1. FESTUCEAE

Lemma awned from a bifid apex (see description of Bromus arcutianus); leaf sheath usually closed.

Spikelets green; lemmas keeled on back; glumes firm, acute at apex; inflorescence usually open.....

.....1. Bromus

Spikelets purplish; lemmas rounded on back; glumes papery, not pointed at apex; inflorescence usually not open....

.....5. Malica

Lemma either not awned or awned from a pointed apex; leaf sheath usually open.

Spikelets crowded in dense, 1-sided clusters.....

.....4. Dactylis

Spikelets not crowded in dense, 1-sided clusters.

Lemmas awned or at least pointed; leaves tapering

to a point.....2. Festuca

Lemmas not awned or pointed; leaves boat-shaped at apex.....3. Poa

1. Bromus L.

Annual or perennial grass; culms erect; blades usually wide, flat; panicle usually open; spikelets large; glumes fairly firm, acute at apex; lemmas keeled on back, usually awned from a bifid apex.

Awns mostly 12-20 mm. or more long; annuals, in age the plant often taking on a purplish red cast.....4. B. tectorum

Awns mostly less than 10 mm. long; perennials, mostly remaining green in age (sometimes becoming somewhat colored).

Leaf blades glabrous or sparingly pubescent.

Spikelets definitely compressed; lemmas keeled...

.....2. B. carinatus

Spikelets not much compressed; lemmas rounded....

.....3. B. orcuttianus

Leaf blades densely pubescent.....1. B. breviaristatus

1. Bromus breviaristatus Buckl.      Narrow-leaved Brome-grass

Perennial grass; culms erect; leaf blades and sheath densely pubescent; blades often showing a tendency to have involute margins; inflorescence a narrow panicle; spikelets 2—3 cm. long; glumes scabrous; lemmas pubescent, awned; awn 3—10 mm. long.

2. Bromus carinatus Hook. & Arn.      California Brome-grass

Perennial grass; culms erect; leaf blades glabrous or with rather scattered hairs; sheath pubescent; inflorescence a narrow to

somewhat spreading panicle; spikelets mostly 5-9-flowered, definitely compressed; lemmas keeled, pubescent, awned; awn 4-10 mm. long.

This species, as described here, includes what has formerly been considered Bromus marginatus Nees and Bromus carinatus Hook. & Arn.. Because of the great amount of intergrading of these two in this area, a morphological separation into two distinct species cannot be made (Hitchcock, A. S., 8., p. 37). In taking this position the writer is following the view of M. E. Peck in his second edition of A Manual of the Higher Plants of Oregon, not yet published.

3. Bromus orcuttianus Vasey      Orcutt's Brome-grass

Perennial grass; culms erect, tufted; leaf blade and sheath glabrous or with scattered pubescence; inflorescence a spreading panicle; spikelets 5-8-flowered; glumes narrow, pointed; lemmas pubescent, generally awned from a bifid apex, however, at times the 2 teeth very minute and hardly appearing to be bifid; awns 5-8 mm. long.

4. Bromus tectorum L.      Downy Brome-grass

Annual grass; culms erect; leaf blade and sheath quite densely pubescent; inflorescence rather open; spikelets drooping when mature; glumes narrow, margins scarious; lemmas awned; awns 12-20 mm. or more long. In age the entire plant often takes on a purplish red cast.

2. Festuca L.

Annual or perennial grasses, often in clumps; blades flat, or involute and filiform; inflorescence various; spikelets few- to many-flowered; glumes unequal, often sharp-pointed, not equalling

the florets; lemmas pointed or awned at apex.

Lemmas not awned or very short awned.....1. F. viridula

Lemmas with a long awn.

Awn longer than or as long as lemma...2. F. occidentalis

Awn shorter than lemma.

Inflorescence narrow but slightly spreading, not  
spike-like; leaves longer than or only about one-  
half as tall as culm.....4. F. idahoensis

Inflorescence a narrow spike-like panicle; leaves  
mostly less than or only about one-half as tall  
as culm.....3. F. ovina

1. Festuca viridula Vasey      Green-leaf Fescue

Perennial grass; culms erect, clumped, forming branches; leaves narrow, the margins inrolled, glabrous; inflorescence a panicle; spikelets 3-6-flowered; glumes nearly equal; lemmas awnless or very short awned, keeled, scarious toward apex.

2. Festuca occidentalis Hook.      Western Fescue

Perennial grass; culms erect, clumped; leaves narrow, the margins inrolled, glabrous and soft; inflorescence a narrow panicle; spikelets 3-5-flowered; lemmas awned; awn as long as or longer than lemma.

3. Festuca ovina L.      Sheep Fescue

Perennial grass; culms erect, clumped, usually not much over 40 cm. tall; leaves narrow, filiform, scabrous, usually not more than one-half as long as culms; inflorescence a narrow spike-like panicle; spikelets 4-5-flowered; lemmas short-awned.

4. Festuca idahoensis Elmer      Idaho Fescue

Perennial grass; culms erect, 30-100 cm. tall, forming bunches; leaves narrow, the margins inrolled, filiform, scabrous; inflorescence a narrow panicle, branches slightly spreading; spikelets 5-7-flowered; lemmas awned; awn usually 2-4 mm. long.

3. Poa L.

Annual or perennial grasses; culms erect, often tufted; leaves slender, the tips often boat-shaped; inflorescence a panicle; spikelets laterally compressed, 2- to several-flowered; glumes keeled; lemmas keeled, awnless, longer than the glumes.

Plants lacking creeping rhizomes.

Culms mostly 10-30 cm. tall.....4. P. alpina

Culms over 30 cm. tall.

Spikelets about 4 mm. long.....3. P. palustris

Spikelets 7-10 mm. long.....5. P. ampla

Plants with creeping rhizomes.

Culm compressed or flattened above....1. P. compressa

Culm not compressed or flattened above (round)....

.....2. P. pratensis

1. Poa compressa L.      Canada Bluegrass

Perennial grass from creeping rhizomes; culms erect, 2-5 dm. tall, flattened above; leaf blades flat; sheath glabrous; inflorescence a panicle; spikelets 3-8-flowered; glumes narrow, 2-3 mm. long; lemmas pubescent on keel, a web of hair at base of lemma.

2. Poa pratensis L.      Kentucky Bluegrass

Perennial grass from creeping rhizomes; culms erect, 2-10 dm. tall, sometimes clustered; leaf blades glabrous, flat; sheath glabrous; inflorescence a panicle; spikelets 3-7-flowered; glumes keeled, the margins scabrous; lemmas with a web of hairs at base.

3. Poa palustris L.      Fowl Meadow Bluegrass

Perennial grass lacking creeping rhizomes; culms slender, erect, 3-15 dm. tall; leaf blades long, flat; sheaths glabrous; ligule 3-5 mm. long; inflorescence a loose, spreading panicle; spikelets small, about 4 mm. long, 2-4-flowered; glumes acute; lemmas pubescent on nerves and at base.

4. Poa alpina L.      Alpine Bluegrass

Perennial grass lacking creeping rhizomes; culms erect, tufted, mostly 10-30 cm. tall; leaf blades and sheath short, glabrous; inflorescence a dense panicle; spikelets often purple tinged, 3-4-flowered; glumes acute; lemmas pubescent on keel.

5. Poa annua Merr.      Merrill's Bluegrass

Perennial grass lacking creeping rhizomes; culms erect, somewhat tufted, 8-12 dm. tall; leaf blades long, narrow, flat; sheath glabrous; inflorescence a narrow panicle; spikelets narrow, 7-10 mm. long; glumes and lemmas scabrous; lemma 4-5 mm. long, firm.

4. Dactylis L.

Perennial grasses, mostly tufted; culms erect; leaf blades mostly flat; inflorescence a panicle of dense, 1-sided clusters

of spikelets; spikelets few-flowered; glumes unequal, acute at apex; lemmas compressed and keeled, the apex sharp-pointed.

1. Dactylis glomerata L. Orchard Grass

Tufted perennial grass; leaf blades flat; culms erect; inflorescence a panicle, spikelets arranged in dense, 1-sided clusters; spikelets few-flowered; glumes awned, ciliate on the keel; lemmas awned on the apex, sharp-pointed.

5. Malica L.

Perennial grasses; culms mostly not clumped, often bulb-like at base; leaf blades mostly flat; sheath closed; inflorescence an open or closed panicle; spikelets 2- or more flowered, often purplish in color; glumes papery; lemmas awnless or awned from a bifid apex.

1. Malica aristata Thurber ex Bolander Awned Malic

Perennial grass; culms erect, base not bulb-like; sheaths often purplish at base; leaf blades flat, pubescent; sheath also pubescent; inflorescence a narrow, closed panicle; spikelets few-flowered; glumes nerved; lemmas pubescent, awned from a bifid apex.

Tribe 2. HORDEAE

Spikelets 1 at a node, placed flatwise to rachis.....

.....6. Agropyron

Spikelets 2 or more at a node.

Spikelets 1-flowered, 3 at a node, 2 lateral spikelets

very much reduced.....9. Hordeum

Spikelets more than 1-flowered, lateral spikelets usually much reduced.

Rachis continuous, not readily disarticulating at maturity; glumes large, entire, awnless or very short awned.....7. Elymus

Rachis discontinuous, readily disarticulating at maturity; glumes small, long, awned and cleft...  
.....8. Sitanion

#### 6. Agropyron Gaertner

Annual or perennial grasses; culms erect from clumps or from creeping rootstocks; inflorescence a spike; spikelets several-flowered, 1 at a node, placed flatwise to rachis; glumes stiff, shorter than the first lemma, awned or awnless; lemmas pointed or awned.

##### 1. Agropyron spicatum (Pursh) Scribn. & Sm. Bluebunch Wheatgrass

Perennial grass from dense clumps; leaves mostly with inrolled margins; leaf blades pubescent above; sheaths glabrous; inflorescence a spike; glumes awnless; lemmas with divergent awns 1-2 cm. long.

#### 7. Elymus L.

Perennial grasses; spike dense; spikelets 2-6-flowered, 2 or more at a node; glumes entire, large, equalling the first floret; rachis continuous, not readily disarticulating.

##### 1. Elymus glaucus Buckl. Blue Wild-rye

Perennial grass from clumps; culms 6-15 dm. tall; leaves glabrous



or pubescent, up to 1.5 cm. wide, mostly rather lax; inflorescence a spike; spikelets densely placed on rachis; glumes entire, not awned or only very short awned; lemmas awned, the awns 1-3 cm. long.

#### 8. Sitanion Raf.

Perennial grasses; culms tufted; leaves flat and pubescent; inflorescence spike-like; spikelets usually 2-flowered; rachis disarticulating at maturity; glumes narrow at apex; lemmas also awned.

Spikelets long and narrow, longer than wide; glumes

1-2-nerved.....1. S. hansenii

Spikelets relatively short, as wide as long; glumes

3-nerved.....2. S. hystrix

#### 1. Sitanion hansenii (Scribn.) J. G. Smith      Hansen's Squirrel-tail

Perennial grass; culms 6-10 dm. tall, not closely clustered; leaves pubescent or glabrous; blades flat and lax; inflorescence a spike, longer than wide, not appearing very bristly; glumes 2-4-nerved, mostly 2-cleft; lemmas awned; awns of glumes and of lemmas mostly up to 4 cm..

This species is believed by Stebbins to be a series of hybrids between Elymus glaucus Buckl. and Sitanion hystrix (Nutt.) J. G. Smith or Sitanion jubatum J. G. Smith (Hitchcock, A. S., 8., p. 263).

#### 2. Sitanion hystrix (Nutt.) J. G. Smith      Squirrel-tail

Perennial grass; culms 1-5 dm. tall, densely clumped; leaf sheaths soft pubescent; blades flat, fairly stiff, the margins scabrous; inflorescence a spike as wide as or wider than long;

glumes 1-2-nerved, entire or 2-cleft, awned; lemmas awned; the 2 sets of awns up to 6 cm. long giving the inflorescence a very bristly appearance.

### 9. Hordeum L.

Annual or perennial grasses; inflorescence a spike; spikelets 1-flowered, 3 at a node, however, the lateral 2 spikelets very reduced, middle spikelet sessile, the lateral 2 pedicled; glumes narrow, awnless or awned; lemmas usually awned

#### 1. Hordeum brachyantherum Nevski Meadow Barley

Perennial grass; culms in clusters; leaves mostly glabrous; blades wide, mostly soft; inflorescence a densely-flowered spike, 2-8 cm. long, sometimes purplish in color; glumes very narrow, awn-like; lemmas awned.

### Tribe 3. AVENEAE

Lemmas rounded dorsally, truncate at apex; small annuals...

.....12. Deschampsia

Lemmas keeled dorsally; perennials.

Rachillas continuous beyond last floret and densely hairy;

inflorescence a loose, slender panicle, but not

spike-like.....11. Trisetum

Rachillas continuous beyond last floret but glabrous or

very sparsely hairy; inflorescence a compact panicle,

almost spike-like.....10. Koeleria

10. Koeleria Pres.

Annual or perennial grasses; leaf blades narrow; inflorescence a compact panicle; spikelets with 2-4 florets; glumes unlike, first narrow and second wider; lemmas awned above middle near apex, if awned.

1. Koeleria cristata (L.) Pers. Junegrass

Perennial grass; culms erect in clumps; leaves with narrow blades; inflorescence a dense, spike-like panicle, shiny in appearance; glumes unlike, the margins scarious; glumes and lemmas both scabrous.

11. Trisetum Pers.

Perennial grasses; leaf blades mostly rather wide, flat, soft; inflorescence a panicle, open or contracted; spikelets 2-5-flowered, mostly 2-flowered; glumes unequal in length, the second longer than the first; lemmas awned and usually 2-cleft at apex.

1. Trisetum canescens Buckl. Tall Trisetum

Perennial grass; culms erect; leaves with flat, soft blades; sheaths hairy; inflorescence a narrow, loose panicle; spikelets mostly 2-flowered; glumes unequal, the second  $\frac{1}{3}$  longer than the first; awns of lemmas long, exserted and twisted.

12. Deschampsia Beauv.

Annual or perennial grasses; inflorescence a panicle; spikelets 2-flowered; rachilla hairy, prolonged beyond upper floret; glumes about equal, equalling or surpassing the florets; lemmas truncate at apex, awned below middle.

1. Deschampsia danthonioides (Trin.) Munro ex Benth

## Annual Hairgrass

Slender annuals, 1-5 dm. tall; leaves narrow, involute; panicle open in age; glumes surpassing florets; awns of lemma exerted and twisted.

## Tribe 4. AGROSTIDEAE

Glumes compressed and keeled; panicle cylindrical and spike-like.....15. Phleum

Glumes rounded, not compressed; panicle not cylindrical but may be narrow and somewhat spike-like.

Callus sharp-pointed, very prominent..17. Stipa

Callus rounded, minute.

Glumes definitely shorter than lemmas.....

.....16. Muhlenbergia

Glumes longer, equalling or very nearly as long as lemma.

Palea well-developed with a tuft of hair at callus.....13. Calamagrostis

Palea minute or absent, tuft of hair at callus very short or absent.....14. Agrostis

13. Calamagrostis Adanson

Perennial grasses; culms erect; inflorescence an open or compact panicle; spikelets 1-flowered; glumes longer than the lemma; lemmas awned dorsally; palea well-developed but shorter than lemma; callus with a tuft of hairs around base of lemma and palea.

1. Calamagrostis rubescens Buckl. Pinegrass

Erect perennial grass from rootstocks; leaf blades pubescent with a woolly pubescence at collar; ligule membranous, 2-5 mm. long; inflorescence a dense panicle, often with a purplish cast; glumes longer than lemmas, mostly enclosing the awn; lemmas awned dorsally; callus with erect, white hairs at base of lemma and palea.

14. Agrostis L.

Annual or perennial grasses; culms erect, slender; inflorescence an open or dense panicle; spikelets 1-flowered, usually very small; glumes usually longer than the lemma; lemmas dorsally awned or awnless; palea developed or vestigial.

1. Agrostis diacansis Vasey Leafy Bent-grass

Erect perennial grass arising from creeping rhizomes; culms slender; blade margins scabrous; collar glabrous; inflorescence a compact or spreading panicle; spikelets 1-flowered; glumes longer than lemma; lemmas awned or awnless; palea wanting or very minute.

15. Phleum L.

Erect perennial grasses from bulb-like bases; culms quite stout, up to 100 cm.; leaves with long, flattened blades; inflorescence a panicle, dense, cylindrical and spike-like, up to 20 cm. long; glumes compressed, keeled, awned.

1. Phleum pratense L. Timothy

Annual or perennial grass; roots clustered, fibrous; culms erect; inflorescence dense, cylindrical and spike-like; spikelets

1-flowered; glumes compressed, keeled, equal, usually awned; lemmas shorter than glumes; palea nearly equalling lemma.

16. Muhlenbergia Schreb.

Annual or perennial grasses; culms branched; inflorescence various; spikelets mostly 1-flowered (sometimes 2-flowered); glumes shorter than lemma, often awned; lemmas toothed at apex, usually awned.

1. Muhlenbergia richardsonii (Trin.) Rydb.      Mat Muhly

Slender, much branched, mat-like grass from creeping rhizomes; culms erect or prostrate; inflorescence small, mostly spike-like, few-flowered; glumes pointed or awned, shorter than lemma.

17. Stipa L.

Perennial grasses; culms erect, usually clumped; inflorescence a narrow panicle; spikelets large, 1-flowered; glumes thin, shiny, long and narrow; lemmas narrow and firm, long awned; awn bent and twisted; callus prominent, sharp-pointed.

Culms over 50 cm. tall, mostly over 60 cm. tall.

Sheath of leaf glabrous.....3. S. californica

Sheath of leaf pubescent.....1. S. elmeri

Culms 50 cm. tall or less, mostly 40 cm. or less.....

.....2. S. occidentalis

1. Stipa elmeri Piper & Brodie ex Scribn.      Elmer's Stipa

Perennial grass; culms erect in clumps, 60-100 cm. tall; leaves narrow, inrolled at the margins, pubescent; sheath pubescent;

inflorescence a narrow panicle, 1.5-3.5 dm. long; glumes narrow, shiny; lemmas indurate, short pubescent below, longer above; awn pubescent to second bend; callus sharp-pointed, 1 mm. long.

2. Stipa occidentalis Thurber      Western Stipa

Perennial grass; culms erect in clumps, usually 25-40 cm. tall; leaf blades narrow, the margins inrolled, glabrous below, pubescent above; sheath glabrous or pubescent; inflorescence a narrow panicle; glumes thin, narrow; lemmas indurate, pubescent; awn pubescent to second bend; callus sharp-pointed, about 1 mm. long.

3. Stipa californica Merr. & Davy      California Stipa

Erect perennial grass; culms erect, slightly pubescent, clumped, usually 75-125 cm. tall; leaf blades flat to inrolled on margins, somewhat pubescent to glabrous; sheath glabrous or somewhat scabrous; inflorescence a long, narrow panicle, 1.5-3.5 dm. long; glumes thin, shiny; lemmas pubescent, long awned; awn pubescent to second bend; callus sharp-pointed, about 1 mm. long.

7. CYPERACEAE (Sedge Family)

Grass-like plants with fibrous roots; annual or perennial stems, often triangular, not hollow; leaves often lacking a ligule, 3-ranked; inflorescence various, often a panicle or a spike; flowers often subtended by only 1 bract (the perigynium) which also often encloses the fruit; styles usually 3; stamens usually 3; fruit an achene.

Plants with compact, spike-like inflorescences.....

.....2. Carex

Plants with diffuse, spreading, umbel-like inflorescences...

.....1. Scirpus

1. Scirpus [Tourn.] L.

Grass- or rush-like plants, mostly perennial, very seldom annual; roots various, fibrous or tuber-like; stem round or triangular; leaves grass-like or sometimes very reduced; inflorescence an umbel or a spikelet of closely compacted flowers; flowers small, perfect; styles 2-3-cleft; stamens 2-3; fruit an achene.

1. Scirpus microcarpus Presl      Small-fruited Bulrush

Perennial, grass-like plants; roots from rootstocks; stems triangular, reddish at base, quite leafy; leaves well-developed, grass-like, glabrous, marked by cross partitions; inflorescence a large group of umbel-like spikes; flowers small, greenish turning brownish; fruit a 3-sided achene surrounded by 4 barbed bristles.

2. Carex L.

Perennial, grass-like herbs with fibrous roots or rhizomes; stems solid, round or 3-angled; leaves 3-ranked, grass-like; inflorescence spike-like with small flowers; flowers monoecious or dioecious; flower parts reduced; petals and calyx absent; each flower subtended by a bract; stamens usually 3; style usually 2-3-cleft; fruit an achene enclosed in the perigynium (a sac-like bract which surrounds the ovary).

Style 3-cleft.....5. C. rostrata

Style 2-cleft.



Inflorescence with staminate flowers above and pistillate flowers below; plants with well-developed, strong rhizomes.....4. G. inops

Inflorescence with staminate and pistillate flowers intermixed in the inflorescence; plants with poorly developed, weak rhizomes.

Lower bracts of the inflorescence long, equalling or surpassing the spikelet.....1. G. athrostachya

Lowest bracts not equalling or exceeding the spikelet.

Perigynium flat, thin-walled.....

.....2. G. microptera

Perigynium plano-convex, thick-walled...

.....3. G. preslii

1. Carex athrostachya Olney      Slender-beaked Sedge

Clumped, perennial, grass-like herbs with mostly fibrous roots and very short rootstocks; stem distinctly 3-sided; leaves narrow, grass-like, from the base of the plant; inflorescence made up of several groups of spike-like clumps of flowers; flower clusters each subtended by a bract the lower of which usually exceeds or equals the total length of the inflorescence; flowers small, green with a slight brownish-purple cast when young but turning a straw brown color at maturity; style 2-cleft; stamens 3; staminate and pistillate flowers intermixed in the same inflorescence; fruit an achene enclosed in a long, slender-beaked perigynium.

2. Carex microptera Mack. Small-winged Sedge

Densely clumped perennial herbs from short, poorly developed rootstocks; stem slender, 3-10 dm. tall, little angled; leaves narrow, weak, grass-like, not equalling the stem; inflorescence spike-like, made up of several spikelets; flowers mostly greenish when young turning brownish in age; staminate and pistillate flowers intermixed in the same inflorescence; perigynium 3.5-4 mm. long, narrowly winged, the wing toothed along sides, walls thin and flat, bidentate; fruit an achene.

3. Carex preslii Steudel Presl's Sedge

Densely clustered, perennial, grass-like herbs from short, somewhat woody rootstocks; stem slender, slightly triangular, mostly longer than leaves; leaves narrow, grass-like, not all basal; inflorescence made up of several spike-like clumps, in general, a purplish brown color; flowers of both sexes found in the same inflorescence; flowers subtended by scales, these scales about the same length as the flowers; perigynia reddish brown, 3.5-4 mm. long; stamens 3; style 2-parted; perigynium with a 2-lobed beak, thick-walled, plano-convex; fruit an achene.

4. Carex inops Bailey Long-stoloned Sedge

Perennial, grass-like herbs with strong, well-developed, creeping rhizomes and stolons; stem slender, 1.5-4 dm. tall; leaves narrow, grass-like, densely clustered at base of plant; inflorescence spike-like, a dark purplish brown color; flowers in 2 separate areas on the inflorescence, staminate in a terminal spike, the pistillate spikelet

below; anthers large, bright yellow; style 2-cleft; scale of the pistillate flower shorter than the perigynium; perigynium 2-toothed; fruit an achene.

5. Carax rostrata Stokes      Beaked Sedge

Coarse, tall, grass-like perennial herbs arising from short rootstocks; stem coarse, 3-12 dm. tall, sharply 3-angled; leaves coarse, scabrous, grass-like, surpassing the inflorescence; inflorescence of several long, narrow spikes, the flowers separated with the staminate portion terminal, 3-8 cm. long and the pistillate portion below, 2-9 cm. long, densely flowered; flowers brown in color; styles 3-cleft; perigynia 4-6 mm. long, spreading, strongly nerved, 2-toothed.

8. JUNCACEAE (Rush Family)

Usually annual or perennial rush- or grass-like herbs (seldom shrubs); leaves reduced to scales or grass-like; roots creeping rhizomes or fibrous; inflorescence various; flowers with 6 perianth parts, not differentiated into calyx and corolla, usually in 2 series of 3 parts each; ovary superior, unilocular or trilocular; fruit a capsule.

Fruit a 3-seeded capsule; grass-like.....2. Ixola

Fruit a many-seeded capsule; grass-like or stems round and wiry.....1. Juncus

1. Juncus [Tourn.] L.

Annual or perennial herbs; stems round or grass-like; leaves reduced or grass-like; inflorescence a panicle or capitate; flowers

6-parted; fruit a many-seeded capsule.

Leaves reduced; stem round, wiry.....1. J. balticus

Leaves grass-like.

Inflorescence dense, compact, roundish clusters; leaves sharp-pointed; sheath and blades with white, scarious margins, no auricles; filaments longer than anthers...

.....3. J. ensifolius

Inflorescence flat-topped clusters; leaves lacking white, scarious margins, small auricles usually present; anthers longer than filaments.....2. J. orthophyllus

1. Juncus balticus Willd.      Baltic Rush

Slender, reed-like perennial herbs from slender rhizomes; leaves reduced to small basal sheaths; stems round, wiry; inflorescence appearing lateral on stem because of an extended single involucre bract which looks like a continuation of the stem; flowers greenish or purplish brown; fruit a many-seeded capsule.

2. Juncus orthophyllus Coville      Straight-leaved Rush

Grass-like perennial herbs from rhizomes; stem slender, leafy; leaves grass-like mostly basal having small auricles at juncture of sheath and blade; inflorescence capitate; flowers in flat-topped rather spreading clusters; flowers brownish; anthers longer than filaments; fruit a many-seeded capsule.

3. Juncus ensifolius Wiks.      Dagger-leaved Rush

Perennial, grass-like herbs arising from creeping rhizomes; stems leafy; leaves flat, grass-like, very sharp-pointed; sheath and blade

scarious on margins, no auricles; inflorescence terminal, very compact, roundish clusters of flowers; flowers brownish; filaments longer than anthers; fruit a many-seeded capsule.

## 2. Luzula DC.

Perennial herbs; stems slender; leaves grass-like; inflorescence various; capsule unilocular, 1-3-seeded.

### 1. Luzula campestris (L.) DC. Common Wood-rush

Grass-like perennial herbs; stems slender; leaves grass-like, pubescent on the margins with long white hairs; nodes also with a white cottony pubescence; inflorescence capitate; flowers brownish, densely clustered; fruit a 3-seeded capsule.

## 9. LILIACEAE (Lily Family)

Mostly perennial herbs, sometimes woody; leaves various, mostly parallel-veined; inflorescence also of several types; flowers usually large and showy, with 2 sets of petal-like structures of 3 segments each, usually not separated into calyx and corolla; stamens usually 6; pistil 1, ovary usually 3-parted; fruit a berry or capsule.

Plants with creeping rhizomes; fruit a berry; flowers small,  
white or greenish.....3. Smilacina

Plants with bulbs; fruit a capsule; flowers large.

Flowers over 5 cm. long, white, light purple or white and  
purple streaked.....1. Lilium

Flowers less than 5 cm. long (mostly 1-2 cm. long), a  
 blotched brownish-purple and greenish-yellow color...

.....2. Fritillaria

1. Lilium L.

Perennial herbs arising from scaly bulbs; stems tall, bearing leaves, these often whorled or sometimes alternately scattered; leaves linear to obovate or sometimes ovate; inflorescence a single flower or several in a raceme; flowers variously colored, large and showy; flower segments 6, not differentiated into calyx and corolla; stamens 6; anthers attached to the filaments near the middle (versatile); fruit a capsule.

1. Lilium washingtonianum Kell.      Washington's Lily

Tall, showy perennial herbs arising from scaly bulbs; stems tall, 6-15 dm.; leaves mostly oblanceolate, arranged mostly in whorls of from 6-12 leaves; inflorescence from 1-20 flowers in a raceme; flowers white or white with purple dots, turning lavender with age, up to 9 cm. long; anthers large, yellow, attached to filaments near the middle; fruit a capsule.

2. Fritillaria [Tourn.] L.

Erect perennial herbs arising from scaly bulbs; stem leafy with usually narrow, lanceolate leaves; inflorescence usually a few-flowered raceme; flowers yellow, white or purple blotched; perianth segments 6; not separated into calyx and corolla, segments not united; stamens 6; anthers attached to filaments at one end (basifixed); fruit a capsule.

1. Fritillaria atropurpurea Nutt.      Purple Fritillary

Erect perennial herbs arising from scaly bulbs, the scales large, sticky and thin; stems slender, 1-6 dm. tall; leaves narrow, linear, alternate and separate on the stem or slightly whorled in groups of 8; inflorescence of from 1-4 flowers the flowers nodding; flowers of 6 lanceolate segments, a mottled dark brownish-purple color with greenish-yellow intermarkings; stamens prominent, yellow; fruit a sharply 6-angled capsule, 1-1.5 cm. long.

3. Smilacina Desf.

Perennial herbs arising from creeping rhizomes; stems erect and leafy; leaves alternate, petioled or sessile; inflorescence a terminal panicle or raceme; flowers small, white or greenish, of 6 segments, not differentiated into calyx and corolla; stamens 6; fruit a berry.

Flowers borne in a panicle.....1. S. racemosa

Flowers borne in a raceme.....2. S. sessilifolia

1. Smilacina racemosa (L.) Desf.      False Solomon's Seal

Perennial herbs arising from creeping rhizomes; stems simple, stout, 3-12 dm. tall; leaves alternate, clasping at the base, mostly broadly lanceolate, widest at the middle; inflorescence a terminal panicle of many small, white flowers; fruit bright red berries dotted with small, purple spots.

2. Smilacina sessilifolia (Baker) Nutt.      Nuttall's Solomon's Seal

Perennial herbs from creeping rhizomes; stems erect, stout or slender, 2-6 dm. tall; leaves alternate, sessile, mostly lanceolate;

inflorescence a raceme of 3-12 small, white flowers; flowers 6-parted; fruit a dark red to almost black berry.

#### 10. IRIDACEAE (Iris Family)

Perennial herbs; roots from rhizomes, bulbs or corms; leaves parallel-veined, 2-ranked; flowers usually showy, perfect, regular or irregular; flowers subtended by 2 bracts; perianth of 6 parts, not differentiated into calyx and corolla; ovary inferior, usually 3-chambered.

##### Sisyrinchium L.

Perennial herbs usually growing in clumps; leaves long, narrow, parallel-veined; inflorescence subtended by 2 bracts; flowers in umbels, seldom solitary; flower parts all alike in size and shape; fruit a 3-chambered capsule.

##### 1. Sisyrinchium idahoense Bickn. Idaho Blue-eyed Grass

Perennial herbs with grass-like, basal leaves; stem flattened, leafless, simple; leaves narrow, seldom taller than stem; inflorescence subtended by 2 bracts; flowers in umbels; perianth segments a light blue, each segment with a splotch of yellow at the base; fruit a 3-celled capsule.

#### 11. ORCHIDACEAE (Orchid Family)

Perennial herbs with various habits; inflorescence various; flowers usually twisted 180° during development, irregular; perianth typically of 6 segments of 2 series; 3 sepals, green or colored; 3 colored petals, the middle one often modified in some way; ovary



inferior, 3-carpellate and usually 1-chambered; fruit a capsule.

Plants lacking chlorophyll; leaves bract-like; stems reddish or yellow; flowers white, purple spotted...3. Corallorhiza

Plants green with basal, well-developed leaves flowers yellowish or greenish.

Basal leaves many, mottled by white lines.....

.....2. Goodyera

Basal leaves only 2, not white mottled.....

.....1. Habenaria

# 1. Habenaria Willd.

Perennial herbs from tuberous roots; stems simple; leaves broad, located on the stem or only at base of the stem; inflorescence a spike of small flowers; flowers small, yellowish or greenish, the middle petal with a well-developed spur.

## 1. Habenaria elegans (Lindl.) Bolander      Slender Rein Orchid

Slender perennial herbs; roots tuber-like; stem leafless except for scarious bract-like leaves; basal leaves 2, broad, turning brown and drying up soon after flowering starts; inflorescence a terminal spike; flowers greenish, the middle petal with a spur usually longer than the rest of the combined flower parts.

## 2. Goodyera R. Brown

Short, perennial herbs with fleshy roots; stem leafless; leaves all basal, oblong in outline and mottled with white lines; inflorescence a terminal raceme; flowers a greenish white.

1. Goodvera oblongifolia Raf.      Rattlesnake Plantain

Perennial herbs with fleshy roots; stem naked except for papery bracts; leaves oblong, all basal, green with white lines running through them giving them a mottled appearance; inflorescence a terminal raceme of greenish white flowers.

3. Corallorhiza (Haller) Chatelain

Perennial, saprophytic herbs lacking chlorophyll, yellowish or reddish in color; leaves reduced to bracts; inflorescence a narrow spike-like raceme; perianth pinkish or white and purple spotted or striped; fruit a capsule.

1. Corallorhiza maculata Raf.      Spotted Coral-root

Saprophytic herbs lacking chlorophyll; stems yellow or reddish; leaves reduced to thin, paper-like bracts; inflorescence a terminal raceme of white, purple-spotted flowers; fruit a conspicuous many-seeded capsule.

12. SALICACEAE (Willow Family)

Trees or shrubs; leaves alternate, simple; flowers dioecious, in catkins; each flower in the catkin seemingly subtended by bracts and a cup-like disk or gland; seed comose.

Flower bracts ending in incised hair-like projections; stamens

many; bud scales more than 1.....1. Populus

Flower bracts entire; stamens few; bud scales 1.....

.....2. Salix

1. Populus [Tourn.] L.

Trees; leaves alternate, entire, usually broadly cordate or crenate at base; winter buds with more than 1 scale; inflorescence catkins; scales subtending flowers incised, ending in stiff hair-like projections; stamens many.

Bark of trunk smooth and almost white; leaves green above, only slightly lighter below.....1. P. tremuloides

Bark of trunk dark gray, rough and fissured in old trees; leaves dark green above, much lighter below, in some cases almost white.....2. P. trichocarpa

1. Populus tremuloides Michx.      American Aspen or Quaking Asp

Trees up to 20 m. tall; branches slender; bark of trunk white, smooth; leaves ovate to almost orbicular, the margins very finely toothed, green above, slightly lighter below; inflorescence catkins, 2.5-5 cm. long; capsule oblong.

2. Populus trichocarpa Torr. & Gray      Black Cottonwood

Tall trees up to 70 m.; branches long; trunk dark gray, rough and fissured in old trees; leaves up to 15 cm. long, the margins finely serrate, dark green above and much lighter below; inflorescence catkins; fruiting capsule and ovary very hairy, globose in shape.

2. Salix [Tourn.] L.

Trees or shrubs; branches mostly slender; leaves alternate, mostly narrow, lanceolate; inflorescence catkins, various; stamens mostly 2 but can be 1-10; scales entire; capsule 2-valved.

Style not over .5 mm. long; leaves quite glaucous or hairy beneath.

Scales brownish; catkins erect; leaves silky, hairy...

.....3. S. geyeriana

Scales black; catkins mostly reflexed; leaves mostly

glabrous or glaucous.....2. S. scouleriana

Style over .5 mm. long; leaves sparsely hairy above and

below.....1. S. lemmonii

1. Salix lemmonii Bebb      Lemmon's Willow

Shrubs up to 5 m. high, much branched; leaves slightly pubescent both above and below, young leaves densely so becoming glabrous or sparingly pubescent with age, narrowly lanceolate to oblanceolate; inflorescence catkins; capsule hairy; style .5-.8 mm. long; scales almost black.

2. Salix scouleriana Barratt      Scouler's Willow

Shrubs or trees up to 12 m. tall, not much branched; leaves may be pubescent but are mostly glabrous and glaucous; inflorescence catkins, mostly reflexed; capsule pubescent; style less than .5 mm. long.

3. Salix geyeriana Anderson      Geyer's Willow

Shrubs up to 5 m. tall, abundantly branched, twigs glaucous; leaves linear or lanceolate, silky pubescent especially when young; inflorescence short, erect catkins; scales brownish; style very short, about .3 mm. long; capsule pubescent.

## 13. BETULACEAE (Birch Family)

Trees or shrubs; leaves of various shapes, alternate, simple, deciduous; inflorescence of catkins; flowers monoecious; styles 2-parted; ovary inferior, 2-celled; fruit a 1-seeded, small nut or a short winged samara.

Shrubs; scales of pistillate catkins deciduous.....

.....1. Betula

Trees; scales of pistillate catkins persistent, woody..

.....2. Alnus

1. Betula [Tourn.] L.

Trees or shrubs; leaves alternate with serrated margins, deciduous; flowers monoecious, in catkins the catkin scales deciduous; fruit a narrow winged samara.

1. Betula glandulosa Michx. Glandular or Scrub Birch

Shrub up to 2 m. high or a little higher, much branched, twigs dotted with resin glands; leaves simple, mostly obovate, the margins evenly toothed, the apex rounded; flowers monoecious, in catkins; catkin 3 lobed scales; fruit a narrow winged samara.

2. Alnus [Tourn.] L.

Trees or shrubs; leaves alternate, the margins serrate, deciduous; flowers monoecious, in catkins the staminate catkins long, narrow, the scales deciduous, the pistillate catkins shorter, the scales persistent and the whole structure becoming woody and cone-like.

1. Alnus rhombifolia Nutt.      White Alder

Trees up to 25 m. tall with smooth bark; leaves alternate, simple, the margins closely serrate, mostly ovate in shape, crenate at base; inflorescence clusters of woody pistillate cones up to 2 cm. long on stout peduncles and staminate catkins up to 7 cm. long.

14. FAGACEAE (Beech Family)

Mostly monoecious trees or shrubs; leaves simple, alternate; inflorescence of staminate flowers in catkins or clusters and pistillate solitary or few-flowered clusters; ovary tricarpellate, inferior; fruit a 1-seeded nut always subtended or enveloped by a cupule or involucre.

Castanopsis Spach

Trees or much branched shrubs; leaves simple, evergreen; staminate flowers in slender catkins; pistillate flowers surrounded by an involucre; fruit a nut enclosed in a very spiny involucre.

1. Castanopsis chrysophylla (Dougl.) A. DC.      Giant Chinquapin

Trees or large shrubs, erect, much branched; leaves evergreen, lanceolate, green above, golden below; staminate flowers in slender catkins; pistillate flowers surrounded by a spiny involucre; fruit a nut enclosed in a spiny involucre.

15. SANTALACEAE (Sandalwood Family)

Trees, shrubs or herbs, a few members of this family parasitic on the roots or branches of trees; leaves alternate or opposite,

simple, entire; inflorescence various; flowers small; seed lacking a seed coat; ovary carpels 3-5; fruit an achene or drupe.

Comandra Nutt.

Perennial herbs; stems arising from creeping rootstocks; leaves alternate, glabrous, entire; inflorescence a terminal cyme; flowers apetalous, inconspicuous; calyx campanulate; fruit a drupe.

1. Comandra pallida A. DC.      Pale Comandra

Perennial herbs; stems arising from long, creeping, whitish rootstocks; stems very leafy; leaves alternate, glabrous, glaucous, entire, obovate to lanceolate, usually green but sometimes turning a purplish color; inflorescence a terminal cyme; calyx urn-shaped, pale cream colored; fruit a drupe.

16. LORANTHACEAE (Mistletoe Family)

Herbaceous or woody aerial parasites on trees; leaves may be present or lacking; stems usually dichotomously branched; inflorescence various; flowers imperfect, inconspicuous; receptacle cup-shaped; ovary inferior; ovules indistinct; fruit a 2-3-seeded berry or drupe.

Arceuthobium Marsch-Bieb.

Herbaceous, leafless, aerial parasites of trees, usually yellow or greenish; leaves reduced to scales; inflorescence 1 to several flowers in a scale axil; flowers imperfect, staminate 3-parted; fruit a berry.

Stems stout; mostly over 6 cm. tall.

Parasites on Pinus ponderosa.....2. A. campylonodum

Parasites on Abies.....3. A. abietinum

Stems slender, mostly under 6 cm. tall.

Parasites on Larix occidentalis.....4. A. laricina

Parasites on Pinus contorta.....1. A. americanum

1. Arceuthobium americanum Nutt. American Dwarf Mistletoe

Greenish parasitic herbs; stems slender, mostly less than 6 cm.; branches whorled; flowers in a terminal panicle; a parasite on Pinus contorta.

2. Arceuthobium campylonodum Engelm. Western Dwarf Mistletoe

Yellow, stout-stemmed, aerial parasites; leaves scale-like; stems stout, clustered; fruits densely clustered, bluish white berries; a parasite on Pinus ponderosa.

3. Arceuthobium abietinum Engelm. Fir Dwarf Mistletoe

Yellowish, fairly stout, leafless parasite on Abies; stem up to 12 cm.; leaf scales rounded to a point; staminate inflorescence spike-like.

4. Arceuthobium laricina (Piper) St. John Larch Dwarf Mistletoe

Greenish yellow, aerial parasites; much branched; stems fairly slender, up to 6 cm. tall; parasites on Larix occidentalis.

## 17. POLYGONACEAE (Knotweed Family)

Herbs or shrubs; stems usually with swollen nodes; nodes usually surrounded by a sheath formed by the 2 stipules; leaves usually



alternate, entire; inflorescence various; flowers small; fruit an angled or winged achene.

Flowers in groups of 1-3 in leaf axils located along terminal portion of stem.....2. Polygonum

Flowers in dense terminal panicle, compact rounded clusters, or umbel-like inflorescence.

Plants with well-developed nodal sheath; flowers lacking an involucre.....1. Rumex

Plants lacking nodal sheaths; flowers with involucre present.....3. Eriogonum

#### 1. Rumex L.

Annual or perennial herbs; stems stout or slender; leaves alternate, entire; stipules paper-like, encircling stem nodes; inflorescence a panicle; flowers greenish, clustered, lacking an involucre of united bracts; calyx 6-parted; stamens 6; fruit a 3-angled achene.

Plants with hastate leaves, from slender, creeping rhizomes...

.....2. R. acetosella

Plants with leaf margins crisped, from deep taproots...

.....1. R. crispus

#### 1. Rumex crispus L.      Curly-leaved Dock

Usually fairly coarse perennials from a taproot; leaves relatively large, lanceolate or oblong with crisp or wavy margins; inflorescence

a long, densely flowered, terminal, spike-like panicle; inner calyx lobes modified into 3 wing-like lobes enclosing the achene.

2. Rumex acetosella L. Red or Sheep Sorrel

Slender perennial herbs from creeping rhizomes; leaves hastate, the basal leaves many, the stem leaves relatively few, alternate; inflorescence a terminal panicle; flowers small, quite densely placed on peduncle.

2. Polygonum [Tourn.] L.

Annual or perennial herbs; stems usually with enlarged nodes; leaves alternate, entire; inflorescence various; flowers with a calyx of 5 lobes; stamens 4-9; fruit triangular achenes.

1. Polygonum douglasii Greene Douglas' Knotweed

Erect, slender annuals; stems wiry; leaves mostly lanceolate although sometimes broader; inflorescence of 1-3 axillary flowers or mostly singly arranged flowers in a terminal spike; flowers pink to white; achenes angled, black, shiny.

3. Eriogonum Michx.

Annual or perennial herbs; stipular sheath lacking; leaves entire, alternate, whorled or opposite; inflorescence terminal, often umbel-like or compact heads; flowers subtended by an involucre; calyx 6-parted; stamens 9; fruit an achene.

Plants with large cordate leaves, green above, white tomentose below; large, compact flower heads.....2. E. compositum

Plants with leaves obovate-ovate or oblanceolate, not cordate at base; flowers may or may not be in compact heads.

Leaves of plants basal, in dense, mat-like clusters, long petioled blade obovate; inflorescence usually loosely flowered.....1. E. proliferum

Leaves of plants whorled or loosely arranged along stem or at base of plant; inflorescence a compact flower cluster.....3. E. umbellatum

1. Eriogonum proliferum Torr. & Gray      Proliferous Eriogonum

Perennial herbs from a stout, woody caudex; mat-like leaves all basal, mostly white tomentose on both faces, densely so below and thin above; inflorescence on a slender tomentose scape, usually rather few-flowered; flowers yellow.

2. Eriogonum compositum Dougl.      Composite Eriogonum

Perennial herbs from woody, basal caudex; leaves basal in whorled clusters, mostly cordate, green above, white tomentose below; inflorescence on a stout scape, a large compound umbellate head of cream yellow flowers.

3. Eriogonum umbellatum Torr.      Sulfur-flowered Eriogonum

Perennial herbs from slender, creeping, woody caudices which root at the nodes; leaves relatively small, basal or whorled on slender stems; flowering scape stout with a whorled group of leaf-like bracts below the stalks which bear the umbellate flower heads; flowers bright yellow or yellow with reddish stripes. This plant is quite variable and appears very different under different

conditions varying from rather loosely branched clumps with bright yellow flowers to more compact, intricately branched clumps with yellow and red striped flowers.

### 18. PORTULACACEAE (Purslane Family)

Annual or perennial herbs or sometimes shrubs; stem and leaves often succulent; leaves alternate, opposite or basal; inflorescence various; flowers with usually 2 sepals; petals often 5; ovary unilocular, 2-5-styled; fruit usually a capsule.

#### Montia [Mich.] L.

Annual or perennial herbs; leaves succulent, mostly basal, alternate or opposite; inflorescence umbel-like or racemose; flowers with 2 sepals, 5 petals and 3-5 stamens; fruit a capsule opening by 3 valves.

Leaves narrow, linear, alternate.....3. M. linearis

Leaves broadly dilated (seldom linear), opposite.

Stem leaves 2, opposite and separate; perennials..

.....1. M. sibirica

Stem leaves 2, opposite, united into a disk below

inflorescence, the disk sometimes cleft; annuals...

.....2. M. perfoliata

#### 1. Montia sibirica (L.) Howell      Western Spring Beauty

Perennial herbs; stems often weak and slender; leaves mostly basal, the stem leaves subtending inflorescence separate, not forming a disk, mostly obovate, the basal leaves long petioled, blade

usually rhombic; inflorescence a loosely flowered raceme, petals pinkish or white.

2. Montia perfoliata (Donn) Howell Miner's Lettuce

Annual herbs; leaves mostly basal, the 2 stem leaves united into a disk-like bract below the inflorescence, the basal leaves green, long petioled blade rhombic, ovate; inflorescence a raceme, sometimes quite crowded; flowers pink or white; fruit a capsule.

Montia perfoliata var. depressa (Gray) Jepson A depressed form of M. perfoliata; under 1 dm. tall; usually reddish in color; disk cleft on one side; other characters the same as for M. perfoliata.

3. Montia linearis (Dougl.) Greene Narrow-leaved Montia

Annual herbs; stem slender; leaves narrowly linear, alternate on stem; inflorescence a terminal raceme, sparsely flowered; petals white; calyx persistent, often a rose pink color in fruit; fruit a capsule; seeds 1-4, black, shiny.

# 19. CARYOPHYLLACEAE (Pink Family)

Annual or perennial herbs; stems with usually swollen nodes; leaves opposite, rarely alternate, usually the leaf bases connate and sheathing or connected by a line; inflorescence various; petals usually 4-5; calyx usually 4-5-lobed; ovary 2-5-carpeled; fruit usually a 1-chambered capsule.

Sepals not united.

Petals cleft.....2. Stellaria

Petals entire.....1. Arenaria

Sepals united to form a tube.....3. Silene

1. Arenaria L.

Annual or perennial herbs; stems usually low; leaves mostly narrow, estipulate, sessile; inflorescence mostly terminal; flowers small, white; petals 5, mostly entire; sepals 5; stamens 10; styles 3; fruit a capsule.

1. Arenaria macrophylla Hook.      Large-leaved Sandwort

Low perennial herbs from creeping rhizomes; leaves mostly lanceolate; inflorescence a terminal cyme; petals white, entire; sepals green acuminate.

2. Stellaria L.

Annuals or perennial herbs; stems short; leaves opposite, mostly ovate or linear; inflorescence various; flowers with 2-cleft petals; sepals 4-5; petals 4-5; stamens usually 8-10; styles mostly 3; fruit a capsule.

1. Stellaria borealis Bigelow      Northern Starwort

Slender perennial herbs from slender rhizomes; stems weak, slender, branched, glabrous; leaves mostly lanceolate; inflorescence a terminal cyme, quite diffuse; petals white, deeply 2-cleft; calyx green, acuminate.

3. Silene L.

Annual or perennial herbs; stems erect or flattened; leaves various, opposite, without stipules; inflorescence of cymes or solitary flowers; calyx nerved, tubular; petals 5; stamens 10; styles 3 or 4; fruit a capsule.

Calyx campanulate, indistinctly nerved; leaves mostly broadly

lanceolate.....1. S. menziesii

Calyx tubular, distinctly nerved; leaves mostly linear...

.....2. S. douglasii

1. Silene menziesii Hook.      Menzies' Campion

Perennial herbs from slender rhizomes; stems slender, leafy, decumbent; leaves opposite, obovate to mostly broadly lanceolate; inflorescence a terminal cyme; petals white, 2-lobed; calyx campanulate, the lobes acute.

2. Silene douglasii Hook.      Douglas' Campion

Mostly erect, clustered, perennial herbs from a woody caudex; stems erect, pubescent; leaves mostly linear, opposite; inflorescence a terminal cyme; petals 2-lobed, white to pinkish; calyx tubular, distinctly nerved, with short, triangulate lobes.

## 20. RANUNCULACEAE (Buttercup Family)

Annual or perennial herbs; leaves often divided or compound; inflorescence various; flowers mostly perfect with reduced or modified petals; stamens mostly numerous and spirally arranged; pistils several to many; ovary 1-celled; fruit a follicle, achene or berry.

Flowers spurred.

Color of perianth blue or purplish....6. Delphinium

Color of perianth reddish and yellow..5. Aquilegia

Flowers not spurred.

Leaves lobed or divided; fruiting head not elongate.

Flowers bright yellow; fruiting receptacle globose;  
roots clustered, fibrous.....1. Ranunculus

Flowers white, pink, purplish or dark red.

Stems slender; leaves trifoliate; sepals pink  
or white.....3. Anemone

Stems stout; leaves pinnately compound; petals  
dark red.....4. Paeonia

Leaves not lobed, mostly linear; fruiting head elongate...  
.....2. Myosurus

# 1. Ranunculus [Tourn.] L.

Annual or perennial herbs; stems leafy; leaves various, often  
compound or cleft; flowers often showy yellow or white; sepals  
usually 5; petals various, often 5 however; stamens many, spirally  
arranged; pistils 5 or more; fruit achenes, usually in heads.

Fruiting receptacle glabrous, not much enlarged in fruit; leaves  
generally under 5 cm. wide, only 3-lobed not divided into 3  
leaflets.....2. R. occidentalis

Fruiting receptacle hairy, enlarged in fruit; leaves generally  
over 5 cm. wide, often completely divided into 3 leaflets...  
.....1. R. macounii

## 1. Ranunculus macounii Britton      Macoun's Buttercup

Perennial herbs from fibrous roots; stems erect or decumbent;  
hairy leaves 5-15 cm. wide; large leaflets up to 5 or more cm. wide,  
divided 3 times, often 3-5-parted and sharply toothed; inflorescence



terminal; flowers solitary on the ends of long peduncles; petals yellow; fruit a globose head of achenes; receptacle hairy; achenes beaked.

2. Ranunculus occidentalis Nutt.      Western Buttercup

Rather slender perennial herbs from fibrous roots; stems erect; leaves 2-5 cm. wide, 3-lobed or 3-parted, the lobes toothed; leaves quite variable with the divisions sometimes quite broad, other times linear; inflorescence terminal; petals yellow; achenes in a roundish cluster, the beak often curved; receptacle glabrous.

2. Myosurus L.

Very small annual herbs; roots fibrous; leaves all basal, mostly linear; inflorescence 1-flowered, borne on a slender scape; flowers greenish, very small; fruit borne on a long spike-like receptacle.

1. Myosurus minimus L.      Western Mouse-tail

Small, slender annual herbs; leaves linear, 3-10 cm. long, all basal; inflorescence a single flower on a slender scape; mature fruiting receptacle 3-25 mm. long.

3. Anemone L.

Perennial herbs from slender rootstocks; basal leaves present with 2 or 3 stem leaves subtending the flowers; inflorescence usually solitary or umbellate, 1-flowered panicles; flowers showy; petals absent; sepals petal-like, usually 5; stamens many; fruit achenes.

1. Anemone lyallii Britton      Little Mountain Anemone

Perennial herbs from slender, creeping rhizomes; stem slender;

leaves mostly basal, disappearing by flowering time; stem leaves 3, trifoliate, subtending the flower; inflorescence a solitary terminal flower; petals absent; sepals white or pinkish; stamens many.

#### 4. Paeonia [Tourn.] L.

Perennial herbs with stout roots; leaves alternate, ternately divided, compound; inflorescence terminal; flowers solitary, large; sepals 5-6; petals 5-6; stamens many; fruit 2 to several follicles.

##### 1. Paeonia brownii Dougl.      Western Peony

Perennial herbs; stems stout, fleshy; leaves alternate, ternately compound; flowers solitary; sepals green, fleshy; petals dark red; fruit a cluster of usually 5 follicles.

#### 5. Aquilegia [Tourn.] L.

Perennial herbs; stems erect; leaves mostly basal, compound, 2-3-ternate; inflorescence terminal; flowers solitary; sepals and petals 5; petals spurred; stamens many; fruit a follicle.

##### 1. Aquilegia formosa Fischer      Western Columbine

Perennial herbs; stems fairly stout; leaves biternate, mostly basal; leaflets mostly with 3 major lobes and smaller rounded teeth; inflorescence terminal; flowers solitary on the ends of the branches; calyx red; petals yellow, spurred; stamens many; fruit a head of follicles.

#### 6. Delphinium [Tourn.] L.

Annual or perennial herbs; stems erect; leaves palmately divided;

inflorescence of terminal racemes; flowers with 5 petal-like sepals, some modified with a basal spur; petals usually 4; fruit follicles.

1. Delphinium menziesii DC.      Menzies' Larkspur

Perennial herbs; roots tuber-like, in clusters; leaves alternate, palmately divided, usually 3 main divisions in the lower leaves and these divisions again once or twice cleft, the upper leaves sometimes 5 or more times divided into linear divisions; inflorescence a terminal raceme of blue flowers; calyx petal-like, forming a spur 12-16 mm. long; upper petals whitish with blue veins, lower yellowish.

21. BERBERIDACEAE (Barberry Family)

Perennial herbs or shrubs; leaves simple or pinnately compound, alternate or basal; inflorescence various; pistil 1; stamens biserrate with anthers opening by valves; fruit usually a berry.

Barberis L.

Shrubs with simple or compound, evergreen leaves; leaves having spine-tipped, irregular margins; flowers in racemes, yellow, often 6-merous; fruit a berry.

Leaves pinnately compound; leaflets 3-7....2. B. repens

Leaves pinnately compound; leaflets 9-15...1. B. nervosa

1. Barberis nervosa Pursh      Long-leaved Oregon Grape

Perennial shrubs; stem short, supporting several whorls of chaffy, acuminate, old bud scales as well as the new bud scales at the apex; leaves pinnately compound with 9-15 leaflets, the

margins serrate and each serration spine-tipped; inflorescence a raceme; flowers yellow; fruit a bluish berry.

2. Barberia repens Lindl.      Creeping Western Barberry

Low perennial shrubs; stems arising along creeping rhizomes; leaves pinnately compound; leaflets 3-7, mostly cordate at base, the margins dentate and each tooth spine-tipped; inflorescence a raceme; flowers yellow; fruit oblong, bluish.

22. CRUCIFERAE (Mustard Family)

Annual or perennial herbs or sometimes subshrubs; leaves alternate, simple, lacking stipules, forked or stellate hairs commonly present; inflorescence usually a raceme; calyx of 4 sepals; petals usually 4; stamens typically 6 (4 long and 2 short); ovary superior; pistil 1; fruit a silique or silicle.

Leaves simple.....2. Arabia

Leaves pinnately compound.....1. Cardamine

1. Cardamine [Tourn.] L.

Perennial herbs, mostly glabrous; stems caulescent; leaves often pinnately parted; inflorescence a terminal raceme, often few-flowered; petals white or purple; fruit a long, slender silique, many-seeded.

1. Cardamine pennsylvanica Muhl.      Pennsylvania Bitter-cress

Perennial herbs from clustered fibrous roots; stem mostly glabrous; leaves pinnately divided, the divisions mostly entire or slightly lobed, terminal lobe rounded; inflorescence a terminal raceme;

flowers white; calyx 4-parted; petals 4; stamens 6; fruit a silique, up to 3 cm. long and about 1 mm. wide; in moist places at medium elevations.

## 2. Arabis L.

Annual or perennial herbs, sometimes shrubby; stem usually leafy; leaves often stellate pubescent; inflorescence terminal; petals white to purple; fruit a silique, linear in shape, narrow or sometimes wide; (in our area) plants of high, open, dry ridges.

Plants mostly glabrous; silique erect, 3-4 mm. wide....

.....2. A. platysperma

Plants stellate pubescent; siliques reflexed, 1-1.5 mm.

wide,.....1. A. holboellii  
secunda

### 1. Arabis holboellii Hornem. var. secunda (Howell) Jepson

Holboell's Rock-cross

Perennial herbs, often woody below, from a taproot; stems single or clustered, simple stellate pubescent below, leafy; leaves clustered below, stellate pubescent, oblanceolate, entire or dentate; cauline leaves auriculate, clasping, mostly entire, pubescent with stellate or forked hairs; inflorescence a terminal raceme, usually many-flowered; petals white to purple; fruit a silique, 1-1.5 mm. wide and up to 8 cm. long, many-seeded.

### 2. Arabis platysperma Gray Flat-pod Rock-cross

Mostly glabrous perennial herbs, woody below; stems herbaceous; basal leaves spatulate, entire; stem leaves clasping, mostly linear;

inflorescence terminal, few-flowered; petals purple to white; fruit erect siliques, 3-4 mm. broad and 4-6 cm. long; seeds winged.

### 23. SAXIFRAGACEAE (Saxifrage Family)

Perennial or sometimes annual herbs; stems mostly not leafy; leaves mostly basal, usually estipulate; inflorescence various; flowers with few stamens and few pistils; floral parts on a regular plan of 4-5 sepals or petals; pistils subtended by scale-like glands; fruit a capsule.

Plants with leafy stems; leaves small, orbicular in outline,

deeply 3-parted.....1. Lithophragma

Stems not leafy; leaves all basal, large, orbicular, not

deeply 3-parted.....2. Huechera

#### 1. Lithophragma Nutt.

Perennial herbs; stems slender, leafy; rootstocks bearing bulblets; leaves usually orbicular in outline, often lobed or parted; inflorescence a terminal raceme; flowers white or pink; petals various; stamens 10; fruit a 1-chambered capsule.

#### 1. Lithophragma bulbifera Rydb.      Slender Fringe-cup or Rock Star

Slender perennial herbs from a mass of fibrous roots and rootstocks which bear red bulblets; stem leafy; leaves orbicular in outline, 3-5-parted and then again lobed by smaller divisions, the stem leaves bearing small bulblets in the axil of the petioles; inflorescence a few-flowered raceme; flowers mostly pinkish; petals cleft into several divisions.

2. Heuchera L.

Perennial herbs arising from a stout caudex; roots thick, fleshy; leaves orbicular, lobed, mostly basal; inflorescence a panicle or a raceme; flowers white; stamens 5; fruit a 1-celled capsule.

1. Heuchera chlorantha Piper      Narrow-flowered Heuchera

Perennial herbs from stout rootstocks; scape slender, long, hairy, leafless, surpassing the basal leaves; leaves basal, orbicular in outline, cordate at base, lobed; pedicels long, hairy; blade glabrous except on veins; inflorescence a spike-like, terminal panicle; flowers greenish white; fruit a capsule.

## 24. RIBESACEAE (Gooseberry Family)

Shrubs; stems often much branched or sometimes climbing; leaves alternate, palmately veined; inflorescence various; flowers perfect; calyx 5-lobed; ovary inferior; fruit a berry.

Ribes L.

Shrubs; stems smooth or with spines; leaves alternate, palmately veined; flowers solitary or in racemes or clusters; ovary inferior; fruit a many-seeded berry.

Plants with sharp spines on the stems.....1. R. inarva

Plants with smooth stems.

Flowers 6-10 mm. long, pinkish or white; leaves small, orbicular, lacking stalked glands; fruit a red berry.....3. R. cereum

Flowers 10-14 mm. long, greenish or greenish yellow (sometimes pink tinged); leaves 3-5-lobed with stalked glands; fruit a black berry.....2. R. viscosissimum

1. Ribes inerme Rydb.      White-stemmed Gooseberry

Erect shrubs with sparingly spiny stems; leaves 3-5-lobed, the margins dentate, glabrous except ciliate on margins; inflorescence mostly 1-3 flowers in axillary clusters; calyx short, tubular, purple or green tinged; petals short, white; stamens exserted; fruit a black berry.

2. Ribes viscosissimum Pursh      Sticky Currant

An erect or spreading shrub; leaves 3-5-lobed, the margins dentate, covered with stalked glands on both surfaces; inflorescence a usually rather crowded raceme; calyx 10-14 mm. long, greenish or greenish yellow or white (sometimes pinkish tinged); petals short, white; fruit a black berry.

3. Ribes cereum Dougl.      White Squaw Currant

An erect, much branched shrub; leaves orbicular, dentate on the margins, in general not lobed, glandular above; inflorescence generally few-flowered; calyx 6-10 mm. long, white or pinkish, narrowly tubular; petals short; fruit a red berry.

## 25. ROSACEAE (Rose Family)

Herbs, shrubs or trees; leaves usually alternate, rarely opposite, usually simple or pinnately compound (sometimes palmately); stipules present; inflorescence various; flowers usually perfect; stamens many,



attached to a hypanthium which surrounds the pistils; petals usually 5; fruit achenes, follicles, drupes, drupelets or pomes.

Fruit a pome; ovary inferior.

Leaves pinnately compound.....10. Sorbus

Leaves simple.

Stems armed with stout spines...12. Crataegus

Stems not armed with stout spines.....

.....11. Amelanchier

Fruit not a pome; ovary superior or at least partially so.

The fruit a solitary, fleshy drupe...13. Prunus

The fruit achenes, follicles or aggregate of drupelets.

Fruit an aggregate of drupelets..9. Rubus

Fruit follicles or achenes.

Fruit of achenes embedded on the surface of a  
red, fleshy receptacle...5. Fragaria

Fruit not composed of achenes embedded over the  
surface of a fleshy receptacle.

Herbs.

Petals yellow.

Achenes with long, hooked bristles;  
lower leaves lyrate...

.....6. Gaulth

Achenes without long, hooked  
bristles; lower leaves merely

pinnately compound or palmately

compound.....3. Potentilla

Petals white or pinkish.....

.....4. Horkelia

Shrubs.

Petals a bright rose pink or light pink,

Stems armed with short spines...

.....7. Rosa

Stems not armed with spines...

.....1. Spiraea

Petals yellow or white.

The petals a light yellow; leaves

trifid at apex.....

.....8. Purshia

The petals white; leaves with

several to many lobes and

teeth.....2. Holodiscus

1. Spiraea L.

Shrubs; leaves simple, alternate; inflorescence paniculate or corymbiform; petals white, pink or rose; stamens usually many; calyx lobes short; fruit a follicle.

1. Spiraea douglasii Hook.      Western Spiraea

Shrubs; stems erect, much branched; leaves alternate, toothed toward apex, green above and whitish below with a dense tomentum; inflorescence a dense, terminal panicle; petals rose colored.

2. Holodiscus Maxim.

Shrubs; stems usually much branched; leaves alternate, simple, lobed or toothed; stipules absent; inflorescence a raceme or a panicle; sepals and petals 5; petals white or pink; stamens numerous, borne on a disk; pistils 5; fruit hairy achenes.

Herbage very glandular; leaves merely toothed, not lobed and toothed; mostly low shrubs.....2. H. glabrescens

Herbage not glandular; leaves lobed and toothed; mostly tall shrubs.....1. H. discolor

1. Holodiscus discolor (Pursh) Maxim.      Ocean-spray

Shrubs 1-5 m. tall; stems usually branched; leaves alternate, dark green above, villous to tomentose below making the undersurface lighter, not glandular; inflorescence dense, terminal; petals white; achenes hairy.

2. Holodiscus glabrescens (Greene) Heller      Dwarf Ocean-spray

Shrubs 5-15 dm.; stems much branched; leaves alternate, 1-2 cm. long, the margins toothed but not lobed, glandular above and below, light green; inflorescence short, terminal racemes; petals whitish; achenes hairy.

3. Potentilla L.

Herbs or shrubs; leaves compound either pinnately or palmately; inflorescence solitary or cymes; petals usually yellow; stamens many; calyx 5-lobed, persistent; fruit achenes.

Leaves pinnately compound.....2. P. glandulosa

Leaves palmately compound.....1. P. gracilis

1. Potentilla gracilis Dougl.      Slender Cinquefoil

Perennial herbs from stout roots; stems erect, 3-7 dm. high, pubescent; leaves alternate, digitate, dark green above, white below due to a white tomentum; stipules long; inflorescence a terminal cyme; petals yellow; achenes arranged on a conical receptacle.

2. Potentilla glandulosa Lindl.      Sticky Cinquefoil

Perennial herbs from woody roots; stems erect, pubescent with gland-tipped hairs; lower leaves pinnately compound, the margins dentate; inflorescence subtended by leaf-like bracts; petals yellow; calyx glandular.

4. Horkelia Cham. & Sch.

Perennial herbs from stout, woody roots; stems erect; leaves pinnately compound; inflorescence a terminal cyme; calyx mostly campanulate, 5-lobed; petals usually white; stamens 5-20; filaments dilated.

1. Horkelia fusca Lindl.      Pine Woods Horkelia

Perennial herbs from stout, woody roots; stems erect; leaves glandular, pinnately compound, the leaflets divided into linear divisions; inflorescence dense, cymose clusters; petals white or pinkish; calyx purplish; stamens 10; filaments broadly dilated. This species is quite variable and several varieties have been described.

## 5. Fragaria [Tourn.] L.

Perennial herbs usually producing stolons; leaves mostly basal, trifoliate; inflorescence of several flowers on a scape; petals 5, white; sepals 5; stamens 20; fruit achenes embedded on the surface of a red, enlarged, fleshy receptacle.

### 1. Fragaria virginiana Druch. ssp. platypetala (Rydb.) Staudt

#### Broad-petaled Strawberry

Perennial herbs; leaves basal, slightly hairy below, mostly glabrous above; flowers white; petals 6-7 mm. long; fruit globose, the achenes embedded in pits on the surface of the fleshy receptacle.

## 6. Gaulth L.

Perennial herbs; stems from rootstocks; leaves pinnately lobed, the terminal lobes large; inflorescence solitary or cymose; sepals and petals 5; stamens many; achenes with a hooked beak.

### 1. Gaulth macrophyllum Willd. Large-leaved Avens

Perennial herbs from stout rootstocks; stems erect, pubescent; leaves lyrate, pinnate, with a large, 3-lobed, terminal leaflet, orbicular in outline, the margins dentate; inflorescence a corymb; petals yellow; achenes with hooked bristles.

## 7. Rosa [Tourn.] L.

Shrubs; stems armed with prickles; leaves pinnately compound; inflorescence solitary or cymose; calyx tube forming a rather fleshy, usually red structure (the hip) which encloses the achenes; petals usually 5; stamens numerous.

1. Rosa gymnocarpa Nutt. Little Wild Rose

Erect or trailing shrubs; stems armed with short, straight prickles; leaves pinnately compound; stipules slender, united to the petiole; leaflets rather coarsely serrated on margins, mostly 5-7; inflorescence usually of solitary flowers; pedicels and calyx usually somewhat glandular; petals rose pink; hypanthium (hip) in fruit elliptic, reddish in color.

8. Purshia DC.

Shrubs or trees; leaves alternate, in fascicled groups, 3-cleft; inflorescence of solitary flowers; petals yellow or white; fruit a beaked achene.

1. Purshia tridentata (Pursh) DC. Antelope or Bitter Brush

An erect shrub; branches erect, stiff; leaves alternate, in fascicled groups, trifid at apex; inflorescence solitary; petals long clawed, yellow; stamens many; fruit an oblong achene.

9. Rubus [Tourn.] L.

Perennial herbs or shrubs, often vine-like; stems usually with prickles; leaves alternate, simple or compound; inflorescence various; petals purplish or white; sepals and petals 5; stamens many; fruit an aggregate of drupelets borne on a cone-like receptacle.

Leaves simple, palmately veined, usually 5-7-lobed; stem not

armed with prickles.....1. R. parviflorus

Leaves compound, mostly trifoliolate; stems armed with

prickles.....2. R. vitifolius

1. Rubus parviflorus Nutt.      Thimble Berry

Shrubs; stems lacking prickles; leaves palmately veined, 5-7-lobed, dark green above and lighter below; inflorescence corymbose, clusters of large, white to pinkish flowers; calyx lobes glandular, pubescent; fruit red, not persistent on receptacle.

2. Rubus vitifolius Cham. & Sch.      Western Dewberry

Trailing, creeping or climbing to partly erect shrubs; stems armed with short, sharp prickles; leaves alternate, 3-5-foliolate; leaflets somewhat lobed and toothed; inflorescence mostly few-flowered clusters of white flowers; stamens many; fruit persistent on receptacle, black.

10. Sorbus [Tourn.] L.

Trees or shrubs; leaves pinnately compound, alternate, leaflets serrate; inflorescence cymose; petals white; ovary inferior; stamens many; fruit a pome.

1. Sorbus sitchensis M. Romer      Western Mountain Ash

Shrubs up to 5 m.; leaves pinnately compound; leaflets serrate on margins; inflorescence of terminal, densely flowered cymes; petals white; fruit an orange or red pome.

11. Amelanchier Medicus

Shrubs or trees; leaves simple, deciduous; inflorescence racemes, corymbs or solitary; petals white; sepals 5; stamens many; fruit a pome.

1. Amelanchier florida Lindl. Western Serviceberry

Shrubs or small trees; leaves ovate to orbicular, alternate, deciduous, the margins serrate at apex and on sides at least above the upper half of the leaf, sometimes almost to the base; inflorescence a raceme; petals 5, white; stamens many; fruit black.

12. Crataegus L.

Trees or shrubs; branches thorny; leaves simple, alternate, deciduous; inflorescence a corymb; petals white or pink; ovary inferior; fruit a 1-5-seeded pome.

1. Crataegus douglasii Lindl. Douglas' Hawthorn

Shrub or small tree; stem and branches armed with stout spines up to 2 cm. long; leaves simple, the margins somewhat lobed and dentate, alternate but appearing somewhat whorled on the ends of short spur branches; inflorescence a corymb of white to pinkish flowers; fruit black.

13. Prunus [Tourn.] L.

Shrubs or trees; leaves simple; inflorescence a raceme, corymb, umbel or sometimes solitary; petals white or pink; fruit a drupe with a bony endocarp.

Flowers in small corymbs; fruit bright red..2. P. emarginata

Flowers in racemes; fruit reddish to purplish.....

.....1. P. demissa



1. Prunus demissa (Nutt.) D. Dietr.      Western Choke Cherry

Trees or shrubs; leaves mostly oblong-ovate, the apex acute, the margins serrate; inflorescence a rather densely flowered raceme up to 15 cm. long; petals white; fruit a dark red to purplish drupe.

2. Prunus emarginata (Dongl.) Walp.      Bitter Cherry

Shrubs up to 5 m., often much branched and sometimes depressed; leaves mostly oblong to elliptic; inflorescence a small corymb; petals white; fruit a bright red drupe.

## 26. LEGUMINOSAE (Pea Family)

Herbs, shrubs or trees; leaves alternate mostly compound (commonly pinnately but sometimes palmately); flowers irregular and papilionaceous; calyx 5-lobed; corolla typically 5 petals; ovary superior; style and stigma 1; fruit usually a legume.

Leaves palmately compound or trifoliolate.

The leaves palmately compound.....1. Lupinus

The leaves trifoliolate.....2. Trifolium

Leaves pinnately compound.

The leaves odd pinnate.....3. Lotus

The leaves even pinnate; the last leaf of rachis modified into a tendril.

Style flattened, hairy on inner side.....

.....5. Lathyrus

Style not flattened, the end of style with a ring of hairs just below stigma....4. Vicia

1. Laminus [Tourn.] L.

Annual, perennial or biennial herbs; leaves alternate, palmately compound; inflorescence a terminal raceme; calyx toothed, bilabiate; corolla usually showy, papilionaceous; stamens 10; fruit a legume.

Leaves glabrous or very minutely pubescent.....

.....4. L. polyphyllus

Leaves definitely pubescent with tomentum of appressed hairs.

Calyx developing a sac or spur just above pedicel...

.....2. L. caudatus

Calyx not developed into a sac-like structure or spur just above pedicel.

Plants not over 30 cm. tall, mostly 20 cm. or less; pubescence silky; inflorescence a densely flowered spike-like raceme 5-8 cm. long.....

.....1. L. lepidus medius

Plants over 30 cm. tall, mostly 40 cm. or more; pubescence densely white tomentose and somewhat villous; inflorescence a fairly densely flowered spike-like raceme 8-30 cm. long.....

.....3. L. leuconhyllus

1. Laminus lepidus Dougl. ssp. medius Detl.      Prairie Lupine

Perennial herbs from slender taproots; stems mostly about 8-20 cm., silky pubescent with silver to brownish hairs; leaves mostly basal, the leaflets and petioles silky pubescent; leaflets 6-9, oblanceolate to obovate; inflorescence a dense spike-like raceme

5-8 cm. long; corolla dark blue, the banner with light or yellowish blotch on the inside; calyx not spurred or sac-like at the base next to the pedicel.

2. Lupinus caudatus Kell. Kellogg's Spurred Lupine

Perennial herbs from slender, woody roots; stem erect, covered with a short silvery pubescence; leaflets and petioles also silvery pubescent; leaflets 6-10, mostly oblanceolate; inflorescence a rather loose flowered raceme; corolla purple to pinkish, the banner usually somewhat lighter than the rest of the petals, the center often white or yellowish; calyx prolonged into a sac or spur-like structure next to the pedicel.

3. Lupinus leucophyllus Dougl. Woolly-leaved Lupine

Perennial herbs from slender taproots; stem leaves and inflorescence densely woolly tomentose; leaves alternate on long petioles, palmately compound, the leaflets oblanceolate, 6-10 in number; inflorescence a rather densely flowered spike-like raceme; calyx not sac-like at base; corolla white, pinkish, bluish to purplish.

4. Lupinus polyphyllus Lindl. Large-leaved Lupine

Perennial herbs from stout roots; stems erect, hollow; leaves large, from 15-30 cm. across on many of the lower leaves, mostly on long petioles, the petioles and leaflets mostly glabrous to very minutely pubescent, the leaflets oblanceolate; inflorescence a long raceme; petals purple to a reddish purple; fruit a legume covered with a long villous pubescence.

2. *Trifolium* [Tourn.] L.

Annual or perennial herbs; leaves mostly trifoliate; inflorescence a spike- or umbel-like head; corolla papilionaceous; calyx mostly regular; stamens 10; fruit a few-seeded legume.

Leaflets pubescent, mostly lanceolate; inflorescence pubescent...

.....1. *T. eriocephalum*

Leaflets mostly glabrous, ovate; inflorescence glabrous...

.....2. *T. repens*

1. *Trifolium eriocephalum* Nutt.      Woolly-headed Clover

Perennial herbs from stout taproots; stems several to many arising from the stout caudex; leaflets mostly lanceolate, pubescent on both surfaces with white hairs, the apex acuminate; inflorescence a rounded, umbel-like cluster of flowers; calyx lobes pubescent; corolla pale yellow.

2. *Trifolium repens* L.      White Clover

Slender stemmed perennial herbs, the stems often rooting at the nodes; leaves mostly ovate, glabrous, the margins slightly toothed, some emarginate at the apex; inflorescence a round, umbel-like cluster of flowers lacking an involucre, on the end of a long peduncle; calyx glabrous; corolla white.

3. *Lotus* [Tourn.] L.

Annual or perennial herbs; leaves odd-pinnately compound; inflorescence axillary; flowers solitary or in umbel-like clusters;

corolla papilionaceous; calyx mostly regular; stamens 10; fruit  
a legume.

Corolla yellow; leaflets pubescent; stems mostly prostrate...

.....2. L. douglasii

Corolla greenish tinged with red or purple; leaflets glabrous;

stem erect.....1. L. crassifolius

1. Lotus crassifolius (Benth.) Greene      Thick-leaved Lotus

Perennial herbs; stems erect, hollow in the lower portions;  
leaves pinnately compound, leaflets 9-23, glabrous and glaucous;  
inflorescence axillary; corolla greenish tinged with red or purple;  
legumes 4-7 cm. long.

2. Lotus douglasii Greene      Douglas's Lotus

Perennial herbs from stout, woody roots; leaves pubescent on  
both surfaces, the leaflets 3-5 mostly 5; inflorescence 5-20-flowered  
axillary clusters; corolla bright yellow; legumes beaked.

4. Vicia [Tourn.] L.

Annual or perennial herbs usually having a tendril at the end  
of each leaf and climbing by these appendages; leaves even pinnate;  
inflorescence axillary, solitary or a raceme; flowers papilionaceous;  
calyx 5-lobed, teeth unequal; stamens 10; style thread-like and  
surrounded by a ring of hairs just below the stigma.

1. Vicia americana Muhl.      American Vetch

Perennial herbs; stems climbing by the aid of tendrils on the  
ends of the leaves; leaves pinnately compound, 8-14 leaflets, the

leaflets mostly elliptic, the apex mucronate; inflorescence axillary in short 2-10-flowered racemes; corolla light purple above, lighter below, 15-18 mm. long.

### 5. Lathyrus [Tourn.] L.

Annual or perennial herbs; leaves bearing tendrils at the apex; tendrils, however, sometimes not well-developed; leaves even pinnate; inflorescence axillary, solitary or racemes; flowers papilionaceous; calyx 5-lobed, teeth about equal; stamens 10; style flattened bearing hairs on the inner face.

Leaflets mostly linear or lanceolate; corolla purple, about

1 cm. long.....1. L. lanswertzii  
aridus

Leaflets mostly elliptic to ovate; corolla bluish purple,

about 2 cm. long.....2. L. nevadensis

#### 1. Lathyrus lanswertzii Kell. ssp. aridus (Piper) Bradshaw

Perennial herbs; stems mostly erect; leaves with usually 2-5 leaflets, the tendrils not well-developed, the leaflets mostly linear to lanceolate; inflorescence a 2-5-flowered raceme; corolla about 1 cm. long, purplish; legumes with a rough surface, 2-5 cm. long.

#### 2. Lathyrus nevadensis S. Wata.      Sierra Nevada Pea

Perennial herbs; stems erect; leaves with 4-8 leaflets, the tendrils poorly developed, the leaflets mostly elliptic to ovate; inflorescence a 2-4-flowered raceme; corolla bluish purple above, yellowish below, about 2 cm. long; legumes glabrous, 3-7 cm. long.

## 27. LINACEAE (Flax Family)

Annual or perennial herbs or sometimes shrubs with 5-merous flowers; distinct petals; stamens united at base; fruit a capsule.

Linum Tourn. ex L.

Annual or perennial herbs with 5-merous flowers; leaves alternate or opposite; petals 5, distinct; calyx 5, also distinct; fruit a capsule.

1. Linum lewisii Pursh      Western Blue Flax

Perennial herbs from a woody taprooted caudex; stems clustered, very leafy; leaves alternate, lanceolate, 1-5 cm. long; inflorescence a terminal cyme; calyx green, 5-lobed; petals 5, blue, distinct, falling early; fruit a capsule.

## 28. ACERACEAE (Maple Family)

Trees or shrubs with opposite leaves, usually palmately veined or sometimes pinnately compound; flowers actinomorphic; fruit a samara.

Acer [Tourn.] L.

Trees or shrubs with opposite, palmately veined or sometimes pinnately compound leaves; calyx mostly 5-parted (sometimes 4 to 12); inflorescence a raceme of small, usually colored flowers; fruit a double samara, the 2 carpels separating at maturity.

1. Acer glabrum Torr. var. douglasii (Hook.) Piper      Douglas Maple

Small trees or shrubs; bark reddish or gray; leaves opposite, palmately veined, prominently 3-5-lobed, the margins dentate;

inflorescence small clusters of yellowish flowers; fruit a double samara, the 2 carpels only divergent from each other about 90°.

## 29. CELASTRACEAE (Staff-tree Family)

Trees or shrubs; leaves simple, alternate or opposite; inflorescence cymose of small greenish or red flowers; ovary usually surrounded by a disk placed inside the point of stamen attachment, sometimes united to the stamens; seed often enveloped in a colored covering.

### Pachystima Raf.

Evergreen shrubs, much branched, with opposite, serrate leaves; inflorescence axillary of minute flowers; fruit a capsule.

#### 1. Pachystima myrsinites (Pursh) Raf.      Oregon Boxwood

Low, creeping or erect evergreen shrubs; stems woody, usually much branched, 7-150 m. high; leaves opposite or obovate with serrate margins; inflorescence axillary of small reddish or yellowish flowers; fruit an oblong capsule.

## 30. RHAMNACEAE (Buckthorn Family)

Trees, shrubs or rarely herbs with simple leaves; inflorescence various; flowers perigynous; petals concave giving them a dipper-like appearance; stamens opposite the petals; fruit a berry, capsule or samaroid.

Fruit berry-like; flowers small, greenish, axillary....

.....1. Rhamnus



Fruit a capsule; flowers white or blue in umbel-like clusters,  
or arranged in a panicle.....2. Ceanothus

1. Rhamnus Tourn. ex L.

Shrubs or small trees; stems mostly erect, branched; leaves simple, alternate; inflorescence axillary; flowers small, greenish, in clusters; petals very small sometimes wanting; calyx 4-5-parted; stamens 4-5; fruit fleshy, containing 2-4 nutlets.

1. Rhamnus purshiana DC.      Cascara Sagrada

Erect shrubs or small trees, many-branched; leaves alternate, entire or serrate margins; inflorescence an umbel-like axillary cluster; flowers greenish; petals very small and inconspicuous; fruit fleshy, black when mature, containing 3 nutlets.

2. Ceanothus L.

Shrubs or small trees; stems erect or prostrate; leaves with smooth or spinescent margins; inflorescence various, mostly paniculate or umbellate; flowers variously colored; calyx 4-5-lobed; petals 5; stamens 5; fruit a capsule that upon drying separates into 3 sections.

Prostrate shrubs with blue flowers; spiny-toothed leaves...

.....2. C. prostratus

Erect shrubs with white flowers; leaves not spiny.....

.....1. C. velutinus

1. Ceanothus velutinus Dougl.      Sticky Laurel

Erect, spreading shrubs; limbs much branched, spreading; leaves

ovate, prominently 3-veined, dark green above, lighter below, the margins finely toothed with black tipped glands; leaves very sticky, appearing varnished, very fragrant with a spicy odor; inflorescence a dense panicle; flowers white; fruit a capsule.

2. Ceanothus prostratus Benth. Mahala-mats or Squaw Currant

Prostrate, mat-forming shrubs; limbs stiff, many-branched; leaves ovate in outline with spiny margins, green above, whitish below; inflorescence a small umbellate cluster; flowers blue; fruit a large capsule.

31. HYPERICACEAE (St. John's-wort Family)

Trees, shrubs or herbs; leaves simple, opposite or whorled, often having black dots or clear spots on the leaves; inflorescence various; stamens fasciated; ovary 3-5-loculed; styles mostly distinct; fruit a capsule or berry.

Hypericum Tourn. ex L.

Herbs or shrubs; leaves opposite, usually with black or clear spots on them; inflorescence a cyme; petals bright yellow or a deep copper yellow; sepals and petals 5; stamens in clusters; fruit a capsule.

1. Hypericum scouleri Hook. Western St. John's-wort

Perennial herb with clustered, erect stems arising from creeping stolons; leaves opposite, oblong to ovate, the margins black dotted; inflorescence a terminal, few-flowered cyme or sometimes solitary;

calyx lobes 5, obtuse; petals bright yellow, 5, distinct; stamens numerous, in clusters; fruit a capsule.

### 32. VIOLACEAE (Violet Family)

Herbs, shrubs or sometimes trees; leaves alternate or basal, stipules present, the blades simple; inflorescence clustered or solitary; flowers 5-merous; zygomorphic corolla (in Viola); stamens basally united and turned inward; fruit a capsule or berry.

#### Viola Tourn. ex L.

Annual or perennial herbs; leaves all basal or alternate on stem; inflorescence solitary, the flowers often on long peduncles; flowers irregular, spurred; stamens 5; fruit a 3-valved capsule.

Petals clear yellow; large heart-shaped leaves.....

.....1. V. glabella

Petals not clear yellow; leaves ovate or variously lobed.

Petals yellow and brownish purple.....2. V. purpurea

Petals blue with whitish interior.....3. V. cascadiensis

#### 1. Viola glabella Nutt.      Smooth Woodland Violet

Perennial herbs from slender rootstocks; stems slender with alternate leaves; leaves glabrous, large, heart-shaped, the margins evenly dentate; flowers with bright, clear yellow petals, the spur short.

#### 2. Viola purpurea Mill.      Purple-tinged Violet

Perennial herbs from strong rootstocks; stems clustered; leaves

variously lobed and toothed, dark green above, lighter below; flowers yellow within, purplish or brownish on the outside, the spur short.

3. Viola cascadiensis M. S. Baker      Cascade Violet

Perennial herbs from slender rootstocks; leaves all basal, long petioled, the petioles over twice as long as blade; flowers solitary, on slender scapes; petals pale lavender, creamy or white inside, the spur blunt and up-turned.

33. ONAGRACEAE (Evening Primrose Family)

Annual or perennial herbs or sometimes shrubs; leaves alternate or opposite, estipulate; inflorescence various; flowers typically having a plan of 2- or 4-merous construction; ovary inferior, terminated by an hypanthium from which the sepals, petals and stamens emerge; fruit usually a capsule but sometimes berry- or nut-like.

Plants with flower parts in 2's; fruit nut-like, covered with  
barbed bristles.....4. Circaea

Plants with flower parts in 4's; fruit a capsule.

Seeds with a tuft of hair at one end...1. Epilobium

Seeds without a tuft of hair at one end.

Flowers large, showy, rose or purplish; stems mostly  
simple; leaves subopposite.....2. Clarkia

Flowers very small; stems usually diffusely branched;  
leaves mostly alternate.....3. Gayophytum

1. Epilobium L.

Perennial or annual herbs; leaves alternate or opposite; inflorescence a terminal raceme; flowers usually small; petals 4, purplish, rose, pink or white; stamens 8; fruit a 4-valved capsule; seeds with a tuft of hairs on one end.

Petals 1.5-2 cm. long; stems up to 3 m. tall; leaves narrowly lanceolate.....1. E. angustifolium

Petals under 1 cm. long; stems mostly under 1 m..

Leaf margins dentate; perennials with fleshy turions on roots; capsules glabrous, 2.5-4 cm. long.....

.....2. E. brevistylum

Leaf margins entire; annuals; capsules minutely pubescent, 1.5-2.5 cm. long.....3. E. paniculatum

1. Epilobium angustifolium L. Fireweed

Perennial herbs; stems stout, up to 3 m. tall, simple; leaves numerous, lanceolate; inflorescence a terminal raceme of large rose or purplish flowers; petals 1.5-2 cm. long; fruit a capsule; seeds with a tuft of hairs at one end.

2. Epilobium brevistylum Barbey Slender Willow-herb

Perennial herbs; roots with fleshy turions; stems slender to stout, erect or decumbent; leaves lanceolate, opposite, with dentate margins; inflorescence a raceme; flowers pink or white, 3-6 mm. long; capsule glabrous, 2.5-4 cm. long.

3. Epilobium paniculatum Nutt. Tall Annual Willow-herb

Slender annual herbs from taproots; stems slender generally

branched; leaves opposite, mostly linear, the margins entire; inflorescence a terminal panicle; flowers small; petals dark pink, 4-7 mm. long; capsule minutely pubescent, 1.5-2.5 cm. long. A very variable species taking many forms depending on habitat conditions.

## 2. Clarkia Pursh

Annual herbs; stems slender; leaves entire, alternate or subopposite; inflorescence racemose; flowers large, brightly colored rose or purple; petals sometimes lobed; stamens 8; stigma 4-parted; fruit a capsule; seeds lacking a tuft of hairs.

### 1. Clarkia rhomboidea Dougl.      Common Clarkia

Annual herbs; stems mostly simple; leaves entire, subopposite; inflorescence a terminal raceme; flowers large, showy; petals clawed, purplish or rose colored; sepals 4, greenish; fruit a pendulous capsule.

## 3. Gayophytum Juss.

Annual herbs; stems slender; leaves entire, mostly alternate; inflorescence various; flowers small; petals 4, white, pink or reddish; sepals 4; stamens 8; fruit a capsule; seeds lacking a tuft of hairs.

### 1. Gayophytum diffusum Torr. & Gray      Diffuse Gayophytum

Annual herbs; stems slender, usually diffusely branched; leaves entire, mostly alternate; inflorescence a raceme; flowers very small; petals 4, 2-4 mm. long, white, turning rose with age, each petal with a yellow blotch at the base; calyx lobes 4; fruit a capsule; seeds glabrous.

4. Circaea L.

Perennial herbs from slender rootstocks; stems short, slender; leaves opposite, thin, delicate; inflorescence terminal of very small flowers; petals 2; sepals 2; stamens 2; fruit nut-like covered with barbed bristles.

1. Circaea pacifica Aschers & Magnus      Western Enchanter's  
Nightshade

Perennial herbs from slender rootstocks; stems slender, delicate; leaves opposite, petioled, ovate; inflorescence a terminal, bractless raceme; petals 2, white; sepals 2, reflexed; fruit covered with hooked bristles.

## 34. UMBELLIFERAE (Parsley Family)

Mostly perennial herbs; leaves alternate, with sheathing petioles; herbage aromatic; inflorescence typically an umbel; flowers 5-parted; fruit a schizocarp.

Leaf divisions broad; leaflets usually twice and at most 3 times pinnately divided; fruit at least 5 or 6 times longer than broad; flowers small, white, in compound umbels.....

.....1. Osmorhiza

Leaf divisions narrow; leaflets more than 3 times pinnately divided; fruit nearly as broad as long and at most no more than 3 times longer than broad.

Dorsal ribs of the carpels winged and the wings wavy on their margins.....3. Pteris

Dorsal ribs of the carpels not winged..2. Lonatium

1. Osmorhiza Raf.

Perennial herbs; stem mostly erect, stout or slender; leaves borne on the stem pinnately compound, the leaflets dissected or toothed on margins; inflorescence a compound umbel; involucre missing or poorly developed; petals white, purple or greenish; fruit round, slender, much longer than broad.

1. Osmorhiza chilensis Hook. & Arn. Mountain Sweet-cicely

Perennial herbs; leafy stemmed; leaves biternately compound, the leaflets broad with serrated margins; inflorescence a compound umbel, the secondary umbels few-flowered; flowers white; fruit hispid pubescent, up to 20 mm. long, 1.5-2 mm. broad, oblong.

2. Lonatium Raf.

Perennial herbs almost acaulescent or in some cases tall and caulescent; roots usually thick and fleshy; leaves usually ternately or pinnately compound, the leaflets usually dissected; inflorescence a compound umbel; flowers yellow, white or purple; involucre mostly wanting; involucels present; fruit flat, lateral ribs winged, sometimes only narrowly, the dorsal ribs not winged.

Plants less than 3 dm. tall (mostly less than 2.5 dm.); fruits turning purplish with age; leaves not divided in narrow linear divisions.....2. L. martindalei



Plants taller, mostly more than 3 dm. (if less, leaflets divided into a few narrow, linear divisions); fruits not turning purple with age.

Leaves pinnately compound with many greatly dissected leaflets; plants mostly tall, robust; flowers whitish...

.....1. L. dissectum  
multifidum

Leaves tritermately compound; leaflets few, mostly narrowly linear; plants mostly slender; flowers yellow...

.....3. L. tritermatum

1. Lomatium dissectum (Nutt.) Math. & Const. var. multifidum (Nutt.)

Math. & Const. Fern-leaved Lomatium

Tall, robust perennial herbs, caulescent, 8-14 dm. tall, arising from thick, fleshy roots; leaves pinnately compound, the divisions of the leaflets numerous; inflorescence a large compound umbel; flowers whitish; fruit oblong, narrowly winged, the wings thick.

2. Lomatium martindalei Coult. & Rose Martindale's Lomatium

Perennial herbs from a fleshy, slender taproot, .5-2.5 dm. tall; leaves pinnately compound, the leaflets cleft on margins; inflorescence a compound umbel; flowers light yellow, in small clusters; mature fruits only 1-3 per inflorescence, oblong, the fruit turning purple with age.

3. Lomatium tritermatum (Pursh) Coult. & Rose Narrow-leaved

Desert Parsley

Perennial herbs with slender, fleshy taproots, 2-7 dm. tall; leaves mostly basal, the sheaths purplish at base; leaves tritermately

the leaflets narrowly linear; inflorescence a compound umbel; flowers yellow; fruit oblong, 9-13 mm. long, narrowly winged.

### 3. Pteryxia Nutt. ex Torr. & Gray

Perennial herbs from stout, long, tap-like, fleshy roots; leaves pinnately compound, finely dissected; inflorescence a compound umbel; flowers yellow, white or purple; fruit with winged dorsal ribs.

#### 1. Pteryxia terebinthina (Hook.) Coult. & Rose      Wormwood Pteryxia

Perennial herbs arising from a fleshy, deeply grown taproot; leaves all basal, pinnately compound, the leaflets finely dissected into numerous divisions; inflorescence a compound umbel; flowers bright yellow; fruit oblong, 6-10 mm. long, the dorsal ribs winged, the wings with wavy margins.

### 35. ERICACEAE (Heath Family)

Trees or shrubs; leaves simple, mostly alternate although sometimes opposite, the margins mostly entire, texture of leaves leathery; inflorescence a raceme, panicle or sometimes solitary; corolla mostly regular and urn-shaped, sometimes irregular, 4-5-lobed; calyx 4-5-parted; stamens usually 8-10; fruit a capsule, berry or drupe.

Ovary superior.....1. Arctostaphylos

Ovary inferior.....2. Vaccinium

#### 1. Arctostaphylos Adans.

Shrubs; stems erect or prostrate; leaves leathery, evergreen, alternate, entire; inflorescence a terminal panicle; flowers small;

calyx of 5 distinct lobes; corolla urn-shaped, 5-lobed, white to rose; fruit a drupe.

Prostrate creeping shrubs.

Leaves rounded at apex; fruit bright red.....

.....1. A. uva-ursi

Leaves acute at apex, often mucronate; fruit light

red.....2. A. nevadensis

Erect shrubs.....3. A. patula

1. Arctostaphylos uva-ursi (L.) Spreng.      Kimmikinnick

Prostrate creeping shrubs; leaves alternate, leathery in texture, obovate, the apex rounded, the margins entire; inflorescence a terminal raceme; flowers white to pink; fruit a bright red drupe.

2. Arctostaphylos nevadensis Gray      Pinemat Manzanita

Prostrate creeping to somewhat erect shrubs; leaves alternate, entire, mostly obovate, the apex acute and mostly mucronate; inflorescence a raceme; flowers white to pink; fruit a light red drupe.

3. Arctostaphylos patula Greene      Green Manzanita

Erect, much branched shrubs; leaves alternate, mostly elliptic, 3-5 cm. long, the apex acute or rounded; inflorescence a dense raceme; flowers bright pink fading to a white; fruit a black drupe.

2. Vaccinium L.

Shrubs, erect or sometimes depressed; stems sometimes angled; leaves simple, alternate; flowers solitary or clustered, urn-shaped; calyx united to ovary; fruit a berry.

Leaves not over 16 mm. long; stems angled; berries red...

.....1. V. scoparium

Leaves mostly over 16 mm. long, up to 3.5 cm.; stems round;

berries blue.....2. V. caespitosum

1. Vaccinium scoparium Leiberg      Grouseberry

Shrubs, 1-4 dm. tall; stems angled, much branched; leaves oval, 5-12 mm. long, acute at the apex; flowers solitary; corolla pink; berry red.

2. Vaccinium caespitosum Michx.      Dwarf Huckleberry

Shrubs; stems depressed, round, .5-3 dm. tall; leaves alternate, simple, mostly obovate, 1.5-3.5 cm. long, mostly about 2.5-3 cm.; flowers solitary; corolla white to pink; berry blue.

36. PYROLACEAE (Wintergreen Family)

Perennial herbs, saprophytes or root parasites, the latter two lacking chlorophyll, the rest from slender rhizomes and possessing evergreen leaves; inflorescence a corymb, raceme or solitary; corolla of united or free petals; sepals various; stamens 8-10; fruit a capsule.

Corolla lobes united from base upward to form urn-shaped

flowers.....3. Pterospora

Corolla lobes separate.

Inflorescence a raceme.....1. Pyrola

Inflorescence a corymb or umbel-like..2. Chimaphila

1. Pyrola [Tourn.] L.

Perennial herbs from long, slender, underground rhizomes; leaves mostly basal or sometimes reduced to bracts or absent; inflorescence a raceme; calyx and petals 5-parted, the petals separate; stamens 10; fruit a capsule.

Leaves absent or very reduced.....5. P. aphylla

Leaves present.

Racemes 1-sided; leaves mostly ovate, the margins finely dentate.....1. P. secunda

Racemes not 1-sided; leaf margins mostly entire or if dentate very obscurely so.

Petals pinkish to almost purple..2. P. asarifolia  
incarnata

Petals mostly greenish yellow or white.

Leaves mottled with white lines.....

.....3. P. picta

Leaves solid color.

Blades of leaves orbicular, the apex

obtuse.....6. P. chlorantha

Blades of leaves oblanceolate to lanceolate,  
the apex acute or rounded.....

.....4. P. dentata integra

1. Pyrola secunda L.      One-sided Wintergreen

Perennial herbs from long, slender, creeping rhizomes; leaves clustered on stem and basal to scape, mostly ovate, the margins

finely dentate; inflorescence a 1-sided raceme; petals greenish white or pinkish.

2. Pyrola asarifolia var. incarnata (DC.) Fernald Bog Wintergreen

Perennial herbs from slender rhizomes; leaves mostly basal, dark green above, lighter below, the petioles as long as or longer than the blade, the blades mostly orbicular; inflorescence a raceme on a scape 2-5 dm. long; petals a deep reddish purple to pinkish.

3. Pyrola picta Smith White-veined Wintergreen

Perennial herbs from slender rhizomes; stems short; leaves mostly basal, the veins and along veins white giving the leaves a mottled appearance, mostly broadly ovate to slightly lanceolate, mostly entire or very obscurely toothed; inflorescence a raceme borne on a scape; petals yellowish to whitish.

4. Pyrola dentata Smith var. integra Gray Nootka Wintergreen

Perennial herbs from long, creeping rhizomes; leaves mostly basal, lanceolate to oblanceolate, the apex acute to rounded, the margins mostly entire, glaucous, green; inflorescence a raceme borne on a scape; petals greenish yellow; fruit a capsule.

5. Pyrola aphylla Smith Leafless Pyrola

Perennial herbs from rhizomes; leaves absent or reduced to small bract-like structures, the scapes reddish in color; inflorescence a raceme; flowers pink or reddish; calyx lobes reddish; petals also reddish or pinkish tinged with yellowish white.

6. Pyrola chlorantha Sw. Greenish Pyrola

Perennial herbs from rhizomes; leaves basal, petiole usually 2-3 times as long as blade, the blade orbicular to slightly ovate,

the apex orbicular, the margins mostly entire; inflorescence a short raceme borne on a scape that much exceeds the leaves; petals a greenish white.

## 2. Chimaphila Pursh

Perennial herbs or slightly woody plants from stout creeping rhizomes; stems branched; leaves evergreen; inflorescence a raceme or corymb; sepals and petals 5; stamens 10; fruit a capsule.

Flowers 1-3, white; stems usually reddish; leaves ovate...

.....2. C. menziesii

Flowers 3-8, pink; stems green; leaves oblanceolate....

.....1. C. umbellata  
occidentalis

### 1. Chimaphila umbellata (L.) Nutt. var. occidentalis (Rydb.) Blake

Perennial herbs or subshrubs; stems sometimes somewhat woody, branched, 2-3 dm. tall; leaves oblanceolate, toothed on margins, appearing whorled; inflorescence 3-8-flowered; corolla pink; fruit a capsule.

### 2. Chimaphila menziesii (R. Brown) Spreng. Little Prince's Pine

Perennial herbs or subshrubs; stems sometimes somewhat woody, reddish, little-branched, 6-10 cm. tall; leaves mostly ovate, toothed on margins; inflorescence 1-3-flowered; corolla white or whitish; fruit a capsule.

## 3. Pterospora Nutt.

Erect saprophytic herbs; stems simple, fleshy; leaves small,

bract-like; inflorescence a long, spike-like raceme; petals white, united; flower urn-shaped; calyx 5-parted; stamens 10, the anthers awned; fruit a capsule.

1. Pterospora andromedea Nutt. Pinedrops

Erect saprophytic herbs; stems fleshy, simple, yellow to reddish, covered with a sticky glandular pubescence; leaves small, bract-like; inflorescence a long, spike-like raceme, the flowers becoming rather widely separated with age as the inflorescence elongates; petals white, united forming an urn-shaped flower.

37. APOCYNACEAE (Dogbane Family)

Trees, shrubs or herbs producing milky sap; leaves opposite, alternate or whorled; inflorescence various; flowers regular; calyx 5-lobed; corolla 5-parted; style 1; stamens free from the stigma; seeds often with a tuft of hair at one end.

Apocynum [Tourn.] L.

Perennial herbs producing milky sap; stems erect or slightly decumbent; leaves opposite; inflorescence a cyme; flowers small; calyx 5-parted; stamens 5; fruit a long, narrow follicle, usually in pairs.

1. Apocynum pumilum (Gray) Greene Dwarf or Mountain Dogbane

Perennial herbs from slightly woody bases; branches mostly spreading; leaves ovate to oblong, the apex mucronate, dark green above, lighter below, mostly short petioled, opposite; inflorescence a small cyme, terminal or from axils of the upper leaves; flowers



white to pinkish; calyx 5-lobed, 1-2 mm. high; corolla tubular, 4-6.5 mm. long, 5-parted, the lobes short, erect; fruit usually paired follicles, erect, brownish at maturity; seeds with a tuft of white hairs at one end.

### 38. POLEMONIACEAE (Phlox Family)

Annual or perennial herbs or sometimes shrubs; leaves basal or usually alternate, sometimes opposite, simple or compound; inflorescence various; flowers regular; corolla and calyx 5-lobed; stamens 5 of unequal length; fruit usually a 3-chambered capsule.

Leaves pinnately parted.

Flowers red.....3. Ipomopsis

Flowers blue or purplish.....1. Polemonium

Leaves entire.

Corolla salmon or yellow, large and showy.....

.....4. Collomia

Corolla pink or purplish, small and inconspicuous...

.....2. Microsteris

#### 1. Polemonium [Tourn.] L.

Annual or perennial herbs; leaves alternate, pinnately compound; inflorescence various; corolla campanulate to funneliform; calyx and corolla both 5-lobed; fruit a capsule.

#### 1. Polemonium occidentale Greene      Western Polemonium

Perennial herbs from creeping rhizomes; stems erect, up to

8 dm. tall; leaves alternate, glabrous, pinnately compound; inflorescence a cluster of blue or purplish flowers; stamens yellow, exserted.

## 2. Microsteris Greene

Annual herbs; stems short, branched or unbranched; leaves entire, opposite except on upper part of stem; inflorescence cymose; flowers small; fruit a capsule which splits as calyx develops.

### 1. Microsteris gracilis (Dougl.) Greene ssp. humilis (Greene) V. Grant

Low annual herbs; stem usually much branched; lower leaves opposite, the upper stem leaves alternate; inflorescence cymose; flowers small, pinkish or purplish.

## 3. Ipomopsis Michx.

Perennial, biennial or annual herbs; stems usually erect; leaves often basal or alternate on stem; leaves pinnatifid; inflorescence cymose; corolla tubular or salverform; stamens unequal, inserted on the corolla.

### 1. Ipomopsis aggregata (Pursh) V. Grant      Skyrocket

Biennial herbs from a deep taproot; stems erect, mostly simple; leaves alternate, pinnately divided; inflorescence a racemose cyme; corolla bright red, tubular; calyx green, segments acute.

## 4. Collomia Nutt.

Annual or perennial herbs, erect or prostrate; leaves alternate, entire, simple; inflorescence usually a dense, rounded terminal cluster of flowers; corolla salverform or funnelform.

1. Collomia grandiflora Dougl.      Large-flowered Collomia

Erect annual herbs; stems slender to stout; leaves broadly linear, alternate, entire; inflorescence a terminal cluster of flowers; corolla tubular, salmon or yellow.

39. HYDROPHYLLACEAE (Waterleaf Family)

Herbs or shrub-like; herbage with a coarse pubescence; leaves alternate or opposite; inflorescence cymose or often scorpioid; calyx and corolla 5-parted; stamens 5; styles often 2 or at least 2-cleft; fruit usually a capsule.

Flowers in capitate clusters; peduncles shorter than the

leaves.....1. Hydrophyllum

Flowers in scorpioid racemes; peduncles much longer than the

leaves.....2. Phacelia

1. Hydrophyllum L.

Perennial herbs; stems erect; leaves pinnately divided; inflorescence a dense cyme; corolla campanulate, mostly blue; style and stamens exserted; fruit a capsule.

1. Hydrophyllum capitatum Dougl.      Dwarf Waterleaf or

Woollen-breeches

Perennial herbs; stems erect, short; leaves pinnately divided into generally 5 divisions; inflorescence a compact cyme borne on a peduncle much shorter than the leaves; corolla blue; style and stamens exserted.

2. Phacelia Juss.

Annual, perennial or biennial herbs; stems and leaves with stiff pubescence; leaves alternate or opposite, entire or divided; inflorescence a scorpioid raceme or spike-like; corolla rotate to tubular, blue, white or violet; calyx mostly deeply lobed; style 2-cleft, exserted; fruit a capsule.

Herbage green; upper leaves mostly entire..2. P. mutabilis

Herbage grayish; upper leaves mostly cleft or pinnately

lobed.....1. P. heterophylla

1. Phacelia heterophylla Pursh      Virgate Phacelia

Biennial herbs or sometimes perennial; stems usually solitary; herbage covered with stiff, straight hairs, the hairs on leaves appressed giving them a grayish appearance; basal leaves mostly pinnately lobed, upper stem leaves usually cleft or pinnately divided; inflorescence a dense scorpioid raceme; corolla white or pinkish.

2. Phacelia mutabilis Greene      Changeable Phacelia

Biennial or perennial herbs; stems often clustered or solitary; herbage hairy with stiff hairs, the hair, however, mostly sparingly distributed; leaves greenish not grayish; basal leaves pinnately lobed, upper stem leaves mostly entire; inflorescence a dense scorpioid raceme; corolla purplish to whitish.

## 40. BORAGINACEAE (Borage Family)

Herbs or shrubs; leaves alternate and simple, usually entire,

many of the leaves with cystoliths in them; stem and leaves harshly pubescent or glabrous; inflorescence usually scorpioid; ovary superior; stamens 5; fruit usually 4 nutlets.

Flowers bluish purple or pinkish.....1. Cynoglossum

Flowers yellowish, greenish or whitish.

Corolla yellowish.....5. Lithospermum

Corolla white.

Tall, stout perennials (over 4 dm. tall); inflorescence large, showy.....4. Hackelia

Short, slender annuals (mostly under 3.5 dm.); inflorescence not large and showy.

Nutlets with a smooth, shiny surface....

.....2. Gryotanthes

Nutlets with wrinkled surface.....

.....3. Plagiobothrys

# 1. Cynoglossum [Tourn.] L.

Annual, perennial or sometimes biennial herbs; leaves usually large, alternate, entire; inflorescence various; corolla funnelform or salverform; calyx 5-parted; ovary 4-parted; fruit 4 nutlets covered with prickles.

## 1. Cynoglossum occidentale Gray      Western Hound's Tongue

Perennial herbs from deep, stout taproots; stems stout; leaves mostly broadly oblanceolate, covered with stiff hairs; inflorescence a panicle, relatively few-flowered; corolla a bluish purple tinged

with a dark brownish pink; nutlets broad, plump, rounded and densely covered with barbed bristles.

## 2. Cryptantha Lehm.

Annual herbs; stems erect, hispid; leaves entire, mostly alternate; inflorescence a scorpioid raceme; flowers white; fruit attached to receptacle so that the nuts are held upright; receptacle elongate so that scar on the nutlet is longer than wide.

### 1. Cryptantha affinis (Gray) Greene      Slender Cryptantha

Erect annuals; stems slender, branched; leaves broadly linear, alternate except bottom 1 or 2 pairs, pubescent; inflorescence a spike-like raceme; corolla small, white; nutlets mottled brownish, smooth and shiny.

## 3. Plagiobothrys Fishch. & Mey.

Annual or perennial herbs; stems short; leaves mostly alternate but bottom 1 or 2 pairs opposite; inflorescence a scorpioid raceme; corolla white, usually very small; nutlets usually sharply angled, the scar at base of nutlet small and roundish because of attachment to a low short receptacle.

### 1. Plagiobothrys hispidus Gray      Bristly Plagiobothrys

Annual herbs; stems erect, usually branched; leaves mostly alternate except the lower 1 or 2 pairs, stiffly hairy; corolla white, very small; nutlets brownish, wrinkled in appearance.

4. Hackelia Opiz.

Perennial or sometimes biennial herbs; stems tall; leaves linear or oblong; inflorescence a panicle; corolla blue, white or pinkish; calyx 5-parted; nutlets covered with barbed bristles.

1. Hackelia californica I. M. Johnston      California Stickweed

Perennial herbs; stems usually clumped, stout, erect, very leafy; leaves mostly oblanceolate, covered with hairs; inflorescence a panicle, compact when first in flower becoming large and diffuse when in fruit; corolla white; nutlets evenly covered with barbed bristles.

5. Lithospermum [Tourn.] L.

Annual or perennial herbs; leaves alternate, pubescence hispid; inflorescence a spike or raceme; flowers small; corolla blue, white or yellow; calyx 5-parted; fruit 4 nutlets attached to the receptacle by their bases.

1. Lithospermum rudicale Dougl.      Western Gromwell

Perennial herbs from deep, stout, purplish roots; stems usually erect, densely pubescent; leaves mostly linear, alternate and crowded on stem; inflorescence in axils of upper leaves; corolla greenish yellow; nutlets a grayish white, smooth and shiny.

## 41. LABIATAE (Mint Family)

Herbs; stems square; herbage aromatic; leaves opposite; flowers solitary, in clusters in axils of upper leaves or in a terminal spike, irregular, perfect; petals often bilabiate; fruit of 4 nutlets.

Flowers in a terminal spike.....2. Prunella

Flowers axillary.

The flowers blue, solitary in leaf axils.....

.....1. Scutellaria

The flowers white or pinkish in dense axillary

clusters.....3. Mentha

### 1. Scutellaria Rivin. ex L.

Annual or perennial herbs; stems square, erect; leaves opposite, dentate or entire; inflorescence axillary, the flowers in racemes, solitary or 2 or 3 in a cluster; flowers blue, violet or white; corolla bilabiate; calyx 2-lipped; stamens 4; style 2-cleft.

#### 1. Scutellaria galericulata L. Marsh Skullcap

Perennial herbs; stems mostly erect, square; leaves opposite, short petioled, lanceolate, the margins dentate; inflorescence of solitary axillary flowers; corolla blue and white, bilabiate; calyx green, 2-lobed; fruit 4 nutlets.

### 2. Prunella L.

Perennial herbs from slender rootstocks; stems erect or decumbent; leaves opposite, mostly long petioled; inflorescence a dense, spike-like cluster; flowers subtended by a large, colored bract; calyx and corolla bilabiate.

#### 1. Prunella vulgaris L. Heal-all

Perennial herbs from slender rootstocks; leaves opposite, mostly long petioled, oblong or roundish, the margins entire or



only slightly toothed; inflorescence spike-like; flowers in clusters of 3, subtended by a large, usually colored bract; corolla dark purple to blue.

### 3. Mentha [Tourn.] L.

Perennial herbs; stems square, erect, very aromatic; leaves opposite; inflorescence axillary, densely clustered, or in terminal spikes; corolla and calyx regular; stamens 4; fruit 4 nutlets.

#### 1. Mentha arvensis L.      Field Mint

Aromatic perennial herbs from slender rootstocks; stems erect; leaves short petioled, opposite, mostly lanceolate to broadly lanceolate, the margins sharply dentate; inflorescence a dense axillary cluster of pinkish to white flowers; corolla mostly regular; stamens 4; fruit 4 nutlets.

### 42. SOLANACEAE (Nightshade Family)

Herbs, shrubs or trees; leaves alternate, estipulate, sometimes becoming opposite at or near the inflorescence; inflorescence typically an axillary cyme or combination of cymes; flowers mostly regular; petals united; fruit a berry or capsule.

#### Chamaesaracha Gray

Perennial herbs; stems arising from woody, creeping rootstocks; leaves entire or pinnatifid; flowers regular, campanulate; corolla 5-lobed; stamens 5; fruit a berry.

1. Chamaesaracha nana Gray Dwarf Chamaesaracha

Low perennial herbs; stems arising from slender rootstocks; leaves quite numerous, entire to somewhat lobed, covered with short crisp hairs; flowers borne mostly singly or in pairs in leaf axils; calyx campanulate, 5-lobed, the lobes 2-3 mm. high; petals united, 5-lobed, white with greenish yellow blotches at base; fruit a berry.

43. SCROPHULARIACEAE (Figwort Family)

Mostly herbs or small shrubs; leaves alternate or opposite, estipulate; inflorescence various; corolla nonplicate, usually zygomorphic; ovary superior, bilocular; posterior stamen usually reduced; fruit usually a capsule.

Flowers subtended by colored bracts.....6. Castilleja

Flowers not subtended by colored bracts.

Corolla nearly regular, yellow; leaves densely covered with a yellowish tomentum.....1. Verbascum

Corolla mostly irregular, if somewhat regular not yellow; leaves not covered with a yellowish tomentum.

Four functional stamens plus a vestigial fifth stamen, either minute or prominent.

Corolla not tubular, distinctly bilabiate, bicolored, dark above and lighter below; fifth stamen very minute.....2. Collinsia

Corolla tubular, bilabiate, not bicolored; fifth stamen well-developed....3. Penstemon

Four functional stamens, vestigial stamen absent.

Corolla definitely irregular, yellow or reddish  
purple; capsule not emarginate at apex...

.....4. Mimulus

Corolla not definitely irregular, white or  
bluish; capsule emarginate at apex....

.....5. Veronica

1. Verbascum Tourn. ex L.

Biennial or perennial herbs; stems erect, branched or simple;  
leaves simple, alternate; flowers in racemes or spikes; calyx  
5-lobed; corolla yellow or white, mostly regular to slightly  
irregular; stamens 5; fruit a capsule.

1. Verbascum thapsus L.      Woolly Mullein

Biennial herbs; stems erect; herbage densely tomentose; basal  
leaves in a rosette, stem leaves alternate, reduced upwards; inflores-  
cence a dense spike; corolla nearly regular, yellow; fruit a many-  
seeded capsule.

2. Collinsia Nutt.

Annual herbs; stems slender; leaves opposite; inflorescence an  
axillary or terminal raceme; corolla bilabiate, bicolored; calyx  
5-parted; stamens 4 functional and 1 vestigial fifth stamen; fruit  
a capsule.

1. Collinsia parviflora Dougl.      Blue-eyed Mary

Slender annual herbs; stems either simple or branched; leaves  
opposite, mostly lanceolate or oblong; inflorescence an axillary

raceme on long, slender peduncles as the plants grow older, in the younger plants the peduncles shorter; corolla bilabiate, bicolored, the lobes blue and throat white; lobes longer than the tube of corolla; calyx regular with acuminate lobes; fruit a capsule.

### 3. Penstemon Mitch.

Perennial herbs or shrubs; leaves opposite or the upper sometimes alternate; inflorescence a cyme, panicle or raceme; corolla usually showy, bilabiate; calyx 5-parted; stamens 4 fertile and 1 sterile fifth stamen; fruit a capsule.

Low shrubs, not merely from a woody caudex.....

.....1. P. fruticosus

Herbaceous, some from a woody caudex.

Leaves mostly sharply serrate.....2. P. nanerosus

Leaves mostly entire, or at least not definitely serrate.

Corolla 25-35 mm. long, bright blue above and

lighter below.....6. P. speciosus

Corolla 6-15 mm. long, blue, purplish or pinkish,

mostly solid color.

Inflorescence glabrous.....3. P. anglaucus

Inflorescence glandular pubescent.

Leaves and stems pubescent; corolla purplish

blue, 9-15 mm. long; stems usually green

below; inflorescence mostly on short

peduncles.....5. P. cinereus

Leaves and stems glabrous except sometimes below; corolla blue, purplish, violet or pinkish, 6 mm. long; stems often purplish below; inflorescence usually in compact very short-stalked clusters except sometimes the lower on longer peduncles..

.....4. P. peckii

1. Penstemon fruticosus (Pursh) Greene      Shrubby Penstemon

Perennial low shrubs; woody stems often prostrate, spreading and forming mat-like clumps; leaves 1-5 cm. long, evergreen, lanceolate to oblanceolate, the margins usually sharply toothed; inflorescence from an erect stem, glandular pubescent; flowers in a terminal raceme; corolla 25-38 mm. long, bright reddish blue; calyx lobes acute.

2. Penstemon nemorosus (Dougl.) Trautv.      Woodland Penstemon

Perennial herbs from a woody caudex; stems erect, usually simple or in small clusters; leaves 5-10 cm. long, ovate to broadly lanceolate, petioled, the margins sharply serrate; inflorescence few-flowered, glandular pubescent; corolla reddish purple.

3. Penstemon euglaucus English      Glaucous Penstemon

Perennial herbs from creeping, woody rootstocks with a well-developed basal rosette of leaves; herbage glaucous and glabrous; leaves entire, the lower obovate to elliptic and petioled, the stem leaves sessile and mostly broadly linear to oblong; inflorescence glabrous, terminal; flowers clustered, the lower ones on long

peduncles; corolla dark blue, 10-15 mm. long; calyx with broadly scarious margins.

4. Penstemon peckii Pennell      Peck's Penstemon

Perennial herbs from a woody caudex; stems clustered; a basal rosette of leaves not well-developed; stems glabrous except toward base, also often a reddish purple at base; leaves glabrous, entire, the lower mostly elliptic, narrowed to long petioles, the upper lanceolate and sessile toward inflorescence, also reduced upward; inflorescence of closely clustered cymes, the upper on very short peduncles, the lower on more elongate peduncles, glandular pubescent; corolla 6-8 mm. long, purplish blue, blue, violet or pinkish; calyx with scarious margins.

5. Penstemon cinereus Piper      Ashy Penstemon

Perennial herbs from a woody caudex; stems erect, clustered; a basal rosette of leaves well-developed; stem and leaves pubescent; basal leaves lanceolate to ovate on long petioles, upper stem leaves linear to lanceolate, sessile, not greatly reduced upward; inflorescence terminal, glandular pubescent; flowers in short cymes along stem; corolla 9-15 mm. long, dark blue or purplish; calyx lobes with narrow scarious margins.

6. Penstemon spaciosus Dougl.      Showy Penstemon

Perennial herbs from a slightly woody caudex, somewhat clustered; stem and leaves glabrous and slightly glaucous; lower leaves petioled, lanceolate to spatulate, upper cauline leaves sessile, mostly lanceolate, slightly reduced upwards; inflorescence terminal; corolla bright blue, 25-35 mm. long; calyx lobes with scarious margins.

4. Mimulus L.

Annual or perennial herbs; leaves opposite; inflorescence of solitary flowers or axillary or terminal racemes; corolla bilabiate, mostly tubular; calyx 5-lobed, irregular or regular; stamens 4, no vestigial fifth stamen present; fruit a capsule.

Corolla yellow.

Flowers on long axillary peduncles; calyx nearly regular;

stems slender, delicate; annuals...1. M. alsinoides

Flowers in terminal racemes; calyx irregular; stems not

delicate but may be slender.....2. M. guttatus

Corolla reddish purple.....3. M. nanus

1. Mimulus alsinoides Dougl. Chickweed Monkey-flower

Slender, delicate annual herbs; stems often branched, the internodes long; leaves opposite on petioles as long as the blade or longer, the blade ovate to orbicular, the margins often dentate; inflorescence axillary; flowers on long, slender peduncles; corolla yellow, purple spotted; calyx slightly irregular, the lobes small, rounded to acute, not alike.

2. Mimulus guttatus [Fischer] DC. Common Monkey-flower

Slender to stout annual or perennial herbs; stems variable; leaves opposite, ovate to orbicular, the margins mostly dentate; inflorescence a terminal raceme; corolla bright yellow, the throat reddish purple spotted; calyx irregular, the upper lobes much longer than the lower.

3. Mimulus nanus Hook. & Arn. Dwarf Monkey-flower

Small, erect annual herbs; stem and leaves glandular pubescent; leaves opposite, entire; inflorescence terminal; corolla a reddish purple, the throat yellow spotted with reddish dots; calyx irregular, 5-toothed, the teeth acute.

5. Veronica [Tourn.] L.

Annual or perennial herbs; stems erect or prostrate; leaves opposite or the upper sometimes alternate; inflorescence axillary or terminal; flowers solitary or in racemes; corolla nearly regular, rotate, 4-lobed; calyx 4-5-parted; stamens 2; fruit a capsule, often emarginate at apex.

Leaves sessile, lanceolate or linear, 3-6 cm. long; inflorescence of axillary racemes; upper leaves remaining opposite...

.....1. V. scutellata

Leaves petioled, ovate to oblong, .5-1 cm. long; inflorescence a terminal raceme with flowers subtended by alternate,

bract-like leaves.....2. V. serpyllifolia

1. Veronica scutellata L. Marsh Speedwell

Perennial herbs from creeping rhizomes; stems weak, often rooting at the nodes; leaves opposite, lanceolate to linear, 3-6 cm. long; inflorescence of axillary racemes; corolla lavender, blue or pinkish; fruit a capsule, emarginate at the apex.

2. Veronica serpyllifolia L. Thyme-leaved Speedwell

Perennial herbs from rhizomes; stems slender; leaves opposite



below, mostly ovate to oblong, .5-1 cm. long, slightly toothed on margins; inflorescence a terminal raceme with flowers subtended by alternate, bract-like leaves; corolla whitish or blue; fruit a capsule emarginate at the apex.

#### 6. Castilleja Mutis ex L.

Annual or perennial herbs; stems woody below, mostly clumped; leaves entire or lobed, the lobes usually narrow; inflorescence terminal, spike-like; flower subtended by colored bracts; calyx lobed or cleft variously, usually colored; corolla bilabiate, tube-like; stamens 4; fruit a capsule.

Leaves deeply cleft.....1. C. hispida

Leaves entire or the upper sometimes shallowly cleft...

.....2. C. miniata

#### 1. Castilleja hispida Benth. Harsh Indian Paint-brush

Perennial herbs; stems pubescent, erect, from a woody caudex; leaves narrow, 3-5 cleft, the lateral lobes narrower than the central lobe; inflorescence a short, densely flowered spike; bracts red, lobed; calyx also red, shorter than the bracts; corolla tubular, narrow; galea long, the lower lip short.

#### 2. Castilleja miniata Dougl. Giant Red Indian Paint-brush

Perennial herbs from a woody rootstock; stems erect, often clustered; leaves mostly lanceolate, entire or sometimes the upper shallowly cleft, mostly glabrous; inflorescence a spike, usually

pubescent; bracts red at the summit; calyx cleft, red; corolla 2-3 cm. long; galea long, the lower lip short.

#### 44. OROBANCHACEAE (Brocmrape Family)

Annual or perennial root parasites, usually not green colored, often brown or yellow; appearing to have leafless stems because the leaves reduced to bracts; flowers solitary, arising from bract axils; stamens 4 of two different lengths; calyx 2-5-lobed; corolla irregular; fruit a capsule.

#### Orobancha [Tourn.] L.

Very glandular root parasites lacking green color, usually yellow, brown or purplish; leaves reduced to scale-like bracts; flowers solitary; calyx 4-5-cleft; corolla irregular, 2-lipped, the upper usually 2-lobed, the lower 3-lobed; stamens 4, of two lengths; fruit a capsule.

##### 1. Orobancha fasciculata Nutt.      Clustered Brocmrape

A yellow to brownish root parasite covered with short, yellow glandular hairs; leaves reduced to bracts; flowers on solitary scapes arising from the axils of the leaves, yellow with prominent purple veins; calyx 5-lobed, the lobes acute, triangular; corolla tubular, irregular, 2-lipped, the upper distinctly 2-lobed, the lobes triangular, the lower 3-lobed also triangular; stamens 4, of two lengths, inserted on the corolla tube; fruit a capsule.

#### 45. PLANTAGINACEAE (Plantain Family)

Annual or perennial herbs with usually rosulate foliage; leaves

with apparent parallel-venation; inflorescence spike-like on a winged scape; flowers 4-merous; stamens exserted; fruit a capsule or nut.

### Plantago [Tourn.] L.

Annual or perennial herbs with a basal rosette of leaves; leaves apparently parallel-veined; inflorescence borne on a slender, naked scape in a dense spike; flowers usually 4-merous; fruit a capsule.

#### 1. Plantago lanceolata L.      English Plantain

Herbs with a basal rosette of lanceolate leaves, each leaf with 5 prominent, apparently parallel veins; stems leafless, 2-8 dm. tall; inflorescence spike-like borne on a wiry scape; corolla brown, 4-parted, scarious; stamens yellow, exserted; fruit a capsule.

### 46. RUBIACEAE (Madder Family)

Herbs; leaves opposite or whorled; inflorescence various; ovary inferior; calyx not well-developed or absent; corolla regular, mostly 4-5-lobed; fruit dry, nut-like or berry-like.

Leaves whorled.....1. Galium

Leaves opposite.....2. Kelloggia

#### 1. Galium L.

Annual or perennial herbs; stems 4-angled; leaves mostly whorled; inflorescence terminal or axillary; flowers small; corolla usually white, yellow or greenish or sometimes reddish; fruit 2-parted, berry- or nut-like.

Leaves mostly 4 to a whorl.

Inflorescence a dense terminal cluster of white flowers...

.....2. G. boreale

Inflorescence a loose cluster; flowers yellowish...

.....3. G. oreganum

Leaves 5-8 in a whorl.

Leaves consistantly 6 per whorl; perennials.....

.....1. G. triflorum

Leaves various, from 5-8 per whorl; annuals.....

.....4. G. aparine

1. Galium triflorum Michx.      Fragrant Bedstraw

Perennial herbs from matted rootstocks; stems weak and slender; stem margins retrorsely hispid; leaves consistantly 6 to a whorl, mostly oblanceolate or lanceolate; inflorescence axillary; flowers on long peduncles with 1-3 branches, each branch bearing 1-3 flowers; corolla greenish; fruit with hooked hairs.

2. Galium boreale L.      Northern Bedstraw

Perennial herbs from slender rootstocks; stems stout, erect; leaves 4 to a whorl, mostly lanceolate; inflorescence terminal, showy; flowers in dense clusters; corolla white; fruit glabrous or hairy.

3. Galium oreganum Britton      Oregon Bedstraw

Perennial herbs; stems weak and erect to prostrate; leaves 4 to a whorl, mostly elliptic in shape, entire, acute at apex, prominently 3-veined; inflorescences terminal and axillary; flowers in loose clusters; corolla greenish yellow; fruit covered with hooked bristles.

4. Galium aparine L.      Cleavers

Mostly annual herbs; stems weak, angles toothed; leaves lanceolate in whorls of mostly 5-8, seldom with any given number; inflorescence axillary; fruit covered with hooked bristles.

2. Kelloggia Torr.

Perennial herbs; stems slender; leaves entire, opposite; inflorescence a few-flowered terminal cyme; ovary 2-celled; fruit nut-like, covered with bristle-like hairs.

1. Kelloggia galioides Torr.      Kelloggia

Perennial herbs from creeping, slender rootstocks; stems slender, single or branched; leaves entire, opposite, linear; inflorescence a terminal few-flowered cyme; corolla pinkish and white; fruit roundish, covered with hooked bristles.

## 47. CAPRIFOLIACEAE (Honeysuckle Family)

Herbs or mostly shrubs, sometimes vine-like; leaves opposite; inflorescence various; flowers perfect; stamens 5; ovary multicarpellate, inferior; fruit a berry or drupe.

Slender, creeping evergreen herbs; flowers usually 2 on slender erect peduncles.....1. Linnæa

Stout, usually erect shrubs.

Flowers tubular, mostly irregular; corolla yellow or orange; berry black or red.....3. Lonicera

Flowers campanulate to tubular, regular; corolla white or pinkish; berry white.....2. Symphoricarpos

1. Linnaea [Gronov.] L.

Perennial, slender, creeping evergreen herbs; leaves opposite; inflorescence of usually paired flowers on slender peduncles; corolla pink to purplish, 5-lobed, regular; fruit drupe-like.

1. Linnaea borealis L. var. longiflora Torr. Western Twin-flower

Perennial, slender, creeping evergreen herbs; sometimes slightly woody; leaves numerous, opposite, mostly obovate or roundish, usually dentate; inflorescence of usually 2 flowers borne on slender terminal peduncles; corolla pinkish.

2. Symphoricarpos Dill. ex Juss.

Erect or decumbent shrubs; leaves simple, variously shaped; inflorescence terminal or axillary; corolla campanulate, usually white or pinkish; fruit a berry.

Stems creeping or trailing; flowers short campanulate; fruit

round.....1. S. mollis

Stems erect; flowers tubular campanulate; fruit oblong...

.....2. S. vaccinoides

1. Symphoricarpos mollis Nutt. Creeping Snowberry

Creeping or partly erect shrubs; leaves opposite, often variously lobed; inflorescence mostly a terminal group or pair of flowers; corolla white or pinkish, short campanulate; fruit a round berry.

2. Symphoricarpos vaccinoides Rydb. Mountain Snowberry

Erect shrubs, 6-12 dm. tall, much branched; leaves opposite,

dark green above, lighter below, mostly ovate or obovate; inflorescence of axillary and small terminal groups; corolla tubular campanulate, pinkish; fruit white, oblong.

### 3. Lonicera L.

Erect vine-like shrubs; leaves opposite; inflorescence various; corolla usually irregular, often tubular, 5-lobed; stamens 5; fruit a berry.

Corolla yellow; fruit black; stems erect...1. L. involucrata

Corolla orange; fruit red; stems climbing...2. L. ciliosa

#### 1. Lonicera involucrata Banks      Black Twin-berry

Erect shrubs, much branched; leaves opposite, light green; inflorescence axillary, 2 flowers per peduncle and subtended by 2 involucre bracts which turn dark red; corolla yellow; fruit black.

#### 2. Lonicera ciliosa (Pursh) Poir.      Orange Honeysuckle

Vine-like shrubs; stems climbing or twining; leaves opposite, dark green above, white glaucous below, the margins ciliate; inflorescence a terminal cluster of flowers; corolla tubular, orange; fruit a red berry.

### 48. CAMPANULACEAE (Bluebell Family)

Annual or perennial herbs, shrubs or sometimes trees; leaves alternate or sometimes opposite, estipulate; ovary usually inferior; stamens frequently united by coherence or connation of filaments or anthers (in ours, however, they are distinct).

Campanula [Tourn.] L.

Annual or perennial herbs; flowers single, racemose or paniculate; leaves alternate, sometimes basal; flowers bell-shaped; petals 5; calyx 5-cleft; stamens 5.

1. Campanula scouleri Hook.      Scouler's Campanula

Perennial herbs with creeping rootstocks; slender stems, 1-3 dm. high; leaves alternate, the margins serrate, mostly obovate, the lower ovate; flowers terminal, single or 2-4 in a raceme, bell-shaped; petals blue or white; calyx green, 5-lobed; style exserted; stamens only slightly or not at all exceeding petals.

## 49. COMPOSITAE (Sunflower Family)

Annual or perennial herbs, shrubs or sometimes trees; leaves lacking stipules, alternate or opposite, entire or dissected; inflorescence an involucre head; flowers with 5-lobed, gamopetalous corollas; a pappus of scales, awns or capillary or plumose bristles usually present; style 2-cleft; stamens 5; fruit an achene lacking endosperm.

## Key to the Tribes

Corollas all ligulate; plants with latex (milky juice).....

.....Tribe 9. CICHORIEAE

Corollas not all ligulate; plants lacking latex.

Involucral bracts bristly, some sharp-pointed; leaves prickly...

.....Tribe 8. CYNAREAE  
(Cirsium)



Involucral bracts not bristly, rounded or acute, lacking sharp points; leaves not prickly (entire, lobed, rounded or dentate).

Involucral bracts enclosing the outer achenes; pappus absent or of very inconspicuous scales....Tribe 4. **MADIAE**  
(Madia)

Involucral bracts not enclosing the achenes; pappus usually present, usually of capillary or plumose bristles or scales, but sometimes absent.

The involucral bracts scarious; ligulate flowers absent; style branches lacking flat appendages...  
.....Tribe 2. **INULEAE**

The involucral bracts not scarious; ligulate flowers usually present; style branches with or lacking flat appendages.

Bracts of involucre in 1 row, not of 2 or more overlapping rows of bracts; flowers yellow.

Leaf blades mostly cleft or pinnately lobed, covered with a white tomentum....

.....Tribe 5. **HELENIEAE**  
(Eriophyllum)

Leaf blades mostly not cleft but entire or dentate, glabrous or tomentose....

.....Tribe 7. **SENECIONEAE**

Bracts of involucre in 2 or more rows, usually made up of rows of overlapping bracts.

Leaf blades dissected; herbage covered with white, silky hairs..Tribe 6. **ANTHEMIDEAE**

Leaf blades not cleft, mostly entire or at the most dentate on the margins; usually not covered with white pubescence.

Basal leaves mostly broadly deltoid or sagittate, 1-5 dm. long; corolla bright yellow; limb of ligulate flower 2-5 cm. long; style branches lacking flat appendages....

.....Tribe 3. HELIANTHEAE  
(Balsamorhiza)

Basal leaves not broadly deltoid or sagittate, the leaf shapes various from lanceolate to nearly filiform, 1-5 dm. long; corolla may or may not be yellow; style branches with flat appendages.....Tribe 1. ASTEREAE

Tribe 1. ASTEREAE

Ligulate flowers none.....1. Chrysothamnus

Ligulate flowers present.

Flowers yellow.

Leaves broad, mostly lanceolate; erect herbs...

.....3. Solidago

Leaves narrow, linear or almost filiform; low shrubs...

.....2. Haplopappus

Flowers bluish, purple or almost white.

Leaves weakly spine-tipped and with short, spine-like projections on leaf margins..5. Machaeranthera

Leaves herbaceous at tip, not spine-tipped, the margins entire or dentate, lacking spine-like projections.

Involucral bracts not definitely in several imbricated series; ligulate flowers bluish...

.....6. Erigeron

Involucral bracts definitely in several imbricated series; ligulate flowers purplish to white...

.....4. Aster

#### 1. Chrysothamnus Nutt.

Erect shrubs; stems much branched; leaves entire, alternate and usually narrow; inflorescence dense clusters of heads; ligulate flowers absent; disk-flowers yellow; involucral bracts imbricate in several series; pappus of many capillary bristles.

#### 1. Chrysothamnus viscidiflorus (Hook.) Nutt.

##### Sticky-leaved Rabbit-brush

Erect shrubs; stems branched many times; bark tannish to white, especially white bark on flowering branches; leaves linear to lanceolate, glandular pubescent, very sticky; inflorescence a dense cyme-like cluster of heads; ligulate flowers absent; disk-flowers yellow; involucral bracts imbricated; pappus of white capillary bristles.

#### 2. Haplopappus Cass.

Herbs or shrubs; leaves alternate, entire or toothed, glabrous,

pubescent or glandular; inflorescence various; ligulate flowers often present, usually yellow but sometimes white; involucre of several rows of bracts; pappus of capillary bristles. This is a large, extremely variable genus.

1. Haplonappus bloomeri Gray      Bloomer's Macroneura

Low shrubs, much branched; stems erect to decumbent; leaves linear to filiform, tomentose to glandular pubescent (mostly glandular in our area although some tomentose plants may be found); inflorescence of dense terminal clusters; ligulate flowers bright yellow; involucre bracts in several series, imbricate, the margins scarious.

3. Solidago L.

Perennial herbs arising from rhizomes; stems solitary or in loose clumps; leaves alternate; inflorescence of many small heads in cymes, racemes or panicles; ligulate flowers yellow; involucre bracts of unequal lengths; pappus white bristles.

1. Solidago canadensis L. ssp. elongata (Nutt.) Keck

Meadow Goldenrod

Perennial herbs from creeping, woody rhizomes; stems erect, simple or sometimes few-branched; leaves lanceolate to oblanceolate, mostly lanceolate, the margins nearly entire to toothed toward apex; inflorescence an elongate panicle of many small heads; ligulate flowers yellow; involucre bracts light green, in several series of unequal lengths.

4. Aster L.

Perennial herbs from creeping rhizomes; caudex often woody; stems erect; leaves alternate, the margins entire or dentate; inflorescence of solitary to many heads; ligulate flowers purple to white; involucreal bracts usually imbricated and in several series; achenes with a pappus of capillary bristles.

Involucre glandular; leaves linear, sessile and of nearly the same length from bottom to top of stem, only slightly graduated; herbage covered with a fine canescent pubescence..

.....1. A. ~~canestris~~  
bloomeri

Involucre not glandular; leaves much larger at bottom of stem than top; herbage nearly glabrous except near inflorescence.

The involucreal bracts strongly graduated into 3 or more distinct series; upper stem leaves reduced.....

.....2. A. ~~adscendens~~

The involucreal bracts not strongly graduated into several distinct series but of rather equal length and in only 2 or 3 distinct series; upper stem leaves not much reduced.....3. A. ~~occidentalis~~

1. Aster ~~canestris~~ Nutt. var. bloomeri Gray

Perennial herbs from slender rootstocks; stems slender; herbage covered with a canescent pubescence; leaves linear, sessile; inflorescence usually of several heads; ligulate flowers dark purple; involucreal bracts and stem near involucre glandular.

2. Aster adscendens Lindl. Long-leaved Aster

Perennial herbs from creeping rootstocks; stems erect, slender; leaves lanceolate, the lower long petioled, the upper strongly reduced and sessile; herbage glabrous except canescent below inflorescence; inflorescence of several heads; ligulate flowers dark purple; involucre bracts not glandular, strongly graduated into several series.

3. Aster occidentalis (Nutt.) Torr. & Gray Western Mountain Aster

Perennial herbs from creeping rootstocks; stems slender to stout; leaves lanceolate to oblanceolate, petioled below and sessile above, not strongly reduced upward; herbage glabrous or slightly canescent below inflorescence; inflorescence of several heads; ligulate flowers violet to purple; involucre bracts not strongly graduated in 2 or 3 series.

A. adscendens Lindl. and A. occidentalis (Nutt.) Torr. & Gray occur in a poorly understood group of Asters. On Black Butte, these two species seem to be intergrading so that a population of nearly inseparable hybrids have been produced.

5. Machaeranthera Nees

Annual, biennial or perennial herbs or shrubs; leaves alternate, the margins usually spiny toothed, the apex spine-tipped; inflorescence usually of several to many heads in a loose cluster; ligulate flowers purple to white; involucre bracts definitely in several overlapping series; pappus of brownish bristles.

1. Machaeranthera shastensis Gray var. glossophylla (Piper)

Cronq. & Keck

Perennial herbs from a woody caudex and stout taproot; stems erect to decumbent, mostly branched several times, the basal portion often a reddish color; herbage usually covered with a fine canescent pubescence; leaves mostly spatulate to linear, the margins nearly always entire or with a tooth now and then, the apex spine-tipped with a very small spine; inflorescence of few to several heads loosely arranged; ligulate flowers dark to light purple; involucre bracts in several series, the inner ones often purplish. This plant is quite variable. Type locality Black Butte, Jefferson and Deschutes Counties, Oregon.

6. Erigeron L.

Annual, biennial or perennial herbs; leaves alternate, entire or dentate; inflorescence solitary or groups of heads; ligulate flowers usually present; involucre bracts lanceolate, narrow, imbricated; disk-flowers numerous; achenes with a pappus of capillary bristles.

1. Erigeron peregrinus (Pursh) Greene      Wandering Daisy

Erect perennial herbs from fibrous roots; leaves alternate, nearly entire to slightly dentate, the lower long petioled, the upper on much shorter petioles to nearly sessile; inflorescence usually of solitary heads or sometimes 2 or 3; ligulate flowers a light bluish purple; disk-flowers numerous, yellow; involucre bracts imbricated, narrow, villous, imperfectly in 2 series; pappus of white capillary bristles. A species mostly of moist areas. This species is wide

spread and quite variable. Several subspecies and varieties have been described but are not considered because of lack of material in the Black Butte area.

## Tribe 2. INULAE

Pappus bristles united at base; leaves at base of plant green,  
at least not withering early.....8. Antennaria

Pappus bristles not united at base; leaves at base of plant  
withering early.....7. Anaphalis

### 7. Anaphalis DC.

Perennial herbs from creeping rootstocks; stems erect, solitary or in clumps; leaves alternate, green above, tomentose below; inflorescence of many heads in a rounded panicle; ligulate flowers absent; involucre bracts white, scarious, persistent.

#### 1. Anaphalis margaritacea Benth. & Hook. Pearly Everlasting

Perennial herbs from creeping rootstocks; stems erect; leaves mostly linear to lanceolate, green above, tomentose below, the lower withering early, the upper green; inflorescence a many-headed, rounded panicle; ligulate flowers absent; involucre of numerous, persistent bracts, the tips obtuse, white scarious.

### 8. Antennaria Gaertn.

Perennial, often woody-based herbs; herbage mostly woolly; leaves alternate, mostly entire, forming a basal rosette; stem leaves usually reduced; inflorescence various, heads small; involucre bracts scarious; pappus of capillary bristles united at base.



Involucre bracts pinkish to rose colored...2. A. rosea

Involucre bracts tan, white, brownish or purple spotted.

Leaves (especially basal) dark green and glabrous above,  
white and woolly below.....1. A. howellii

Leaves grayish or white tomentose on both faces...

.....3. A. geyeri

1. Antennaria howellii Greene      Howell's Everlasting

Perennial herbs from woody, creeping stolons; stems erect; basal leaves in a rosette, oblanceolate to obovate, dark green and glabrous above, densely white woolly below; stem leaves sessile, reduced, linear to lanceolate, also green above and densely white woolly below; inflorescence a rather loose-flowered cluster; involucre bracts scarious, tan or brownish or sometimes purple spotted.

2. Antennaria rosea Greene      Rosy Everlasting

Perennial herbs from woody, creeping rootstocks; leaves alternate, mostly oblanceolate, densely pubescent on both faces; inflorescence a rounded cluster of small heads; involucre bracts scarious, pinkish to rose; pappus of white hairs.

3. Antennaria geyeri Gray      Pinewoods Everlasting

Perennial herbs from woody caudex; stems forming mats or clumps; leaves linear to oblanceolate, densely grayish to whitish pubescent on both faces; inflorescence a close terminal corymbose cluster; involucre bracts scarious, tan to brownish, purplish or white.

## Tribe 3. HELIANTHEAE

9. Balsamorhiza Hook.

Perennial herbs from large, deep, fleshy roots; leaves mostly basal, the basal leaves much larger than the stem leaves; inflorescence of large, showy heads in small clusters or solitary; ligulate flowers yellow; involucre of several rows of loose bracts; achenes lacking a pappus.

1. Balsamorhiza deltoidea Nutt. Northwest Balsamroot

Perennial herbs from deep, thick rootstocks; leaves mostly triangular, hirsute or glandular, mostly cordate at base, 1-5 dm. long, the petioles somewhat pubescent at base, the stem leaves much smaller than the basal leaves; inflorescence of 1-several large heads; ligulate flowers yellow; involucre bracts somewhat foliaceous; achenes lacking a pappus.

## Tribe 4. MADIAE

10. Madia Molina

Annual or perennial herbs; stems simple or usually branched; leaves alternate or opposite; herbage glandular, often ill-scented; inflorescence various; ligulate flowers yellow; involucre bracts enclosing the outer achenes; pappus absent or very small and inconspicuous.

Involucre 6-9 mm. high; usually tall plants; stem 10-150 cm.

tall; heads with 20 or more flowers.....1. M. gracilis

Involucre 2-3 mm. high; small plants; stems 2-15 cm. tall;

heads with about 5-7 flowers.....2. M. minima

1. Media gracilis (Smith) Keck      Gum-weed or Slender Tarweed

Annual herbs from a slender taproot; stems usually simple from base, 10-15 cm. tall; leaves linear to lanceolate, pubescent; inflorescence a panicle or raceme of heads, glandular pubescent; ligulate flowers very small, 3-8 mm. long, yellow; involucre bracts 6-9 mm. long, glandular pubescent.

2. Media minima (Gray) Keck      Hemizonella

Low annual herbs; stems often much branched from base; stems erect or somewhat spreading, 2-15 cm. tall; leaves linear, opposite at base, alternate above; herbage hirsute and glandular pubescent; inflorescence solitary or clusters of heads; ligulate flowers very small, yellow; involucre bracts glandular pubescent, enclosing the outer achenes, 2-3 mm. high.

Tribe 5. HELENIEAE

11. Eriophyllum Lag.

Annual or perennial herbs; herbage usually tomentose; leaves alternate, entire, lobed, toothed or dissected; inflorescence usually of solitary heads; ligulate flowers usually yellow; involucre bracts in 1 row; achenes with a pappus of scales.

1. Eriophyllum lanatum (Pursh) Forbes      Common Woolly-sunflower

Perennial herbs from a woody caudex; stems erect or decumbent; herbage tomentose; leaves alternate; stem leaves pinnatifid with the

uppermost sometimes entire, also the lowermost sometimes entire; inflorescence of solitary heads; ligulate flowers bright yellow; involucre bracts in 1 row; achenes oblong, pappus of scales.

#### Tribe 6. ANTHEMIDEAE

##### 12. Achillea L.

Perennial herbs; leaves alternate, dissected; inflorescence of small heads; ligulate flowers white or rose colored; involucre bracts relatively few, imbricate; achenes lacking a pappus.

##### 1. Achillea millefolium L. var. lanulosa (Nutt.) Piper

Perennial herbs from creeping rootstocks; stems erect; leaves alternate, dissected into many fine divisions; herbage gray because of many fine, silky hairs; inflorescence a large, flat-topped cluster of many small heads; ligulate flowers white or sometimes pinkish or rose; involucre bracts imbricate, the margins brownish; achenes lacking a pappus.

#### Tribe 7. SENECEIONEAE

Leaves opposite.....14. Arnica

Leaves alternate.

Ligulate flowers white or whitish; leaves dark green and glabrous above, white tomentose below.....

.....13. Adenocaulon

Ligulate flowers yellow; leaves either tomentose on both faces or glabrous to slight pubescent on the veins below.....15. Senecio

13. Adenocaulon Hook.

Perennial herbs; stems erect; leaves alternate, densely white tomentose below; inflorescence a loose panicle of heads; flowers small; involucre bracts in 1 series; pappus absent.

1. Adenocaulon bicolor Hook. Trail-plant

Perennial herbs; stems erect, pubescent below with long, white hairs, glandular pubescent below inflorescence; leaves deltoid, alternate, dark green above and glabrous, white tomentose below, the margins shallowly lobed or dentate; inflorescence a loose, very glandular, spreading panicle of heads; ligulate flowers white or whitish; involucre bracts in 1 row; flowers very small.

14. Arnica L.

Perennial herbs; leaves simple, opposite or sometimes the very terminal leaves somewhat alternate; inflorescence solitary or in clusters of heads; ligulate flowers, if present, yellow or orange; involucre bracts in 1 row; pappus tan to white.

Lower stem leaves deeply cordate at base, long petioled; leaf blades glandular pubescent; many long white hairs below involucre bracts and on bracts; stem with scattered white hairs.....1. A. cordifolia

Lower stem leaves mostly tapered to petiole, sometimes somewhat cordate, generally short-petioled; leaf blades nearly glabrous or slightly ciliate on margins; glandular and very sparingly

pubescent below involucre bracts and on bracts; stems nearly glabrous or with very few hairs.....2. A. latifolia

1. Arnica cordifolia Hook. Heart-leaved Arnica

Perennial herbs from slender rootstocks; stems mostly erect, pubescent with long, white hairs; leaves opposite, the margins dentate; basal stem leaves deeply cordate, long-petioled, the petioles pubescent with long, white hairs, the blades glandular and pubescent; inflorescence usually of solitary heads; ligulate flowers bright yellow; involucre bracts and below involucre covered with many long, white hairs; involucre bracts in 1 row; pappus white.

2. Arnica latifolia Bong. Mountain Arnica

Perennial herbs from creeping rootstocks; stems erect, mostly glabrous; lower stem leaves tapered to petiole or sometimes slightly cordate, short-petioled, upper stem leaves mostly sessile, the margins dentate; all leaves nearly glabrous or slightly ciliate on margins; inflorescence of 1-3 heads; ligulate flowers yellow; glandular or sparingly pubescent below involucre bracts and on bracts; involucre bracts in 1 row; pappus white.

15. Senecio [Tourn.] L.

Annual or perennial herbs; stems erect; leaves alternate, glabrous or pubescent; inflorescence usually corymb-like clusters of heads; ligulate flowers often yellow or orange; involucre bracts few, usually in 1 row, usually herbaceous; a few with a pappus of white bristles.

Leaves essentially glabrous except for a few hairs on the  
veins.....2. S. pseud aureus

Leaves usually tomentose-pubescent on both leaf surfaces, at  
least not glabrous (sometimes the pubescence less on the  
upper face).....1. S. canus

1. Senecio canus Hook.      Woolly Butterweed

Perennial herbs from woody rootstocks; stems erect, tomentose to  
floccose; basal leaves long-petioled, the blades entire to dentate,  
mostly tomentose on both faces, sometimes becoming somewhat sparse on  
the upper face; stem leaves reduced; inflorescence of few to several  
heads; ligulate flowers yellow; involucral bracts herbaceous. Plants  
of dry situations.

2. Senecio pseud aureus Rydb.      Golden Ragwort

Perennial herbs from rootstocks; stems erect, somewhat floccose-  
pubescent at base of leaves; lower leaves long-petioled, mostly  
glabrous except on veins, the blades mostly orbicular to ovate, the  
margins serrate; stem leaves mostly sessile, essentially glabrous, the  
margins often deeply incised; inflorescence of few to many heads;  
ligulate flowers bright yellow; involucral bracts in 1 series,  
herbaceous. Plants of moist situations.

Tribe 8. CYNAREAE

16. Cirsium [Tourn.] Adans.

Biennial or perennial herbs; leaves prickly, alternate, the  
margins pinnate or dentate; inflorescence of discoid heads; involucre

of imbricated bracts of which at least the outer are usually spine-tipped; pappus of plumose bristles; achenes flattened.

Involucral bracts all spine-tipped, not scarious at tip; leaves pinnately lobed, the lobes spine-tipped; flowers a deep purple.....2. C. vulgare

Involucral bracts not all spine-tipped, the inner scarious at tip; upper leaves often merely dentate on margins with dentations spine-tipped; flowers mostly rose colored...

.....1. C. americanum

1. Cirsium americanum (Gray) Daniels      Slender Mountain Thistle

Slender perennial herbs from slender to stout taproots; stems erect, slender, pubescent; leaves green above, nearly glabrous, nearly white below due to dense white tomentum, the margins spiny; lower leaves petioled, deeply pinnately lobed; upper stem leaves sessile, often not pinnately lobed but merely dentate to nearly entire; inflorescence subtended by imbricate bracts, the outer spine-tipped with scarious margins, the inner mostly scarious or only very weakly spine-tipped; flowers rose to white in color.

2. Cirsium vulgare (Savi) Tenore      Common or Bull Thistle

Biennial herbs; stems erect from stout taproots; leaves green above and covered with short, spine-like projections, white below with a white tomentum, all deeply pinnately lobed, the lobes armed with sharp spines; inflorescence subtended by many imbricated, spine-tipped bracts; flowers a deep purple.



## Tribe 9. CICHORIEAE

Leaves all entire or with slightly wavy margins, oblanceolate or long and narrowly linear, if narrowly linear 4-8 dm. tall with a pappus of plumose bristles.

Leaf blades mostly oblanceolate.....21. Hieracium

Leaf blades long and narrowly linear..17. Tragopogon

Leaves toothed or cleft on margins or sometimes entire and somewhat linear, if entire and linear, short plants 7-40 cm. tall with a pappus of capillary bristles.

Flowers bright, clear pink in living plants; pappus of plumose bristles.....18. Stephanomeria

Flowers burnt orange or yellow in living plants (sometimes turning pink or purplish upon drying); pappus of capillary bristles.

Leaves mostly basal; heads solitary on scapes.

Achenes with small, spine-like projections at summit; ribs 4-5.....19. Taraxacum

Achenes lacking small, spine-like projections toward summit; ribs 10-15.....

.....20. Agoseris

Leaves not all basal, stem leaves present; heads usually several and not borne on scapes...

.....22. Crepis

17. Tragopogon [Tourn.] L.

Mostly biennial herbs from taproots; leaves long and narrowly

linear, entire; stems and leaves glabrous; inflorescence single heads on long peduncles; flowers yellow or purple; involucre bracts in a single row; pappus of plumose bristles.

1. Tragopogon dubius Scop.      Yellow Salsify

Biennial herbs from a deep taproot; stems clustered, 4-8 dm. tall; leaves narrowly linear; inflorescence a solitary head on the end of a long peduncle, the peduncle enlarged and inflated below; flowers yellow; involucre bracts in a single row of usually about 13 bracts; pappus plumose, whitish.

18. Stephanomeria Nutt.

Annual or perennial herbs; stems slender; herbage glabrous, often glaucous; leaves alternate, entire or pinnately toothed or dissected; inflorescence solitary or a panicle of heads; flowers pink or purplish; involucre bracts herbaceous, nearly equal; pappus of plumose bristles.

1. Stephanomeria lactucina Gray      Large-flowered Stephanomeria

Perennial herbs from creeping rootstocks; stems simple or branched; leaves linear, alternate, the margins mostly dentate with short spine-like projections, however, the upper sometimes nearly entire; inflorescence mostly raceme-like with few heads; flowers a bright clear pink.

19. Taraxacum Zinn

Biennial or perennial herbs from a taproot; leaves all basal; inflorescence a solitary head borne on a hollow scape; involucre

bracts in 2 distinct series; flowers yellow; achenes 4-5-ribbed with small, spine-like projections at summit.

Pinnate division of leaves usually complete to midrib; upper lobes of leaf about same size as other..2. T. laevigatum

Pinnate division of leaves not complete to midrib; terminal lobe of leaf nearly twice as large as other divisions...

.....1. T. officinale

1. Taraxacum officinale Weber      Common Dandelion

Perennial herbs from deep taproots; leaves all basal, oblong, the margins pinnately lobed, the lobes not extending to the midrib, the upper lobe usually about twice as large as the other lobes; inflorescence a solitary head on a hollow scape; flowers yellow; involucre bracts in 2 series, the inner erect, the lower series often reflexed.

2. Taraxacum laevigatum (Willd.) DC.      Red-seeded Dandelion

Perennial herbs from deep taproots; leaves all basal, oblong in outline, the margins deeply pinnately dissected to midrib, the upper lobe about the same size as the other lobes; inflorescence a solitary head borne on a hollow scape; flowers yellow; involucre bracts in 2 series, the upper row erect, the lower row reflexed.

20. Agoseris Raf.

Annual, biennial or perennial herbs; leaves mostly basal, linear to oblanceolate, mostly dentate on margins although sometimes entire; inflorescence a solitary head borne on a scape; flowers burnt orange

or yellow; involucral bracts in 2-4 rows; pappus of white capillary hairs.

Leaves regularly and deeply pinnately dissected or toothed on margins.....2. A. retrorsa

Leaves irregularly and shallowly dissected on margins to nearly entire.

Flowers burnt orange in living plants; involucral bracts not conspicuously differing in length..3. A. aurantiaca

Flowers yellow in living plants; outer involucral bracts definitely shorter than other series of bracts...

.....1. A. glauca monticola

1. Agoseris glauca (Pursh) Raf. var. monticola (Greene)

Q. Jones ex Cronq.

Perennial herbs from a long taproot; leaves all basal, linear, the margins mostly toothed to entire, glabrous to finely pubescent; inflorescence a solitary head on slender, hollow scape; scape pubescent especially below involucral bracts; flowers yellow in living plant often turning pink to lavender upon drying; involucral bracts in 2 series, the outer definitely shorter than the other series.

2. Agoseris retrorsa (Benth.) Greene      Spear-leaved Agoseris

Perennial herbs from taproots; leaves all basal, lanceolate, evenly and deeply pinnately lobed or toothed, mostly glabrous except on petioles and underside of veins where they are quite tomentose; inflorescence a solitary head on a stout scape; scape mostly floccose

pubescent, especially below involucral bracts and at base; flowers yellow in living plants, often drying pinkish; involucral bracts in several series.

3. Agoseris aurantiaca (Hook.) Greene      Orange-flowered Agoseris

Perennial herbs; leaves all basal, lanceolate, the margins mostly remotely toothed to nearly entire; scape and leaves glabrous to woolly pubescent at base of leaves, along scape and particularly below involucre; inflorescence a solitary head borne on a long, hollow scape; flowers burnt orange to pinkish in living specimens, often drying purplish; involucral bracts in about 3 series, not varying much in length.

21. Hieracium [Tourn.] L.

Perennial herbs; leaves mostly entire and basal, oblanceolate; stem leaves reduced; inflorescence usually several heads; flowers yellow, white or bright orange; involucral bracts usually in 2-3 series; pappus of white capillary bristles.

Flowers white.....1. H. albiflorum

Flowers yellow.....2. H. scouleri

1. Hieracium albiflorum Hook.      White-flowered Hawkweed

Perennial herbs from a woody rootstock; stems mostly solitary; leaves mostly entire or slightly wavy on margins, oblanceolate, basal; stem leaves reduced; lower stem and leaves pubescent with long, stiff, white hairs; inflorescence a terminal, loose cluster of medium sized heads; flowers white.

2. Hieracium scouleri Hook.      Scouler's Hawkweed

Perennial herbs from creeping rootstocks; stems mostly solitary; stems pubescence varying from hirsute to nearly glabrous; leaves mostly lanceolate, entire, reduced upward, the margins ciliate; inflorescence a loose panicle of heads; flowers yellow; involucral bracts finely stellate pubescent, also covered with black glandular hairs as well as sometimes yellowish hairs.

22. Crepis L.

Annual, biennial or perennial herbs; stem leaves alternate, however, leaves mostly basal, entire or pinnately dissected; inflorescence of few to many heads; flowers yellow; involucre made up of mostly 1 row of bracts and a few outer ones; pappus of capillary bristles.

1. Crepis acuminata Nutt.      Long-leaved Hawksbeard

Perennial herbs; stems erect; basal leaves many, 12-40 cm. long, deeply pinnatifid on margins, usually quite pubescent with a fine tomentum; inflorescence usually a many-flowered head; flowers yellow; involucral bracts nearly glabrous; pappus white.

## SUMMARY

Black Butte, elevation 6436 feet, is located in the Deschutes National Forest east of the Cascade Mountains on the boundary between Jefferson and Deschutes Counties, Oregon, about eight air miles northwest of the town of Sisters, Oregon. It is a craterless cone formed from recent pyroxene andesite lavas and measures four miles across at its base. The conduit for this volcano is believed to be a north-south fault which passes through Metolius Springs and along the upper part of the Metolius River Canyon. The soils of Black Butte are uniform and mostly sandy in texture. It is in a rain shadow formed by the Cascade Mountains, and most precipitation falling on the Butte is in the form of snow. At the present time no grazing is allowed on it. In recent years, some lumbering has been permitted around the base up to 4500 feet on the north, northeast, east, southeast and south slopes. Fire has played an important part in the history of the vegetation in the past as evidenced by fire scars on most of the older living trees.

The vegetation on Black Butte is divided into two fairly well-defined zones, the Montane, from about 3000 feet to 5600 feet, and the Subalpine, from about 5600 feet to the summit. Within these two zones were recognized certain subdivisions called associations and unions. These associations and unions repeat themselves both on the Butte and in the surrounding area. Within the Montane Zone seven associations were recognized: the Pinus / Purshia / Festuca, the Pinus / Ceanothus / Pteridium, the Pinus / Castanopsis / Arctostaphylos / Ceanothus,

the Pinus / Bromus / Melica, the Pinus / Carex / Calamagrostis, the Pseudotsuga / Pachistima / Chimaphila and the Pinus / Populus. Within the Subalpine Zone three associations were recognized; the Amelanchier / Ribes, the Ceanothus / Arctostaphylos and the Festuca. In approaching the problem of classifying the vegetation, the nomenclature and system used by Daubenmire in similar areas has been followed for this tentative classification.

Two rather interesting phenomena were noted on the Butte in connection with fire. One, an Arctostaphylos patula succession, is probably related to the presence of fire in certain areas. The other, the presence of Douglas fir and grand fir in the ponderosa pine understory, is apparently correlated with the absence of fire.

The main portion of this thesis is devoted to keys and to descriptions of the 49 families, 156 genera and 253 species of vascular plants collected on Black Butte.



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