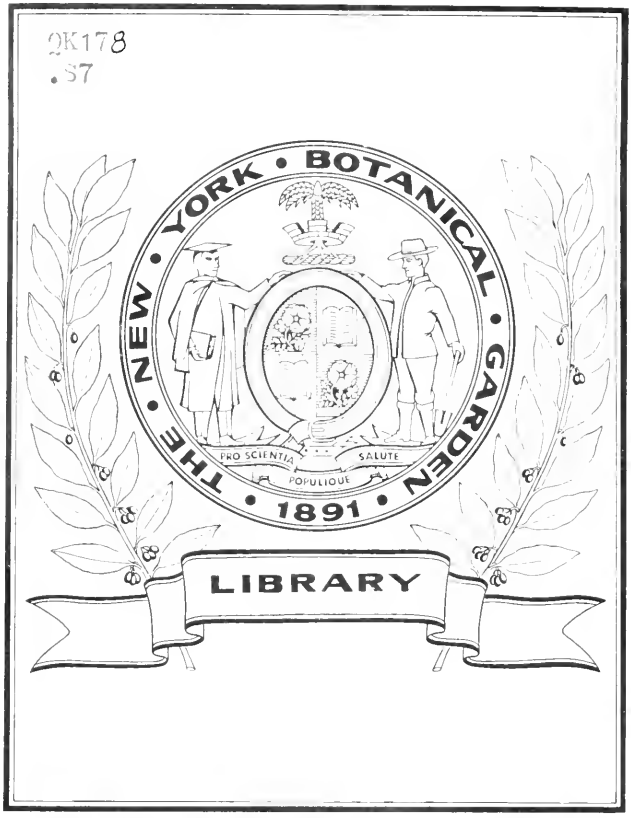
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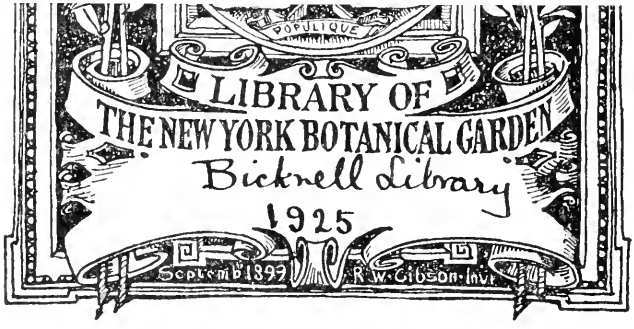
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FROM THE

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VOLUME 22, PART 5

FLORA OF GLACIER NATIONAL PARK MONTANA

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PREFACE.

Among the many thousands of persons who visit the national parks each year a large number are deeply interested in the plant life, including not only the wealth of conspicuous flowering plants but the trees of the forest also. All the national parks offer exceptional opportunity for the study and enjoyment of primeval vegetation, and in this respect none of them perhaps is better provided with attractive and refreshing material than Glacier National Park, Montana. The present paper has been written for the purpose of enabling visitors to this park to become more familiar with its wild plants and to derive greater enjoyment from them. This publication will be useful not only in Glacier Park but elsewhere in the mountains of Idaho, Alberta, and British Columbia. Most of the common plants of Yellowstone National Park occur also in Glacier Park. The present flora will be found helpful therefore to travelers in the Yellowstone region.

FREDERICK V. COVILLE,
Curator of the United States National Herbarium.

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FLORA OF GLACIER NATIONAL PARK, MONTANA.

By Paul C. Standley.

INTRODUCTION.

Glacier National Park lies in northwestern Montana along the main range of the Rockies. It embraces an area of 1,534 square miles, nearly all of which consists of masses of high mountains. On the north it adjoins British Columbia and Alberta; eastward stretch the prairies of the Blackfoot Indian Reservation, and to the west lie the mountains and heavy forests of the Flathead Valley. The Continental Divide runs along the crest of the chief mountain ridge. The drainage of the west (Pacific) slope of the park is consequently into the Columbia River, while on the east (Atlantic) slope it is partly to Hudson Bay and partly to the Missouri River. From one point, Triple Divide Peak, the drainage is partly into each of the three systems. The highest peaks of the region reach an altitude of but little more than 3,000 meters (10,000 feet), but the elevation of the surrounding country is comparatively low (950 meters on the west slope and 1,440 meters on the east slope), so that the mountains are quite as imposing in appearance as many of those in the southern Rockies which have a much greater elevation.

The rocks of the park are stratified and of Algonkian age. They consist chiefly of shale, limestone, sandstone, and argillite, their prevailing colors being rich reds and dull greens. In many places the stratification is very regular and certain strata can be traced with the eye for many miles, but in other places the strata are folded and contorted in an interesting fashion. Besides the stratified rocks, a conspicuous feature is an intrusion of diorite—an igneous rock—which can be followed for a long distance along the Garden Wall as a well-marked band of black.

The whole region of the park is extremely rugged (see plate 33), the mountains usually having sharp summits and precipitous sides. The main ridge is broken only infrequently by passes, whose altitudes range from 1,800 to about 2,100 meters. The slopes of the mountain masses have been plowed by ancient glaciers, and numerous lateral valleys have been cut, along which streams now run. In many of the valleys lie large or small lakes whose waters are wonderfully transparent and beautifully colored in blue or green. Fed directly by

streams from the snow fields and present glaciers, the water of these lakes is ice cold. High up on the peaks, in glacier basins, are often found miniature jewel-like lakes of intense colors, frequently surrounded by the ice walls of the glaciers themselves. Most spectacular of them is Iceberg Lake, on the east slope, which all summer long is full of huge blocks of floating ice which have broken off from the overhanging glacier. In some of these small alpine lakes the water is milky white from the particles of rock, finely ground by glaciers, held in suspension.

One of the most striking features of the park is found in the glaciers which have given it its name. These lie in depressions at the head of some valley or hang high up on steep rock slopes. None of them are very large—Blackfoot Glacier is about three miles wide—but there are over 60 of them in the park. Each one possesses all or most of the features of the largest glaciers, and in a small glacier one can see the processes of glacial action much more readily than in a large one. Streams of water flow away from each of these ice masses, often falling abruptly over high cliffs, carrying down chunks of ice and rock which are heard constantly crashing upon the rocks below. The streams themselves, which abound everywhere in the park, are one of its many attractive features.

To most people another source of interest is the profusion of animal life.[1] Deer, elk, moose, mountain sheep and goats, bears, and many smaller animals are found in varying abundance. Sheep and goats are particularly plentiful and may be seen by the visitor in any of the higher regions, sometimes even in the vicinity of the hotels and chalets. The streams and lakes are well stocked with trout and other fishes.

The winters are long in northern Montana. Snow falls by middle September or even earlier; indeed, at high altitudes, it frequently falls even in midsummer. At low elevations it remains until late in the season. In 1919, although the snowfall had been extremely light the previous winter, numerous snow banks remained at middle or even at low altitudes the first of July. Because of the short summers, the tourist season is limited; it extends from June 15 to September 15.

GENERAL FEATURES OF THE FLORA.

All the national parks of the West possess many attractions for anyone interested in plants, whether from the esthetic or from the scientific standpoint, and for the study of plants none offers greater advantages than Glacier Park. The flora is rich in number of species, and the vegetation is luxuriantly developed. All through

[1] See Wild animals of Glacier Park: The mammals, by Vernon Bailey; The birds, by Florence Merriam Bailey. Department of the Interior, National Park Service. 1918.

the summer there is a lavish display of color, which attains its climax about the first of July. The flowers follow close upon the retreating snow banks, and thus even when they are somewhat faded at lower altitudes they may be seen in all their vernal freshness on the high slopes. The growing season is so brief that plants must bloom and fruit quickly. At high altitudes, and to some extent at middle ones, there are no "spring," "summer," or "fall" flowers, for nearly all plants are in bloom at once, asters and goldenrod mingling with violets, springbeauties, and anemones. At low altitudes, however, there are marked differences between the spring and autumn floras.

The flora of Glacier Park is in general typical of the Rocky Mountain region, but like that of any restricted area it shows certain special characteristics. The Continental Divide, which traverses the park, is to a certain extent a barrier to plant migration, and there are noticeable differences between the plants of the east and west slopes. The differences are most conspicuous in the case of the trees, and will be discussed in detail further on. In general, the flora of the east slope is like that of the central Rockies, while the flora of the west slope shows a marked relationship to that of the northern Pacific coast. It is noteworthy that a large number of coastal species reach the eastern limit of their range (in the United States at least) in Glacier Park. Many characteristic plants of the mountains of Alberta and British Columbia reach their southern limit in this region, and several such plants collected in Glacier Park have not been found elsewhere in the United States. Of course, more thorough exploration of the mountains of western Montana may show that some of these have a wider range than is known at the present time.

The forests of the park are of chief interest to those who come from the East. Like all western forests, they are composed almost wholly of coniferous trees belonging to a comparatively small number of species. The only broad-leafed tree which occurs in much abundance is the aspen. The forests of the east slope are only moderately heavy, but those of the west slope, especially about Lake McDonald, are very dense and are composed of large trees. The forests of the west slope are similar to those of the Pacific coast, although they are not so extensive or luxuriant.

Since there is practically no cultivated land inside the park, few introduced plants are to be expected, and in the present list there are included only 61 species of foreign origin. Most of these have been found only about Belton and the east entrance, where they have become established along the railroad. A few foreign plants are thoroughly naturalized in the park, however, and some are abundant, such as timothy, sheep sorrel, fanweed, red, white, and alsike clover,

and the common thistle (*Cirsium lanceolatum*). None of these, with the possible exception of the thistle on the west slope, is sufficiently plentiful to constitute a prominent element of the flora.

LIFE ZONES.

In the study of the vegetation of any region it soon becomes apparent that many of the species are restricted in their distribution. Some plants, of course, grow only in water or in wet soil, and others only in dry or well-drained situations, but most species are not generally distributed even when such habitats are disregarded. In the mountains, as one ascends the slopes, it is noted that the character of the vegetation changes, either gradually or abruptly, certain plants disappearing and new ones taking their places. Very few plants that grow on mountain tops grow also in the foothills or valleys or on the plains. In general, it is found that the vegetation is divided roughly into belts or zones, which are sometimes well marked, but often of indefinite limitation. As a general rule the trees and shrubs are more definitely distributed in belts than are the herbaceous plants. This zonal distribution of plants is the result of varying conditions with regard to temperature and moisture, as influenced by exposure and elevation. Moisture and especially temperature vary greatly at different elevations, and each plant reaches its best development at the elevation at which conditions are most fully suited to its growth.

After studying the broader aspects of the distribution of plants and animals, botanists and zoologists have evolved a general classification of regions into life zones, each of which occupies a wide geographic area. For North America these zones have been worked out with great care, and a knowledge of the characteristics of each is desirable in the study of the flora of any region, especially a mountainous one. In regions of little variation in elevation a single zone often continues without interruption for hundreds of miles, but in the Rocky Mountains one may often pass through three or four different zones in a half day's walk.

The life zones, of course, are not always sharply marked; indeed, more often they are not, but their general features can usually be recognized, and the more familiar one becomes with a certain region the more apparent are the broader features of the zonal division. If temperature and moisture were uniform at a given altitude, probably the so-called zones would be sharply marked, but this is obviously not the case. On northward slopes there is less evaporation and consequently more moisture, and also the temperature is somewhat lower at a given altitude than on a sunny slope; on a southward slope the conditions vary in the opposite direction. As a consequence, plants of high altitudes are often found at compara-

tively low elevations on northward slopes, and plants of low altitudes at high elevations on sunny slopes. In Glacier Park the snow banks remain on northward slopes all through the summer at rather low elevations, and about them one finds many plants which are characteristic of alpine meadows. On exposed southward slopes above timber line one often comes unexpectedly upon plants which ordinarily grow far below upon the plains or foothills.

The greater number of the plant species, except those which grow upon the prairie or the highest summits and rock slides, range through two zones, but some are more widely dispersed, and a few are found nearly everywhere. The following list includes those species which are found at almost all altitudes, the zone names in parentheses indicating the region in which each is most abundant, if it is noticeably more abundant anywhere:

Zygadenus elegans (Hudsonian).
Allium cernuum (Canadian).
Erythronium grandiflorum (Hudsonian).
Ranunculus reptans (Canadian).
Parnassia fimbriata (Hudsonian).
Saxifraga bronchialis.
Heuchera glabella.
Potentilla fruticosa (Hudsonian).
Astragalus alpinus (Arctic-Alpine).
Hedysarum sulphurescens (Hudsonian).
Linum lewisii.
Epilobium latifolium (Hudsonian, Arctic-Alpine).
Dodecatheon pauciflorum (Hudsonian).
Galium boreale.
Campanula rotundifolia.
Aster meritus (Hudsonian, Arctic-Alpine).
Achillea lanulosa.
Gaillardia aristata (Transition).

It will be noticed that these are all herbaceous plants, and only a few of them are divided by any author into two or more species.

The life zones represented in Glacier Park [2] are four—Transition, Canadian, Hudsonian, and Arctic-Alpine (see plate 34). These are discussed below.

TRANSITION ZONE.

On the east slope of the park this zone is well represented, for it includes all the plains, part of the foothills, and the low valleys (see plate 35), and in warmer, exposed places it extends up to an altitude of about 1,350 meters. In this part of the Rockies the Transi-

[2] A map showing the distribution of the life zones in the park is included in the "Wild Animals of Glacier Park," by Vernon Bailey.

tion Zone is typically a plains belt, but in the southern Rockies it usually occupies the middle slopes of the mountains, at much greater altitudes. On the west slope of the park it is poorly represented; there are traces of it about Belton, as indicated by the presence of yellow pine and western red cedar, together with a few characteristic herbaceous species. Along the North Fork of the Flathead, on the west boundary of the park, the yellow pines are said to be more abundant, and the Transition Zone better developed. This latter area was not visited by the writer.

The only trees characteristic of the Transition Zone are the yellow pine and red cedar, and these are not present on the east slope. The common shrubs are the creeping cedar, water birch, white clematis, bush cinquefoil, wild rose (*Rosa bourgeauviana*), chokecherry, serviceberry, silverberry, a snowberry (*Symphoricarpos occidentalis*), and sagebrush. Of these, the creeping cedar, bush cinquefoil, chokecherry, and serviceberry extend also into the Canadian Zone. The following list includes the more common and characteristic herbaceous plants. Those marked with an asterisk extend also into the Canadian Zone.

Typha latifolia.
Sagittaria cuneata.
Alisma brevipes.
Distichlis spicata.
Agropyron smithii.
Allium nuttallii.
Iris missouriensis.
Comandra pallida.
Rumex mexicanus.
Dondia depressa.
Atriplex hastata.
Chenopodium humile.
Chenopodium salinum.
Pulsatilla ludoviciana.
Halerpestes cymbalaria.
Physaria didymocarpa.
Lesquerella spathulata.
Potentilla anserina.
Potentilla pennsylvanica *
Potentilla hippiana.
Thermopsis rhombifolia
*Lupinus tenellus.**
Astragalus miser.
Astragalus goniatus.
Astragalus drummondii
Astragalus carolinianus.
Oxytropis deflexa.
*Oxytropis gracilis.**
Oxytropis splendens.
Mentzelia dispersa.
Gaura coccinea.
Taraxia breviflora.
Pachylophus caespitosus.
Hippuris vulgaris.
Zizia cordata.
Bupleurum americanum.
Gentiana affinis.
Navarretia minima.
Lithospermum ruderale.
Allocarya californica.
Orcocarya glomerata.
Pentstemon nitidus.
Orthocarpus luteus.
Pyrrocoma lanceolata.
Grindelia perennis.
Aster campestris.
Aster crassulus.
Erigeron caespitosus.
Helianthus subrhomboideus.
Artemisia frigida.
Artemisia biennis.
Madia glomerata.
*Gaillardia aristata.**
Arnica foliosa.
Cirsium undulatum.

The Transition Zone is moderately well differentiated from the Canadian, but there are certain complications. The prairie, of course, is purely Transition, but in the foothills and low valleys it is often impossible to tell whether a given area is more typically Transition or Canadian. The lower open slopes are usually without any Canadian intrusion, but on the higher rocky slopes, like those of Altyn Peak, plants of the two zones are intermingled. In fact, about snow banks upon such slopes Arctic-Alpine plants grow in close proximity with Transition ones. Sometimes patches of apparently Transition vegetation occur at high altitudes, as at Cracker Lake. On the other hand, Canadian vegetation, characterized by a heavy growth of trees, often extends to low altitudes, especially along streams.

The species of the Transition Zone are mostly ones which are characteristic of wide areas of the Great Plains. Many of them extend eastward to Minnesota and southward to Texas. The species of this zone are most easily studied at the east entrance, at St. Mary, and just below Lake McDermott.

The most interesting portion of the zone, as represented in the Glacier Park region, is found on the prairie about the east entrance. The plains here are broken by deep canyons, with precipitous banks composed of crumbling shale. Several of these canyons are within a few minutes' walk of the Glacier Park Hotel, but from a short distance one would never guess their existence, for the landscape appears to consist of a continuous expanse of rolling prairie On the shale slopes a number of species are found which are rare or absent elsewhere. Of greater interest, however, are the small ponds and marshy spots scattered all over the prarie. In 1919 all these places were quite dry, but in a year of moderate rainfall they must be full of water or at least wet throughout the season. Umbach collected here a number of water plants not found by the writer; in 1919 there was no water in which they might grow. But in such an abnormally dry season these spots supported a large number of plants found nowhere else, like *Typha, Sagittaria, Alisma, Rumex maritimus, Polygonum muhlenbergii, Potentilla anserina, Taraxia, Boisduvallia, Hippuris, Gentiana affinis, Navarretia, Allocarya,* and *Orthocarpus.* In many of these depressions the soil is strongly alkaline, and there are found a a few halophilous plants, such as *Distichlis spicata, Dondia depressa, Atriplex hastata, Chenopodium humile,* and *Halerpestes cymbalaria.*

CANADIAN ZONE.

The Canadian Zone covers by far the largest portion of the park, for it includes all the timbered portion except a narrow belt just below timber line (see pls. 37, 38, B). It extends from practically the base of the mountains (1,440 meters on the east slope and 950 meters on the west slope) up to an elevation of 1,800 to 2,100 meters, accord-

ing to exposure. Within this area, too, are found a larger number of species than in any of the other zones. The trees of the east slope are the alpine fir, Douglas fir, spruces, limber pine, lodgepole pine, cottonwood, and aspen; but of these, the limber pine and cottonwood do not occur in sufficient abundance to be an important element of the forest. On the west slope are found the same trees, but in addition the great silver fir, hemlock, western white pine, larch, giant cedar, and canoe birch. The chief shrubs of the Canadian Zone are the following: Ground juniper, yew (west slope only), numerous species of willows, alders, purple clematis, Oregon grape, gooseberry, currants, ninebark (west slope), white meadowsweet, red raspberry, black raspberry (west slope), thimbleberry, mountain-spray, several species of wild rose, chokecherry, pin cherry, mountain-ash, black hawthorn (often a tree on the west slope), serviceberry, buckthorn, maple (often a small tree), mountain lover, deerbrush, Canada buffaloberry, devil's-club (west slope), red-osier dogwood, Labrador tea (west slope), menziesia, whortleberries, elderberry, twinberries, snowberry, and highbush cranberry (west slope). The following is a list of some of the more characteristic herbaceous plants of the zone. Those marked with an asterisk extend also into other zones in more or less abundance.

*Xerophyllum tenax.**
Veratrum viride.
Clintonia uniflora.
Disporum spp.
*Streptopus amplexifolius.**
Claytonia parvifolia.
*Arenaria formosa.**
Actaea rubra.
*Thalictrum megacarpum.**
Nymphaea polysepala.
Cardamine breweri.
*Tiarella unifoliata.**
Fragaria spp.
*Lupinus sericeus.**
*Lupinus tenellus.**
Geranium viscossisimum.
Sphaeralcea rivularis.
Viola canadensis.
Viola orbiculata.
Epilobium angustifolium.
Epilobium adenocaulon.
Aralia nudicaulis.
*Heracleum lanatum.**
Sanicula marilandica.
Angelica lyallii.
Cornus stolonifera.
*Pyrola asarifolia.**
Chimaphila umbellata occidentalis.
Galium triflorum.
Galium trifidum.
Linnaea borealis.
Hieracium albiflorum.
Prenanthes sagittata.
Aster conspicuus.
Aster sayianus.
*Aster engelmannii.**
Balsamorrhiza sagittata.
Anaphalis margaritacea.
Adenocaulon bicolor.
Arnica latifolia.
*Senecio triangularis.**

The timbered portions of the Canadian Zone are easily recognized by the characteristic tree species, with the accompanying herbaceous plants; but the open slopes are not so easily classified, since there is often a puzzling admixture of Transition and Hudsonian species. As remarked above, Canadian plants extend far down along the streams. In this connection one fact should be noted: Running

water plays a more or less important part in plant dissemination in mountain regions, for the streams often bring down seeds from alpine slopes even to the plains, and the plants thus propagated frequently thrive at low altitudes. *Epilobium latifolium* is certainly a typical plant of alpine meadows and rock slides, but it is found in many places along streams at low altitudes, often in considerable abundance and in greater luxuriance than at high altitudes. Along the creek at St. Mary *Dryas drummondii* is more abundant and more vigorous than above timber line, yet it is evident to any botanist that the plant is there only by accident. Along the creek at the east entrance stray plants of many alpine species may be found.

There is a conspicuous difference between the forests of the east and west slopes of the park. As indicated above, there are several important timber trees which grow only on the west slope, although there are none peculiar to the east slope. Moreover, on the west slope the timber is much denser and the trees are larger (see pl. 38, B). The general appearance of the forest is very different on the two slopes, the differences becoming conspicuous just as soon as one crosses the continental divide. The greater development on the west slope is due presumably to the greater amount of rainfall in that region, and probably also to the lower elevation.

It is rather remarkable that while the differences between the forests of the two slopes are so strongly marked, there are no proportionate differences in the case of the herbaceous and shrubby vegetation. The predominating species of the herbs and shrubs are largely the same, and the differences in the general appearance of the vegetation are mostly such as are to be expected as a consequence of the differences in forest density. On the west slope the forest is in many places so dense that there is scarcely any herbaceous vegetation, but on the east slope there is always a luxuriant growth of herbaceous plants.

The following shrubs and herbaceous plants are chiefly or entirely confined to the west slope: *Taxus brevifolia, Scheuchzeria palustris, Lysichiton kamchatcensis, Trillium ovatum, Nymphaea polysepala, Drosera rotundifolia* and *D. longifolia, Opulaster malvaceus, Potentilla palustris, Rubus leucodermis, Rosa gymnocarpa, Aralia nudicaulis, Echinopanax horridum, Cicuta bulbifera, Ledum glandulosum, Vaccinium canadense, Melampyrum lineare,* and *Viburnum pauciflorum.* Most of these are species which are typical of the Pacific slope, but their total does not form an important percentage of the whole herbaceous vegetation. In the case of the trees of the Canadian Zone over 40 per cent of the species are found only on the west slope, and it might be expected that an equal proportion of the herbaceous species would be similarly restricted. On the east slope of the park the writer collected many species of herbaceous plants

(but no important ones) which he did not find on the west slope, but it is probable that this is due to the less amount of time spent in the latter region, and to the lateness of the season at which the collections were made. On the plains east of the park (Transition Zone) there are many species of plants not found on the west slope, because there is no similar area in the latter region.

On both slopes of the park it is apparent that the vegetation of the Canadian Zone is not homogeneous, and that there is a marked difference between the lower and upper portions. On the west slope the great silver fir, hemlock, western white pine, larch, giant cedar, aspen, cottonwood, and canoe birch are found only at lower levels. These, it may be noted, include all the Pacific coast species. The larch extends higher up, perhaps, than any of the others. It is at the low altitudes that the forest is most dense; higher up the timber is thinner, and spruces and alpine fir are more abundant. Around Lake McDonald the lodgepole pine, which is so abundant on the east slope, is not very common, and its place is taken largely by the larch.

On the east slope the lower part of the Canadian Zone is timbered chiefly with lodgepole pine, which often forms extensive, dense, nearly pure stands, and with aspens. There is some admixture of cottonwood, Douglas fir, and limber pine, and frequently of other trees. In some places there are areas covered almost exclusively with Douglas fir, and the aspen forms extensive groves, especially along the automobile road. On the higher slopes the trees are chiefly alpine fir, spruces, and Douglas fir. There is a pronounced difference also in the herbaceous vegetation of the two belts of this zone.

There are numerous special localities in the Canadian Zone which are of particular interest botanically. Along the streams are many swampy thickets, where water-loving plants abound. Most of the larger lakes lie in this zone, but their flora is rather meager. In most of them the water seems to be too cold for the growth of water plants, but in St. Mary and McDonald lakes several pondweeds grow in some quantity. On the west slope there are small lakes only a few acres in extent where pondweeds, yellow pondlily, bur-reeds, bladderwort, and other water plants are plentiful. In slow stretches of the streams pondweeds, *Callitriche*, bur-reeds, water buttercups, and other plants are often found.

One of the most interesting localities in the Many Glacier region is a bit of deep swampy woods along Swiftcurrent Creek, shortly below the falls (see pl. 36). This area is difficult to explore because of fallen logs, beaver dams, and bogs, but it yields many plants that locally are rare, such as *Cornus canadensis*, *Habenaria obtusata*, *Pyrola minor*, and *Mitella nuda*. Farther down the stream, close to the automobile road, is a boggy meadow, in whose center rises a

large spring of cold water, from which a good-sized stream flows to the creek. The coldness of the water must have a decided influence upon the vegetation, for here, surrounded chiefly by Transition vegetation, are found such plants as *Eriophorum chamissonis, Carex gynocrates, Salix candida, Pinguicula vulgaris, Petasites sagittata,* and several others which are commonly found only at much higher altitudes. Just above the edge of the road along the side of Altyn Peak, on an open slope, is a small bog carpeted by deep moss and filled with scrub birch. In it there are hundreds of plants of *Botrychium virginianum,* growing with other species that are scarce in this region. Dozens of similar spots of exceptional interest might be mentioned.

One of the most distinctive botanical features of the park is the large sphagnum bogs about Fish and Johns lakes (see pl. 40, B), on the west slope, and a visit to these localities, which are within a short distance of the head of Lake McDonald, will richly repay anyone searching for the less common plants. These bogs are similar to many that are found in the eastern and northern States. They have a dense covering of different species of *Sphagnum,* through which one's feet sink into water. Some of the sphagnum masses extend out into the lake, and many of them are merely floating upon the water, so that they will not support any considerable weight. The sphagnum belt is only a few yards wide, and is bordered by a thicket of shrubs, which gradually encroaches upon the bog. In and at the edge of the sphagnum grow such plants as *Lycopodium selago, L. annotinum, L. clavatum,* and *L. complanatum, Dryopteris cristata, Scheuchzeria palustris, Eriophorum chamissonis, Carex diandra, C. limosa, C. buxbaumii,* and *C. lasiocarpa, Juncus filiformis, Ibidium romanzoffianum, Drosera rotundifolia* and *D. longifolia, Potentilla palustris, Cicuta bulbifera,* and *Kalmia microphylla.* Most of these are species which are not found elsewhere in Glacier Park.

HUDSONIAN ZONE.

The Hudsonian Zone is the least clearly defined of all the zones represented in the park. It is stated by competent authorities that in some regions this zone is well marked, but the writer has never seen such a locality. In Glacier Park, as in many other places, it is an ill-defined belt which forms a sort of transition between the Canadian and Arctic-Alpine zones, and its vegetation consists of a mixture of species which are characteristic of those areas. It embraces a rather narrow belt at the upper edge of the timbered slopes, covered with small, often stunted trees and shrubs, which are often widely spaced, with open meadows between them (see pls. 41, 42). The Hudsonian

Zone seems to include also some of the meadows above the timber, but it is impossible to draw any sharp line here. Sometimes the heavy timber of the Canadian Zone borders directly upon alpine meadows, without any intervening transitional zone.

The characteristic trees of the Hudsonian Zone are the alpine fir and whitebark pine, but the fir, of course, grows also at lower altitudes. Douglas fir and limber pine sometimes grow about timber line, and the alpine larch grows here if anywhere in the park. At the upper limit of timber the wind blows violently much of the time, and for most of the year the ground is covered with snow, so that trees find existence difficult; consequently, most of them are stunted or twisted, and many are mere shrubs. Frequently they are bent down by the wind and snow, their trunks lying flat upon the ground. In such cases their branching is abnormally dense, and these stunted trees often form impenetrable thickets.

The principal shrubs of the zone are willows (*Salix vestita*), green alder, spiny currant, pink meadowsweet, red raspberry, mountain-ash, menziesia, Rocky Mountain laurel, red and white heather, whortleberries (*Vaccinium membranaceum* and *V. scoparium*), and elderberry. The laurel and heathers are practically confined to this zone, but the other shrubs are more widely distributed.

The herbaceous vegetation is rather varied, and because of abundant moisture it is remarkably luxuriant. Here are found more lavish displays of color than at any other level, and the meadows are often an indescribable riot of color. The flower displays endure longer here than elsewhere, for snow banks lie until the end of the summer, and as they melt new beds of flowers are coming continuously into bloom. The following list indicates the characteristic herbaceous plants of the Hudsonian Zone:

Phleum alpinum.
Xerophyllum tenax.
Tofieldia intermedia.
Streptopus amplexifolius.
Polygonum bistortoides.
Silene multicaulis.
Trollius albiflorus.
Aquilegia flavescens.
Thalictrum megacarpum.
*Delphinium depauperatum.**
*Pulsatilla occidentalis.**
Tiarella unifoliata.
Sibbaldia procumbens.
Hypericum scouleri.
Antennaria racemosa.
Arnica spp.
Senecio triangularis.
Viola glabella.
*Angelica dawsoni.**
*Gaultheria humifusa.**
Dodecatheon pauciflorum.
*Gentiana calycosa.**
Romanzoffia sitchensis.
Lappula diffusa.
Mimulus lewisii.
Castilleja spp.
Pedicularis groenlandica.
Pedicularis bracteosa.
Valeriana sitchensis.
Aster engelmannii.
*Erigeron salsuginosus.**
*Senecio megacephalus.**
Senecio ovinus.

The species marked with an asterisk are nearly or altogether confined to this belt, while the others are abundant elsewhere as well. It is evident that very few species are peculiar to the Hudsonian Zone.

The flora of the zone is much the same wherever it is found, and there are no localities in it of exceptional interest. The plants can be studied easily at Granite Park, Iceberg Lake, Sexton Glacier, Gunsight Lake, Sperry Chalets, and many other localities.

ARCTIC-ALPINE ZONE.

The Arctic-Alpine Zone includes all vegetation above the Hudsonian, and covers all the slopes above 1,800 to 2,100 meters (see pls. 43, 44). In mountain regions in general the plants of this zone are found only about the higher summits, but in Arctic regions the same species grow at sea level. The species are more widely distributed than those of any other division and many of the characteristic plants of the higher levels of Glacier Park are found also in Europe and Asia. Vegetation extends to the summits of some of the peaks of Glacier Park, but on others it ceases far below the summits. In places plants grow close to the sides of the glaciers and snow banks, but often there are wide stretches of rocks and gravel upon which no vegetation exists.

It is impossible, as stated above, to draw a sharp line between the Hudsonian and Arctic-Alpine zones. The latter region is composed of wet meadows, of rocky slopes of loose stones with a large amount of soil between them, of areas of exposed rock in place, and of great slides of loose rock in which there is little or no soil. In the meadows especially it is difficult to determine which zone is represented, for here truly Arctic species are associated with those of lower altitudes. On rock slides and on exposed summits the flora is decidedly different, and there is no doubt that it is purely Arctic. Just as soon as one leaves the meadows and begins to climb a rock slide, an abrupt change in the flora is apparent, yet it is hardly possible to restrict the Arctic-Alpine Zone to these slides and to the exposed summits.

There are no trees in the zone, of course, but there are dwarfed shrubs, especially low willows, which frequently form dense bushy masses of considerable extent. At Cracker and Iceberg lakes willows are particularly abundant. Most of them are shrubs 30 to 60 cm. in height, but there are also smaller species, some of which creep closely along the ground. Scrub birch sometimes grows on high slopes, also bush cinquefoil; and the heathers grow here as well as in the Hudsonian Zone. Two species of *Dryas* are common, but in spite of their woody stems they resemble herbs much more than shrubs.

The herbaceous plants are rather numerous, as shown in the following list. The species marked with an asterisk grow only on rock slides and in the most exposed places.

Phleum alpinum.
Tofieldia palustris.
Eriogonum depressum.
*Eriogonum androsaceum.**
Rumex acetosa.
Oxyria digyna.
Polygonum viviparum.
*Claytonia megarrhiza.**
Claytonia lanceolata.
Silene acaulis.
*Lychnis apetala.**
*Cerastium alpinum.**
*Stellaria americana.**
Stellaria laeta.
Sagina saginoides.
*Arenaria nuttallii.**
Arenaria formosa.
*Arenaria rossii.**
Trollius albiflorus.
*Aquilegia jonesii.**
Anemone parviflora.
*Papaver pygmaeum.**
Draba glacialis.
*Draba andina.**
*Draba oligosperma.**
Draba crassifolia.
Smelowskia americana.
Arabis lyallii.
*Parnassia kotzebuei.**
Sedum integrifolium.
Saxifraga rhomboidea.
*Saxifraga oppositifolia.**
Saxifraga adscendens.
Saxifraga rivularis.
Saxifraga lyallii.
Leptarrhena pyrolifolia.
*Potentilla nivea.**
Potentilla glaucophylla.
Lupinus minimus.
Astragalus bourgovii.
Oxytropis alpicola.
*Oxytropis parryi.**
Epilobium alpinum.
Epilobium anagallidifolium.
*Polemonium viscosum.**
Phacelia lyallii.
Myosotis alpestris.
Pentstemon ellipticus.
Veronica wormskjoldii.
Castilleja occidentalis.
Pedicularis contorta.
*Crepis nana.**
Solidago ciliosa.
*Erigeron lanatus.**
Erigeron unalaschkensis.
Erigeron jucundus.
Arnica alpina.
*Arnica tomentosa.**
*Senecio conterminus.**
Senecio fremontii.

Not all the species listed are confined to this zone, but most of them are so limited. Few of them are found below the Hudsonian Zone, except under abnormal conditions.

Most of the plants of the Arctic-Alpine Zone may be found in any locality above timber line. The majority are widely dispersed in this belt, but some are of local occurrence. On rock slides (see pl. 44, B) the individuals are not numerous, and they are often half hidden under the rocks; consequently one occasionally stumbles upon a single individual of a given species, but searches in vain for a second one. It is hard to see how plants can grow on the rock slides, where there is no soil visible and where the rocks are rolling downward almost constantly. Most of the plants found in such places have remarkably long roots, and in many instances the roots are very elastic, so that a plant is not easily torn up or broken off if a rock rolls over it.

The Arctic-Alpine Zone may be studied easily at Iceberg Lake, Cracker Lake, Ptarmigan Lake, Sexton Glacier, Gunsight Pass, Swiftcurrent Pass, Sperry Glacier, and at various other easily accessible localities. Frequently, also, patches of Arctic-Alpine vegetation are found at middle or even rather low altitudes, especially where the snow lies late in the summer. On the rock slides above Many Glacier Hotel, which may be reached in half an hour by an easy climb, one may find most of the plants that grow on the rock slides above Cracker Lake; and on the slopes of Altyn Peak, above Many Glacier Chalets, many alpine species are represented.

SCOPE AND PLAN OF THE FLORA.

The present list is intended to include all the species of flowering plants, ferns, and fern allies which have been found in the park. The number listed is 955. With more thorough exploration the list undoubtedly will be greatly increased, for no part of the region has been thoroughly explored botanically, and the greater portion of the park has not even been visited by a botanist. The number of species still to be discovered can not be expected to be proportional to the area which remains unexplored, for most of the common plants of the park are included in this catalogue. Although the flora is only imperfectly known, it seems worth while to place on record our present knowledge of it, for the region affords botanical features of exceptional interest. The published flora will be found useful not only in Glacier Park, but in many parts of western Montana and in adjacent Alberta and British Columbia.

The list of species here presented is the result chiefly of field work conducted by the author during July, August, and September, 1919, under cooperation of the National Park Service of the Department of the Interior and the United States National Museum. The exploration was conducted primarily in order to obtain data for a popular account of the plants of the park, which is to be published soon by the National Park Service for the use of visitors to the region. It was therefore necessary to give chief attention to those portions of the park most visited by tourists, and it was found that the investigation of these areas required the whole time available for field work. The writer visited all the localities generally seen by tourists, and covered most of the trails on foot. The larger part of the summer was spent on the east slope, with headquarters at Many Glacier Hotel, the most centrally located of all the hotels and camps. The Many Glacier region was explored rather thoroughly, and its flora and that of the region about the east entrance are now better known botanically than any other portions of the park. Although the writer was able to spend only three weeks on the west slope, and those in late summer, it was possible nevertheless to cover all the

trails, since they are not nearly so extensive as those of the east side of the park.

Besides the work done inside the park proper, extensive collections were made also at the "east entrance" (Glacier Park station on the Great Northern Railroad, formerly known as Midvale), and at Belton, the west entrance. The plants collected at these localities are listed here, for it is probable that nearly all are found also within the actual park boundaries. Certainly those found at Belton must be, that station being separated from the park only by one of the forks of the Flathead River. The east entrance is farther removed from the park; yet nearly all of even the typical prairie species of that region must be expected to cross the boundaries on the foothills or along the low stream valleys. At any rate, it is desirable that the floras of these two localities should be included, for many visitors spend considerable time at one or both stations, which are for practical purposes a part of the park.

The summer of 1919 was not a favorable season for botanical work in northwestern Montana, since it was the third of a series of dry years; practically no rain fell during the summer, and the snowfall of the preceding winter was exceptionally light. As early as the first of July the vegetation upon the prairies was almost as dry as tinder, and on the foothills conditions were not much better. Even in the heavy forest the ground became very dry by midsummer, and the plants drooped and withered. At high altitudes, where the snowfall is heavier and evaporation less rapid, plants were probably nearly as luxuriant as in normal seasons. While the dry season increased the comfort of travelers in the park, it was most unfavorable for the growth of plants. Probably most of the species of the region were represented during the season by growing plants, but some of them withered so early that the writer did not see them. On account of the dryness of the summer it may be that the habitats of some of the species have been indicated as more arid than they would be in a normal season. In the Rockies the amount of moisture in a given locality varies so much from month to month or even from week to week that it may be described at one time as "dry" and with equal correctness at another season as "wet." The writer has often had occasion to note this in labeling or working over a summer's collection, for sometimes a plant collected in midsummer during the rainy season was, according to the notes, collected on a "wet grassy slope," while a less mature plant from exactly the same hillside, but collected early in the summer, might be noted as coming from a "dry "slope.

Keys for the identification of the genera and species accompany the present catalogue of species, and there is also an artificial key to the families, based so far as possible upon leaf characters and

upon those flower characters that can be seen easily. The descriptive notes under each species are brief, and are intended only to supplement the characters indicated by the keys. It has been the purpose throughout to use only such technical terms as could not be avoided except by the sacrifice of accuracy. A few synonyms have been inserted in parentheses. They are cited chiefly in the case of plants for which two generic names are in use by botanists who follow different systems of nomenclature. The names of Rydberg's Flora of the Rocky Mountains have been listed when they differ from those employed here.

EARLIER BOTANICAL EXPLORATION.

All the species here enumerated were collected by the writer in 1919, unless otherwise indicated. The only exception is in the case of the grasses; no attempt was made to collect these, and only a few specimens were obtained. Aside from the writer's collections there are in the United States National Herbarium probably less than a thousand specimens from Glacier Park. Several previous collections have been made in the region, but only a few of them are represented here.

The most important earlier collection in the National Herbarium is that obtained by L. M. Umbach, of Northwestern College, Naperville, Illinois, in 1901. Umbach's collections were obtained chiefly at the east entrance (Midvale), Mount Henry, Belton, and Sperry Glacier. His specimens from the east entrance have been particularly valuable in the preparation of this list, for the season of 1901 was undoubtedly a favorable one, and he obtained a considerable number of species not found there by the writer.

In 1897 Mr. R. S. Williams, now of the New York Botanical Garden, was a member of the party which surveyed the west boundary of the Blackfoot Indian Reservation, and was in the region from late June until late September. Mr. Williams was interested chiefly in mosses, but he collected flowering plants also. In earlier years he made large collections of plants about Columbia Falls, and some on the west slope of Glacier Park. Columbia Falls is only about 12 miles west of Belton, but many of the plants collected there have not yet been found in Glacier Park. The writer has not deemed it advisable to list them, but it is probable that most of them will be found on the west slope, at least along the North Fork of the Flathead.

In July, 1898, Prof. J. M. Holzinger, of Winona, Minnesota, collected about the head of Lake McDonald. He also was interested chiefly in mosses, but he made a small collection of flowering plants, which is in the National Herbarium.

In 1900 Dr. David Griffiths, of the United States Department of Agriculture, in company with Mr. E. F. Lange, visited western Montana for the purpose of studying the grasses. He spent about a week at Summit, a station on the Great Northern Railroad, on the south boundary of the park. He collected grasses here and at other stations in the vicinity.

In 1901 Dr. Stuart Weller, of the University of Chicago, was paleontologist of a party sent out by the United States Geological Survey to determine the condition of the international boundary monuments, and to secure information regarding the geology of the region traversed. Doctor Weller obtained a small collection of plants, some of which are not otherwise known from the region. All those seen by the writer are from the northern portion of the east slope.

In the same year Mr. F. K. Vreeland, an electrical engineer of New York City, made a rather extensive collection on the west slope, in the region of McDonald and Camas lakes. The plants were determined at the New York Botanical Garden by Dr. P. A. Rydberg, and a partial set of them is in the National Herbarium. Several species were described as new by Doctor Rydberg from this collection.

In 1914 Prof. A. S. Hitchcock, of the Department of Agriculture, spent three weeks in Glacier Park, collecting grasses. The list of grasses presented here is based chiefly upon his collections. In addition he obtained a considerable series of other plants.

Mr. Vernon Bailey, of the Bureau of Biological Survey, Department of Agriculture, made a small collection of plants in the park in 1917, while engaged in the preparation of his report upon the mammals.

Mrs. Otto Thompson, of Glacier Park station, has presented to the National Museum two small collections of the early spring plants, from the vicinity of the east entrance. These contain some species not otherwise known from the region.

The collections enumerated above are the only ones in the National Herbarium from Glacier Park, but several others have been made in the region. Mr. Marcus E. Jones, of Salt Lake City, Utah, collected in the park, chiefly at Sperry Glacier, and he has published a list of the species obtained (see bibliography). Mr. John G. Jack, of the Arnold Arboretum, made a collection of trees and shrubs at St. Mary Lake in September, 1918. Others who have collected in the park are Miss Gertrude P. Norton; Prof. M. J. Elrod, of the University of Montana; Mr. M. P. Somes, of Kalispell, Montana; and Mr. Titus Ulke.

There should not be omitted, also, the tourists, some of them amateur botanists of no mean ability, who every year preserve dried specimens of the plants whose acquaintance they make here for the first time. There must be dozens, if not hundreds, of such herba-

ria scattered about the United States, some of which in the course of time will doubtless pass into the possession of the larger botanical institutions.

ACKNOWLEDGMENTS.

The field investigation of which this publication is a result was performed under the direction of the National Park Service, and the officials of that office have facilitated the work in every possible manner. To Mr. W. W. Payne, superintendent of Glacier Park, and to several of the park rangers, the writer is particularly indebted for assistance while in the field. Acknowledgments are due also to Mr. H. A. Noble, of the Glacier Park Hotel Co.; to Mr. Roe Emery, of the Glacier Park Transportation Co.; and to Mr. J. E. Lewis, of the Glacier Hotel, all of whom aided materially in the successful prosecution of the field work. Many of the employees of the hotel and transportation companies also rendered important assistance in many ways.

The late Miss Gertrude Norton, of Salt Lake City, contributed a large amount of information regarding the plants of Montana, much of which is published here. Through her long field work in Montana Miss Norton had gained an intimate knowledge of the plants, especially the orchids, and she shared this knowledge generously with visitors to the park.

The writer is deeply indebted to those who have assisted directly in preparing the accompanying account of the Glacier Park flora. Mrs. Agnes Chase, of the United States Department of Agriculture, has prepared the account of the grasses; Mr. C. R. Ball, of the Department of Agriculture, that of the willows; and Mr. Kenneth K. Mackenzie, of New York City, the treatment of the genus *Carex*. Prof. J. H. Schaffner, of Ohio State University, has furnished the key to the species of *Equisetum*.

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Includes a detailed account of the life zones, with copious references to plants; also a colored map showing the distribution of the life zones of the park.

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Graff, P. W. Unreported ferns from Montana. Bull. Torrey Club **47**: 125–129. 1920.
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Grout, A. J. Two new varieties of *Brachythecium.* Bryologist **4**: 48. 1901.
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Holzinger, J. M. *Grimmia mollis* B. & S. in the United States. Fern Bull. **2**: 27. 1899.
The species reported from Sperry Glacier.

——— *Grimmia manniae* and *Grimmia holzingeri.* Bryologist **4**: 10–12. 1901.
A new species described from Sperry Glacier.

——— A new *Hypnum* from Montana. Bryologist **4**: 12. 1901.
H. bestii, from Lake McDonald.

——— On *Limnobium bestii* Ren. & Bryhn. Bryologist **4**: 22–24. *pl. 3.* 1901.
A species of Glacier Park.

——— A puzzling moss from northwestern Montana. Bryologist **5**: 26–27. 1902.
Amblystigium montanae Bryhn, a new species from Lake McDonald.

Jones, M. E. Montana botany notes. Bull. Univ. Mont. Biol. Ser. **15,** pp. 1–75, *pl. 1–5.* 1910.
Contains an extensive list of flowering plants of northwestern Montana, about 195 of which are reported definitely from Glacier Park. A list of 190 species of mosses from the park is included, most of them collected by Holzinger. Of hepatics, 25 species are enumerated, and of lichens 3 species.

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McClintock, Walter. Medizinal- und Nutzpflanzen der Schwarzfuss-Indianer. Zeitschrift für Ethnologie **41**: 273–279. 1909.
Most of the notes in the present publication with regard to Blackfoot uses of plants are taken from this paper.

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Only a few species are listed from Glacier Park.

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Standley, P. C. Sphagnum in Glacier National Park, Montana. Bryologist **23**: 5–6. 1920.
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Sixty-one species listed.

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Numerous species are listed from Glacier Park.

SYSTEMATIC TREATMENT.

KEY TO THE FAMILIES.

I. Pteridophyta. Ferns and Fern Allies.

Plants without true flowers, reproducing by spores (no embryo being formed); fernlike, mosslike, or rushlike plants.

Stems hollow, jointed, grooved; leaves reduced to toothed sheaths surrounding the joints . . . . . **EQUISETACEAE** (p. 268).
Stems neither hollow, jointed, nor grooved; leaves never reduced to sheaths.
Leaves small (1 cm. long or less), very numerous, sessile, awl-shaped or bractlike, 4 to many-ranked; plants more or less mosslike.
Plants depressed or short-creeping, 3 to 5 cm. high or less; stems slender, not over 3 mm. thick (including the leaves); spores of 2 kinds, megaspores and microspores . . . . . **SELAGINELLACEAE** (p. 271).
Plants tall or wide-creeping, often more than 10 cm. high; stems (including the leaves) often much more than 3 mm. in diameter; spores all alike.
LYCOPODIACEAE (p. 270).
Leaves much larger, few, neither awl-shaped nor scalelike, stalked, clustered or solitary; plants not mosslike.
Sporangia (spore cases) large, borne in a stalked terminal spike or loose panicle, the sterile blade entire or several times divided.
OPHIOGLOSSACEAE (p. 263).
Sporangia very small, borne in clusters (sori) on the back of ordinary foliage leaves
POLYPODIACEAE (p. 264).

II. Spermatophyta. Flowering Plants.

Plants with true flowers, reproducing by seeds, these containing an embryo.

I. Trees and Shrubs.

Leaves needle-like, linear, or scalelike, evergreen (except in *Larix*); fruit a cone or a berry.
Fruit a cone or a nearly dry bluish berry . . . . . **PINACEAE** (p. 273).
Fruit a juicy red berry . . . . . **TAXACEAE** (p. 272).
Leaves neither needle-like nor scalelike (except in one small parasitic plant), rarely linear, but the fruit then a capsule.
Leaves opposite.
Plants parasitic upon evergreen trees, very small (5 to 10 cm. high).
LORANTHACEAE (p. 438).

Plants not parasitic.
Plants climbing; leaves of three or more leaflets . . . . . **Clematis** (p. 339).
Plants erect, never climbing; leaves simple or compound.
Leaves toothed or lobed, or composed of several leaflets.
Leaves evergreen, thick and leathery, with small low teeth; flowers very small, green, sessile in the axils of the leaves.
CELASTRACEAE (p. 375).
Leaves deciduous, thin, with coarse teeth, or often lobed or compound; flowers various.
Petals distinct; fruit dry, winged . . . . . **ACERACEAE** (p. 375).
Petals united; fruit fleshy, not winged . . . **CAPRIFOLIACEAE** (p. 412).
Leaves entire.
Leaves covered beneath with silvery and brownish scales; corolla none, the flowers greenish yellow; fruit red, juicy . . . . . **Lepargyrea** (p. 378).
Leaves somewhat hairy or glabrous, never scaly; corolla present, never yellow; fruit never red.
Fruit a capsule; leaves evergreen, leathery, glaucous beneath; corolla 10 to 15 mm. wide, bluish purple . . . . . **Kalmia** (p. 390).
Fruit juicy; leaves deciduous, thin, green; corolla 5 mm. wide or less, white or pink.
Leaves acute; flowers white, in terminal flat-topped clusters.
Cornus (p. 387)
Leaves very obtuse; flowers pink, clustered in the leaf axils.
Symphoricarpos (p. 413)
Leaves alternate.
Stems armed with spines or prickles.
Leaves compound, composed of 3 or more leaflets . . . . **ROSACEAE** (p. 358).
Leaves simple, toothed or lobed.
Leaves very large (20 to 60 cm. wide), covered with prickles on the under side.
Echinopanax (p. 383).
Leaves small, not prickly.
Leaves as broad as long or broader; stems with short slender prickles; flowers in racemes, never white . . . **GROSSULARIACEAE** (p. 357).
Leaves longer than broad; stems with long stout spines; flowers in flat-topped clusters, white . . . . . **Crataegus** (p. 366).
Stems never with spines or prickles.
Leaves compound, composed of 5 or more leaflets.
Leaflets with spiny teeth, evergreen; flowers in racemes; fruit blue.
BERBERIDACEAE (p. 344).
Leaflets never with spiny teeth, deciduous; flowers not in racemes; fruit not blue.
Flowers white; fruit juicy; leaflets 3 to 6 cm. long . . . **Sorbus** (p. 366).
Flowers yellow; fruit dry; leaflets 2 cm. long or less . . **Potentilla** (p. 359).
Leaves simple, entire or toothed.
Leaves covered with silvery scales on both surfaces . . . **Elaeagnus** (p. 378).
Leaves never with silvery scales on both surfaces.
Leaves entire.
Flowers in catkins; leaves usually with stipules . . . . . **Salix** (p. 319).
Flowers not in catkins; leaves without stipules.
Flowers in dense heads surrounded by small bracts; leaves white-hairy . . . . . **Artemisia** (p. 432).
Flowers never in heads; leaves not white-hairy . **ERICACEAE** (p. 390).

Leaves from finely toothed to lobed.
Flowers green, without a corolla, in catkins; fruit sometimes conelike.
Fruit conelike; seeds not hairy . . . . . **BETULACEAE** (p. 324).
Fruit a small capsule; seeds each with a tuft of hairs.
SALICACEAE (p. 317).
Flowers not green, with a corolla, never in catkins; fruit not conelike.
Leaves conspicuously lobed, about as broad as long.
Petals 1.5 to 3 cm. long; fruit like a raspberry . . . **Rubus** (p. 364).
Petals less than 5 mm. long; fruit like a currant . . **Ribes** (p. 357).
Leaves toothed but never lobed.
Corolla of united petals; fruit juicy, with minute seeds.
VACCINIACEAE (p. 392).
Corolla of distinct petals; fruit dry, or sometimes juicy, but with large or rather large seeds.
Fruit juicy, containing a single seed . **AMYGDALACEAE** (p. 367).
Fruit dry or, if juicy, containing 2 or more seeds.
Flowers in racemes; fruit juicy . . . . . **Amelanchier** (p. 366).
Flowers not in racemes; fruit dry or juicy.
Stamens 4 or 5; fruit dry or juicy: flowers green or white.
RHAMNACEAE (p. 375).
Stamens 15 or more; fruit dry; flowers white or pink.
ROSACEAE (p. 358).

II. Herbaceous Plants.

Plants grasses or resembling grasses; corolla green or brownish or none.
Flowers not inclosed by husklike scales, composed of 3 sepals and 3 petals; fruit a capsule, containing 3 or more seeds . . . . . **JUNCACEAE** (p. 305).
Flowers inclosed by husklike scales, without a proper calyx or corolla; fruit 1-seeded, not opening.
Leaves in 2 ranks on the stems; stems round or somewhat flattened, usually hollow; leaf sheaths usually split; flowers with 2 bracts, one above and one below. . . . . **POACEAE** (p. 280).
Leaves in 3 ranks; stems round or usually 3-angled; leaf sheaths not split; flowers with only one bract, this below . . . . . **CYPERACEAE** (p. 294).
Plants not grasslike; leaves sometimes resembling grass leaves but the plants then with colored flowers.
A. Leaves composed of 3 or more leaflets, or else lobed to the midrib.
Plants floating on or submerged in water.
Leaves alternate; flowers white . . . . . **Batrachium** (p. 341).
Leaves opposite or whorled; flowers green or yellow.
Leaves with small bladders; corolla yellow, spurred, of united petals.
Utricularia (p. 410).
Leaves without bladders; corolla of minute distinct greenish petals or none.
Myriophyllum (p. 382).
Plants not growing in water.
Flowers sessile in dense heads, the head surrounded by bracts and often resembling a single flower . . . . . **ASTERACEAE** (p. 419).
Flowers not in a dense head surrounded by bracts.
Leaves opposite, or else all borne at the base of the naked stem.
Flower-bearing stems naked, the leaves all at the base of the stem.
Leaflets 3, entire; corolla of united petals.
MENYANTHACEAE (p. 395).
Leaflets more than 3, toothed or lobed; corolla of distinct petals.
Flowers solitary on the stems; fruit a capsule; leaves many.
PAPAVERACEAE (p. 344).

Flowers in umbels; fruit a berry; leaves 1 or 2 . . . . **Aralia** (p. 383).
Flower-bearing stems leafy.
Plants hairy; corolla of distinct petals . . **GERANIACEAE** (p. 374).
Plants glabrous or nearly so; corolla of united petals.
VALERIANACEAE (p. 413).
Leaves alternate, the stems leafy.
Corolla of united petals.
Capsule 3-celled; flowers not in 1-sided racemes.
POLEMONIACEAE (p. 396).
Capsule 1-celled; flowers mostly in 1-sided racemes, these often clustered . . . . . **HYDROPHYLLACEAE** (p. 397).
Corolla of distinct petals, or sometimes wanting.
Flower shaped like that of a bean or pea; fruit a legume.
FABACEAE (p. 367).
Flower not like that of a bean or pea; fruit not a legume.
Flowers in umbels; fruit of 2 united carpels, these separating at maturity . . . . . **APIACEAE** (p. 383).
Flowers not in umbels; fruit not of 2 carpels.
Petals 4; flowers in racemes; fruit a pod, this splitting into 2 parts.
Petals unlike, one of them spurred; leaves divided into numerous narrow lobes . . . . . **FUMARIACEAE** (p. 344).
Petals all alike, not spurred; leaves of few, mostly broad leaflets.
Leaflets 3, attached at the end of the petiole, entire; petals about 1 cm. long, purplish . . **CAPPARIDACEAE** (p. 352).
Leaflets more than 3, some attached along the sides of the petiole, usually toothed; petals smaller.
BRASSICACEAE (p. 344).
Petals 5 or more or wanting; flowers not in racemes; fruit various.
Stamens 5 or 10; flowers white or pink.
SAXIFRAGACEAE (p. 353).
Stamens 15 or more; flowers of various colors.
Leaves without stipules; sepals distinct; petals often absent.
RANUNCULACEAE (p. 338).
Leaves with stipules; sepals more or less united; petals present.
ROSACEAE (p. 358).

AA. Leaves simple, entire or toothed, sometimes lobed but not lobed to the midrib.
Plants floating on or submerged in water.
Plants very small, 1 cm. long or less, without leaves, floating and not attached.
LEMNACEAE (p. 304).
Plants many times larger, with leaves, attached to the bottoms of streams or lakes.
Leaves in whorls of 6 to 12 . . . . . **Hippuris** (p. 383).
Leaves opposite or alternate, not whorled.
Leaves cordate at the base, 15 to 20 cm. wide or larger; flowers yellow, 6 to 10 cm. broad . . . . . **NYMPHAEACEAE** (p. 338).
Leaves not cordate, much smaller; flowers small and green.
Flowers in globose heads . . . . . **SPARGANIACEAE** (p. 277).
Flowers not in heads.
Leaves 5 to 20 mm. long; flowers sessile in the leaf axils; leaves opposite; fruit not beaked . . . . **CALLITRICHACEAE** (p. 375).
Leaves usually much longer; flowers in spikes, or sometimes sessile in the leaf axils but the fruit then beaked.
POTAMOGETONACEAE (p. 278).

Plants not floating on or submerged in water . . . . . B, BB.

B. Leaves opposite or whorled (a few of the uppermost sometimes alternate); stems leafy.

Leaves toothed or lobed.

Stems with slender stinging hairs; flowers green, in cymes . . **URTICACEAE** (p. 326).

Stems without stinging hairs; flowers colored or, if green, not in cymes.

Flowers in a dense head surrounded by an involucre of bracts, the whole resembling a flower; stems not prostrate . . . . . **ASTERACEAE** (p. 419).

Flowers not in a head surrounded by bracts; stems sometimes prostrate.

Corolla none or of distinct petals.

Leaves deeply lobed . . . . . **GERANIACEAE** (p. 374).

Leaves merely toothed.

Corolla none; stems prostrate; juice milky . . **EUPHORBIACEAE** (p. 374).

Corolla present, white, green, pink, or purple; stems not prostrate; juice not milky.

Leaves thin, not evergreen; petals 2 or 5 . . . **ONAGRACEAE** (p. 378).

Leaves leathery, evergreen; petals 5 . . . . . **PYROLACEAE** (p. 388).

Corolla of united petals.

Leaves thick, evergreen; stems prostrate; flowers 2 at the end of a slender stalk . . . . . **Linnaea** (p. 412).

Leaves thin, not evergreen; stems usually erect; flowers not in twos.

Fruit a capsule; corolla 2-lipped . . . . **SCROPHULARIACEAE** (p. 403).

Fruit of 4 nutlets in the bottom of the calyx; corolla 2-lipped or regular.

Stems prostrate; leaves lobed . . . . . **VERBENACEAE** (p. 401).

Stems erect or nearly so; leaves toothed . . . . **MENTHACEAE** (p. 401).

Leaves entire.

Leaves in whorls of 3 or more, or else a single pair on the stem.

Leaves 2 on each stem.

Petals 3, very unlike, green; leaves oval, rounded, or kidney-shaped. **Ophrys** (p. 315).

Petals 5, all alike, pink; leaves lanceolate . . . . . **Claytonia** (p. 333).

Leaves 3 or more on each stem.

Flowers sessile in the leaf axils; leaves 6 to 12 in a whorl . . . **Hippuris** (p. 383).

Flowers not sessile in the leaf axils; leaves 3 to 6 in a whorl.

Stems bearing numerous whorls of leaves . . . . . **RUBIACEAE** (p. 411).

Stems bearing a single whorl of leaves.

Flowers in a dense head surrounded by 4 white petal-like bracts; leaves 4 to 6 . . . . . **Cornus** (p. 387).

Flower 1 on each stem, with 3 distinct petals; leaves 3 . . **Trillium** (p. 314).

Leaves opposite by twos, several pairs on each stem.

Plants parasitic upon the branches of trees . . . . . **LORANTHACEAE** (p. 438).

Plants growing on the ground.

Corolla of distinct petals or none.

Leaves very thick and fleshy . . . . . **CRASSULACEAE** (p. 352).

Leaves thin, not fleshy.

Petals yellow; leaves with black dots . . . . **HYPERICACEAE** (p. 376).

Petals never yellow; leaves not black-dotted.

Calyx and corolla absent; flowers sessile in the axils of the leaves. **CALLITRICHACEAE** (p. 375).

Calyx and usually a corolla present; flowers not sessile in the axils of the leaves.

Calyx borne on top of the ovary and fruit; petals 2 or 4. **ONAGRACEAE** (p. 378).

Calyx borne at the base of the ovary and inclosing the capsule; petals usually 5 . . . . . **SILENACEAE** (p. 333).

Corolla of united petals.

Fruit of 2 long pods; juice milky.

Pods glabrous; corolla bell-shaped; flowers in cymes.

APOCYNACEAE (p. 395).

Pods woolly; corolla flat, with reflexed lobes; flowers in umbels.

ASCLEPIADACEAE (p. 395).

Fruit not of 2 pods; juice not milky.

Corolla 2-lipped.

Fruit of 4 nutlets in the bottom of the calyx; corolla purple.

Prunella (p. 402).

Fruit a capsule; corolla variously colored.

SCROPHULARIACEAE (p. 403).

Corolla not 2-lipped, the lobes all alike.

Capsule 1-celled; corolla 15 to 40 mm. long, blue, purple, or lavender.

GENTIANACEAE (p. 394).

Capsule 3-celled; corolla 3 to 18 mm. long, white or purplish.

POLEMONIACEAE (p. 396).

BB. Leaves alternate or else all borne at the base of the stem, the stems often naked (one or two pairs of the lowest leaves rarely opposite).

Leaves evidently parallel-veined; petals and sepals, when present, 3 each (in a few plants the leaves are net-veined, but these are easily distinguished by the 3 petals).

Flowers sessile in dense globose heads . . . . . **SPARGANIACEAE** (p. 277).

Flowers not sessile in globose heads.

Flowers sessile in dense cylindric spikes, the lower part of the spike brown and velvety; plants about a meter high, with spongy linear leaves.

TYPHACEAE (p. 277).

Flowers not as above; plants various in habit.

Flowers sessile in a spike, this surrounded by a yellow hood-shaped corolla-like spathe, the whole appearing like a single flower; leaves all basal, 7 to 25 cm. wide . . . . . **ARACEAE** (p. 304).

Flowers never in a sessile spike surrounded by a spathe; leaves various.

Fruit a head of numerous small achenes; petals white; leaves arrow-shaped or ovate . . . . . **ALISMACEAE** (p. 279).

Fruit not a head of achenes; petals variously colored; leaves various but never arrow-shaped.

Petals unlike, one of them very different from the other two.

ORCHIDACEAE (p. 314).

Petals all alike.

Fruit of 3 to 6 distinct pods; flowers in loose racemes, the petals white.

SCHEUCHZERIACEAE (p. 279).

Fruit never of distinct pods; flowers various.

Petals (blue) and sepals borne at the top of the ovary; leaves with their edges turned to the stem; stamens 3; fruit dry.

IRIDACEAE (p. 314).

Petals and sepals borne at the base of the ovary; leaves usually with one face turned to the stem; stamens 6; fruit dry or juicy.

LILIACEAE (p. 308).

Leaves net-veined; sepals (always present) and petals (often absent) usually 4 or 5 each (leaves rarely appearing to be parallel-veined, but such plants never with 3 petals).

Plants without any green coloring; leaves all reduced to scales.

MONOTROPACEAE (p. 389).

Plants with green leaves.

C. Stems naked, the leaves all at the base of the flower-bearing stem (a whorl of leaflike bracts sometimes present at the base of the flowers in *Eriogonum*, a single small leaflike bract sometimes present on the stem in *Parnassia*).

Flowers in a dense head surrounded by an involucre of bracts; fruit an achene, usually with a tuft of bristles at the top.

Juice milky; flowers all with strap-shaped corollas.

CICHORIACEAE (p. 414).

Juice not milky; only the outer flowers of the head with strap-shaped (ray) corollas . . . . . **ASTERACEAE** (p. 419).

Flowers not in a head surrounded by bracts or, if sometimes appearing to be so, the perianth of distinct sepals; fruit never an achene with a tuft of bristles.

Leaves covered with long gland-tipped hairs; flowers in racemes.

DROSERACEAE (p. 352).

Leaves without gland-tipped hairs; flowers various.

Flowers in dense cylindric spikes; leaves with 3 or more ribs.

PLANTAGINACEAE (p. 411).

Flowers not in spikes; leaves not ribbed.

Corolla of united petals.

Flower one on each stem.

Corolla spurred, purple; leaves sessile . . . . . **Pinguicula** (p. 410).

Corolla not spurred, white; leaves slender-petioled.

Limosella (p. 406).

Flowers more than one on each stem.

Flowers in umbels; leaves longer than broad.

PRIMULACEAE (p. 393).

Flowers not in umbels; leaves as broad as long.

Romanzoffia (p. 398).

Corolla of distinct petals, or the flower without petals but with distinct colored sepals.

Petals none, the flowers with 6 sepals; flowers in clusters surrounded by an involucre of united bracts . . . . . **Eriogonum** (p. 326).

Petals present; sepals 4, 5, 8, or 10; flowers not in a cluster surrounded by an involucre.

Petals and sepals 8 or 10 each; leaves white-woolly beneath.

Dryas (p. 362).

Petals and sepals 4 or 5 each; leaves not white-woolly beneath.

Petals and sepals each 4, inserted at the top of the ovary and fruit.

ONAGRACEAE (p. 378).

Petals and sepals each 5, not inserted at the top of the ovary and fruit.

Fruit of numerous achenes; petals yellow.

RANUNCULACEAE (p. 338).

Fruit a capsule; petals variously colored.

Petals yellow or violet, one of them spurred at the base.

VIOLACEAE (p. 377).

Petals white, greenish, or pink, none of them spurred.

Leaves thick, evergreen, usually finely toothed; stamens 10; capsule 5-celled; flowers one or several on each stem. **PYROLACEAE** (p. 388).

Leaves thin, not evergreen, entire; stamens 5, with clusters of sterile stamens between them; flower one on each stem. **PARNASSIACEAE** (p. 353).

CC. Stems leafy, usually with 2 or more leaves.

Flowers in heads surrounded by an involucre of bracts, the whole resembling a single flower (goldenrod, aster, dandelion, etc.).

Juice milky; flowers all with strap-shaped (ray) corollas. **CICHORIACEAE** (p. 414).

Juice not milky; only the outer flowers of the head, if any, with strap-shaped corollas . . . . . **ASTERACEAE** (p. 419).

Flowers not in heads surrounded by bracts.

Corolla of united petals.

Stems creeping, not twining; corolla about 3 mm. long; fruit fleshy. **Gaultheria** (p. 391).

Stems erect or rarely prostrate and trailing; corolla usually larger; fruit dry.

Fruit of 4 nutlets; leaves entire; corolla regular. **BORAGINACEAE** (p. 399).

Fruit a capsule; leaves entire, toothed, or lobed; corolla regular or 2-lipped.

Corolla 2-lipped or saucer-shaped . . **SCROPHULARIACEAE** (p. 403).

Corolla neither 2-lipped nor saucer-shaped.

Stamens protruding from the corolla; leaves entire or lobed. **Phacelia** (p. 398).

Stamens shorter than the corolla; leaves entire or toothed.

Leaves with 2 lobes at base, oblong or ovate; seeds 4. **CONVOLVULACEAE** (p. 396).

Leaves without lobes, mostly linear; seeds 3 or many.

Leaves entire; corolla tubular, about 1 cm. long, pink or pale purple, not drooping . . . . . **Collomia** (p. 397).

Leaves finely toothed; corolla bell-shaped, 15 to 20 cm. long, blue or bluish purple, drooping. **CAMPANULACEAE** (p. 414).

Corolla of distinct petals or often wanting, the calyx sometimes corolla-like.

Petals none, the calyx sometimes corolla-like.

Calyx inserted on the top of the ovary, white; leaves entire. **SANTALACEAE** (p. 326).

Calyx not inserted on the top of the ovary, variously colored; leaves entire, toothed, or lobed.

Fruit a head of numerous hairy achenes; sepals petal-like. **Anemone** (p. 343).

Fruit a capsule or a single achene; sepals various.

Fruit containing 2 or more seeds; leaves toothed or lobed.

Flowers in spikes; leaves woolly . . . . . **Synthyris** (p. 407).

Flowers in racemes; leaves not woolly . . . . . **Lepidium** (p. 345).

Fruit 1-seeded; leaves entire, toothed, or lobed.

Leaves with sheathing stipules; fruit often 3-angled. **POLYGONACEAE** (p. 326).

Leaves without stipules; fruit never 3-angled.

Fruit opening by a lid; bracts of the inflorescence with sharp spiny tips; leaves entire . . . **AMARANTHACEAE** (p. 332).

Fruit not opening by a lid; bracts rarely with sharp tips; leaves entire, toothed, or lobed . . **CHENOPODIACEAE** (p. 330).

Petals present.
Petals unlike, one of them with a spur at the base.
VIOLACEAE (p. 377).
Petals all alike or nearly so, none of them spurred.
Sepals 2; leaves fleshy . . . . . **PORTULACACEAE**(p. 332).
Sepals 4 or more or none; leaves fleshy or thin.
Petals blue; leaves entire . . . . . **LINACEAE** (p. 374).
Petals not blue; leaves entire, toothed, or lobed.
Leaves thick and fleshy, glabrous; fruit of 4 or 5 small pods.
CRASSULACEAE (p. 352).
Leaves thin, not fleshy, often hairy; fruit various.
Sepals and petals each 4.
Sepals inserted at the top of the ovary and fruit.
ONAGRACEAE (p. 378).
Sepals inserted at the base of the ovary and fruit.
BRASSICACEAE (p. 344).
Sepals and petals each 5 or more.
Flowers in umbels; leaves entire or toothed.
APIACEAE (p. 383).
Flowers not in umbels; leaves various.
Sepals inserted on the top of the fruit.
LOASACEAE (p. 378).
Sepals inserted at the base or at the side of the fruit.
Sepals distinct. Fruit of numerous achenes or of several pods . . . . . **RANUNCULACEAE** (p. 338).
Sepals united at the base.
Fruit composed of numerous sections shaped like those of an orange, covered with long stiff hairs; petals 2 to 2.5 cm. long; stamens united into a column.
MALVACEAE (p. 376).
Fruit of 2 to 4 small, distinct or united pods, not long-hairy; petals 1 cm. long or less; stamens distinct.
SAXIFRAGACEAE (p. 353).

ANNOTATED CATALOGUE OF SPECIES.

1. OPHIOGLOSSACEAE. Adder's-tongue Family.

1. BOTRYCHIUM Swartz.

Plants with erect rootstocks and 1 or sometimes 2 leaves; roots fleshy; leaves not coiled in bud, composed of a sterile blade and one or more stalked spore-bearing panicles; sporangia (spore cases) capsule-like, opening by 2 valves.

Sterile blade once pinnate, the segments fan-shaped, entire or lobed . **1. B. lunaria.**
Sterile blade 3 to 5 times divided, the segments lanceolate to ovate, toothed or lobed.
Sterile blade sessile, thin . . . . . **2. B. virginianum europaeum.**
Sterile blade stalked, very fleshy. . . . . **3. B. silaifolium.**

1. Botrychium lunaria (L.) Swartz. MOONWORT. Rare; a few isolated plants found on grassy slopes, on mossy banks, and in bogs about Lake McDermott and Sun Camp; plentiful on the moraine at Grinnell Glacier. Alaska to Calif., Colo., N. Y., and Greenl.; also in the Old World.—Plants 5 to 15 cm. high; sterile blade sessile or nearly so, with 5 to 15 divisions, these thick and somewhat fleshy, the veins all radiating from the base and repeatedly forking.

The plants are probably of rather frequent occurrence, but they are so small and so hidden by grasses and other plants that it is difficult to find them.

2. **Botrychium virginianum europaeum** Ångstr. GRAPEFERN. Rare; in wooded swamps or in deep moist woods at low altitudes; abundant in an open mossy bog below Lake McDermott. The species widely distributed in N. Amer.; also in tropical Amer. and in the Old World.—Plants 10 to 50 cm. high; sterile blade broadly triangular.

In woods the leaves are deep green, but in the open they are yellowish green. The plants vary greatly in size. Only a few isolated individuals were found by the writer about Lake McDermott, except in one bog, where in the thick moss under scrub birches there were hundreds of plants.

3. **Botrychium silaifolium** Presl. LEATHERY GRAPEFERN. Rare; in a wet thicket below Lake McDermott, and in sphagnum bog at Johns Lake. Alaska to Calif. and Mont.; Wis. to Ont., Que., and Pa.—Plants 10 to 50 cm. high; sterile blade broadly triangular, thick and heavy, dark green.

The sterile blades persist for one or two years, and the species may be recognized easily by this fact.

2. POLYPODIACEAE. Polypody Family.

Plants consisting of a rhizome and leaves, the leaves coiled in bud; leaves simple, or compound and composed of leaflet-like pinnae; sporangia borne on the lower surfaces or along the margins of the leaves in clusters (sori); sori naked or with a special covering (indusium).

Leaves deeply lobed, the lobes entire. Sori dotlike, on the lower surface of the leaf. **1. POLYPODIUM.**

Leaves compound, composed of few or numerous pinnae.

Sori borne along the margin of the leaf and protected at first by the inrolled margin.

Sori distinct; leaf stalk divided above into 2 branches . . . . . **2. ADIANTUM.**

Sori not distinct, forming a continuous line about the margin; leaf stalk not 2-branched.

Leaves large, 20 to 60 cm. wide or larger, solitary . . . . . **3. PTERIDIUM.**

Leaves small, usually less than 10 cm. wide, commonly tufted.

Leaf stalks green or pale brown . . . . . **4. CRYPTOGRAMMA.**

Leaf stalks dark brown or nearly black . . . . . **5. CHEILANTHES.**

Sori borne on the lower side of the leaf, not at the margin.

Sori linear or oblong, straight or curved.

Leaves small, 4 to 15 cm. long, once pinnate; sori straight . . **6. ASPLENIUM.**

Leaves large, 25 to 100 cm. long or even larger, 2 or 3 times pinnate; sori curved. **7. ATHYRIUM.**

Sori rounded and dotlike.

Indusium attached by the middle beneath the sori or at one side.

Indusium attached by the middle, split into lobes; leaves with minute stalked glands . . . . . **10. WOODSIA.**

Indusium attached by one side, not lobed; leaves without glands. **11. FILIX.**

Indusium attached by the middle or by one side and spreading above the sorus, or the indusium sometimes wanting.

Indusium wanting.

Leaves much longer than broad, in dense clumps, from a very thick rootstock . . . . . **7. ATHYRIUM.**

Leaves about as broad as long, arising singly from a slender creeping rootstock . . . . . **9. DRYOPTERIS.**

Indusium present.

Leaves thick, evergreen, the teeth bristle-tipped; indusium round, attached by the center . . . . . **8. POLYSTICHUM.**
Leaves thin, not remaining green through the winter, the teeth scarcely or not at all bristle-tipped; indusium kidney-shaped, attached by its base . . . . . **9. DRYOPTERIS.**

1. POLYPODIUM L.

1. Polypodium hesperium Maxon. WESTERN POLYPODY. Occasional at low and middle altitudes, on shaded mossy rocks; more common on the east slope. Yukon to Calif., S. Dak., N. Mex., and Ariz.—Rootstocks slender, creeping; leaves 7 to 20 cm. long, the lobes blunt, the stalks straw-colored; sori large, rounded, without an indusium, borne on the lower leaf surface.

The rootstocks are sweet and have the flavor of licorice.

2. ADIANTUM L.

1. Adiantum pedatum aleuticum Rupr. MAIDENHAIR. Infrequent; chiefly above timber line, in crevices of cliffs or in soil at the foot of cliffs. Alaska to Calif., Utah, and Mont.; also in Que.—Leaves glabrous, composed of numerous small thin fan-shaped leaflets; leaf stalk very slender, brittle, dark chestnut-brown; sori at first covered by the reflexed lobes of the leaflets.

In many regions the maidenhair grows in rich woods, but in Glacier Park it is seldom found except upon cliffs.

3. PTERIDIUM Scop.

1. Pteridium aquilinum pubescens Underw. BRACKEN. Common and often abundant up to timber line; on open slopes or in dry or moist woods; sometimes in swampy thickets. Alaska to Mex.—Rootstocks slender, creeping; leaf stalks slender, pale, the leaves coarse and firm, somewhat triangular in outline, divided into numer ous narrow pinnules, these entire or lobed.

One of the most common ferns of the park, often densely covering considerable areas. On the west slope in wet places the plants get to be 1.5 meters high or even larger. In open places the leaves are frequently very pubescent, but in moist woods they are greener and nearly glabrous; in autumn they turn brown or bright yellow. The young stems were eaten by some of the western Indians.

4. CRYPTOGRAMMA R. Br.

Leaves much divided, glabrous, tufted, the sterile and fertile ones unlike, the ertile ones taller and with narrower divisions; sori marginal but extending down along the veins.

Leaves thin and delicate, the divisions of the sterile ones ovate to fan-shaped; leaf stalks brown or brownish below or throughout . . . . . **1. C. stelleri.**
Leaves firm, the divisions of the sterile ones ovate-oblong; leaf stalks straw-colored. **2. C. acrostichoides.**

1. Cryptogramma stelleri (Gmel.) Prantl. CLIFFBRAKE. Occasional in crevices of wet cliffs above timber line; abundant on wet mossy rocks at Baring Falls. Alaska to Lab., Pa., Colo., and Wash.; also in Asia.—Rootstocks slender, creeping; leaves pale green, usually 10 cm. long or shorter, 2 or 3 times divided, the pinnules finely toothed.

At Baring Falls the plants densely cover the overhanging cliffs in the spray of the falls; at high altitudes they are smaller and poorly developed. They usually have a pale, sickly appearance, and are not at all conspicuous.

2. Cryptogramma acrostichoides R. Br. PARSLEY FERN. Common on cliffs and rock slides at middle and high altitudes. Calif. to N. Mex., Sask., L. Huron, and

northward.—Leaves in large dense tufts, bright green, the fertile ones 10 to 30 cm. high, long-stalked, 3 or 4 times divided.

Sometimes associated with *C. stelleri* on cliffs above timber line, but more common on dry cliffs or on rocks slides at middle elevations.

5. CHEILANTHES Swartz.

Plants small; leaves 2 or 3 times divided, with small pinnules.

Leaves glabrous, the fertile and sterile ones somewhat dissimilar . . . **1. C. siliquosa.**
Leaves hairy and chaffy on the lower surface, the fertile and sterile ones alike.
2. C. gracillima.

1. Cheilanthes siliquosa Maxon. POD FERN. Rare; on dry open rocky slope near Many Glacier Chalets; reported from the Lake McDonald region. B. C. to Calif., Wyo., and Utah; also in Que. and Ont. (*Pellaea densa* Hook.)—Plants densely tufted, with slender wiry leaf stalks; leaves 6 to 20 cm. long, ovate or oblong-triangular, 3 times pinnate, with very numerous pinnules; fertile pinnules linear, with reflexed margins.

The fertile pinnules resemble the pods of some plants of the mustard family.

2. Cheilanthes gracillima D. C. Eaton. LACE FERN. Frequent on dry cliffs at middle altitudes, extending to timber line. B. C. to Mont., Nev., and Calif.—Leaves forming large or small tufts, 5 to 20 cm. long, narrowly ovate-lanceolate, usually bipinnate; pinnules covered beneath with branched scalelike hairs.

Plentiful on cliffs just below Sperry Chalets and near Many Glacier Chalets, as well as in various other localities. This fern has been reported from the park as *C. feei* Moore, a species not known to occur in the region.

6. ASPLENIUM L.

1. Asplenium viride Huds. GREEN SPLEENWORT. Scarce; on moist cliffs above timber line. Alaska to Ore., Wyo., Vt., and Newf.—Leaves tufted, 4 to 15 cm. long, bright green; pinnae 4 to 9 mm. long, rhombic, obtuse, with crenate margins.

An inconspicuous fern, more plentiful at Cracker Lake than at any other place at which it was observed by the writer.

7. ATHYRIUM Roth.

Plants large; leaves often densely tufted, 2 or 3 times pinnate.

Indusium none; sori rounded; plants usually forming large and very dense clumps.
1. A. americanum.
Indusium present and conspicuous; sori linear, curved; plants not in dense clumps.
2. A. filix-foemina.

1. Athyrium americanum (Butters) Maxon. ALPINE LADY FERN. Abundant in some localities above timber line; in moist meadows, along brooks, on rock slides, or rarely in crevices of cliffs. Alaska to Calif., Colo., and Mont.; also in Que. (*A. alpestre* of American authors.)—Rootstocks short; leaves erect, 25 to 60 cm. high, pale yellowish green, oblong-lanceolate, 2 or 3 times pinnate; pinnules lobed or cut, the lobes sharply toothed.

One of the most attractive of our ferns. The dense clumps are 30 to 100 cm. broad, and the leaves are so crowded that there scarcely seems to be room for one more. The clumps are usually isolated from other tall vegetation, and they always have a fresh appearance. The leaves have a slight balsamic odor. The most abundant display of this fern is on the slopes below Sperry Glacier, but it is plentiful near Grinnell Glacier and above Lake Ellen Wilson. In the last locality there are many clumps on the slides formed of bright red argillite rocks, and the combination of colors is very pleasing.

2. Athyrium filix-foemina (L.) Roth. LADY FERN. Abundant nearly everywhere in wooded portions of the park; most plentiful in deep moist woods, but found also in thickets or on open slopes, and frequently above timber line. Western N. Amer.,

Eur., and Asia. (*Asplenium filix-foemina* Bernh.)—Rootstock short-creeping; leaves in small clusters, 0.4 to 1.5 meters long, green, oblong-ovate to lanceolate; leaf stalks straw-colored or brownish, chaffy; pinnules cut or lobed, the lobes often toothed.

This is by far our most abundant fern, being found almost everywhere in the woods; on moist open slopes it often forms large dense patches to the exclusion of all other plants. It is so extremely abundant that one soon tires of it. The leaves vary greatly in width; in exposed places they are usually stiffly erect, but in deep shade they are more spreading. In late summer they are much discolored with dark spots. The sori vary in shape, being sometimes only slightly curved and in other cases nearly circular.

8. POLYSTICHUM Roth.

Plants large or small, the leaves tufted at the end of a thick rootstock; leaf stalks very chaffy; sori large, with a conspicuous indusium.

Leaves once pinnate, the pinnae 1 to 5 cm. long . . . . . 1. **P. lonchitis.**
Leaves twice pinnate, the pinnae 4 to 10 cm. long . . . . . 2. **P. andersoni.**

1. Polystichum lonchitis (L.) Roth. HOLLY FERN. Frequent in moist woods at middle altitudes and under shrubs above timber line. Alaska to Calif., Colo., Alta., N. S., and Greenl.—Leaves tufted, 10 to 40 cm. long, erect or spreading, the stalks covered with light brown scales; pinnae dark green, closely toothed, with spine-tipped teeth; sori borne chiefly or wholly on the upper pinnae.

Although the holly fern is widely distributed in the park it is rarely plentiful, and the plants are mostly scattered. They vary greatly in size, those above timber line often being much reduced. They are found occasionally in crevices of cliffs.

2. Polystichum andersoni Hopkins. BRISTLE FERN. Rare; in moist alder thickets at Grinnell Lake and along the upper trail from Many Glacier Hotel to Piegan Pass. B. C., Wash., and Mont.—Leaves tufted, erect, 35 to 75 cm. long; leaf stalks very chaffy; rachis of the leaf bearing a bud near the tip; pinnules with bristle-tipped teeth.

This is a handsome plant, and one of the rarest of North American ferns.

9. DRYOPTERIS Adans.

Plants large or small; leaves solitary or tufted, 2 or more times divided.

Rootstocks very slender, long and creeping; leaves solitary, broadly triangular, about as broad as long or broader; leaf stalk not chaffy, slender; indusium none.
1. D. linnaeana.

Rootstocks very thick, short; leaves tufted at the end of the rootstock, much longer than broad, not triangular; leaf stalks very chaffy, stout; indusium present.
Leaves 3 times pinnate or lobed. Indusia very small . . . . . 2. **D. dilatata.**
Leaves twice pinnate.
Pinnae triangular-oblong or triangular-ovate; scales at the base of the leaf stalk ovate-oblong . . . . . 3. **D. cristata.**
Pinnae linear-lanceolate, with a broad base; scales lance-linear, long-pointed.
4. D. filix-mas.

1. Dryopteris linnaeana C. Chr. OAK FERN. Common nearly everywhere in deep woods; in some localities very abundant. Alaska to Greenl., Va., Minn., Ariz., and Oreg.; also in Eur. (*Thelypteris dryopteris* Slosson; *Phegopteris dryopteris* Fée; *Dryopteris dryopteris* Christ.)—Leaves thin, 10 to 25 cm. wide, divided into 3 nearly equal parts, these once or twice pinnate, the segments oblong, entire or toothed.

In some places this fern covers large mossy banks with its graceful fronds; it is often associated with the lady fern and male fern. This species has been incorrectly reported from the park as *Phegopteris polypodioides* Fée.

2. **Dryopteris dilatata** (Hoffm.) Underw. WOOD FERN. Frequent in moist woods and in alder thickets; sometimes about sphagnum bogs. Alaska to Calif., Mont., N. C., and Greenl.; also in Eur. (*Aspidium spinulosum dilatatum* Hook.)—Leaves loosely tufted, 25 to 90 cm. high, pale green, triangular-ovate to broadly oblong; pinnules with short-pointed teeth.

Usually associated with the lady fern and male fern. The plants are mostly scattered, but in some localities they are abundant.

3. **Dryopteris cristata** (L.) A. Gray. CRESTED SHIELDFERN. Rare; under bushes at edge of sphagnum bog, Johns Lake. Idaho to Nebr., Va., and Newf. (*Aspidium cristatum* Swartz.)—Leaves densely tufted, 25 to 60 cm. long, the fertile ones much longer than the sterile ones; scales of the leaf stalk pale brown; segments of the leaf broad, oblong or triangular-oblong, obtuse, finely toothed.

4. **Dryopteris filix-mas** (L.) Schott. MALE FERN. Frequent in moist woods; sometimes on moist, open or brushy slopes, or even on rock slides; occasionally found above timber line. B. C. to Oreg., N. Mex., S. Dak., Vt., and Newf.; southern Calif.; also in Eur. (*Aspidium filix-mas* Swartz.)—Leaves tufted, deep green, rather firm, 25 to 100 cm. long, broadly oblong-lanceolate; pinnules toothed, especially at the apex.

Usually associated with the lady fern; a fine, handsome plant, the fronds usually stiffly erect.

10. WOODSIA R. Br. WOODSIA.

Leaves densely tufted, often forming large clumps, rather stiff, erect, pinnate, the pinnae deeply lobed and toothed.

Leaves with flat jointed whitish hairs on the lower surface . . . 1. **W. scopulina.**
Leaves without jointed hairs . . . . . 2. **W. oregana.**

1. **Woodsia scopulina** D. C. Eaton. Frequent on cliffs and rock slides. Alaska to Calif., N. Mex., and Nebr.; Que. and N. C.—Leaves 10 to 30 cm. long, lanceolate; pinnae oblong-ovate.

2. **Woodsia oregana** D. C. Eaton. East entrance, on rocky hills, *Umbach*. B. C. to Calif., Ariz., Sask., and Que.—Leaves 10 to 25 cm. long, lance-oblong; pinnae triangular-oblong.

11. FILIX Adans.

1. **Filix fragilis** (L.) Gilib. BRITTLE FERN. Frequent at nearly all altitudes, on cliffs or mossy banks. Widely distributed in N. Amer. and in the Old World. (*Cystopteris fragilis* Bernh.)—Leaves few, soft and lax, 10 to 30 cm. long, oblong-lanceolate, 2 or 3 times pinnate; pinnae ovate or lanceolate, irregularly lobed or toothed.

One of the most widely distributed of all ferns. The leaf stalks are very brittle. The brittle fern often grows with *Woodsia*, but it is easily recognized by the thin leaves, which are often pendent. The leaves, too, do not endure dry weather like those of *Woodsia*, but turn yellow and shrivel.

3. EQUISETACEAE. Horsetail Family.

1. EQUISETUM L. HORSETAIL.

Rushlike plants, simple or with whorled branches, with rootstocks, the stems hollow, jointed, with toothed sheaths at the nodes; spores borne in a terminal cone composed of shieldlike bracts.—The stems are roughened with a gritlike silex. They were formerly much used for scouring, hence the name scouring-rush, which is sometimes applied to the plants.

The following key to the species has been furnished by Dr. J. H. Schaffner.

Cones with a rigid point; aerial stems evergreen.
Sheath segments and deciduous teeth well differentiated; stems usually tall and rigid, usually many-grooved; central cavity of the internodes large.
Ridges of the stem with one row of tubercles; sheath segments without a central groove or sometimes with a minute groove, normally tricarinate. **1. E. praealtum.**
Ridges of the stem with two rows of tubercles; sheath segments with a deep central groove, normally quadricarinate . . . . . **2. E. hyemale.**
Sheath segments and teeth not sharply differentiated, the base of the teeth usually persistent, but the bristle tip deciduous; stems low and slender, tufted, usually with 10 or fewer grooves, the central cavity only one-half to one-third the diameter of the internode . . . . . **3. E. variegatum.**
Cones rounded at the top or merely acute, not with a rigid point; aerial stems annual, not surviving the winter.
Aerial stems all green and essentially alike.
Fertile stems usually not branched, or the branches minute at time of maturing of the spores, very smooth, with cross bands of silex; sheaths elongate and dilated above, green, with a narrow black band at the top; plants of dry or ordinary wet soil . . . . . **4. E. kansanum.**
Fertile stems branched, usually with numerous whorls of branches; plants of wet soil, or growing in water.
Sheaths usually appressed; stems 45 to 90 cm. high, usually many-grooved, with a large central cavity in the internode . . . . . **5. E. fluviatile.**
Sheaths loose and somewhat dilated; stems 15 to 45 cm. high, slender, 5 to 15-grooved.
Central cavity of the internode very small; cones well developed. **6. E. palustre.**
Central cavity about half the diameter of the internode; cones imperfectly developed . . . . . **7. E. litorale.**
Aerial stems of two kinds, the sterile shoots green and much branched, the fertile ones brown and, at least at first, with little or no chlorophyll.
Fertile shoots withering after the shedding of the spores, very rarely producing branches . . . . . **8. E. arvense.**
Fertile shoots producing compound branches after maturity of the spores, only the tips withering . . . . . **9. E. sylvaticum.**

1. Equisetum praealtum Raf. Occasional at low altitudes, in willow thickets or on rocky lake shores. B. C. to Calif., La., and Ohio.—Stems stout, 50 to 90 cm. high, with a large central cavity, very rough; sheaths ashy or black in age, usually with a black ring around the limb and a second one at the base, not dilated except when young; cones large and thick.

2. Equisetum hyemale L. Common at low altitudes, in swamps or wet thickets; sometimes on open, well-drained banks. Widely distributed in N. Amer., Eur., and Asia.—Stems stout, 0.5 to 1 meter high, very rough, with a large central cavity; sheaths close, ashy or black, usually black-banded.

3. Equisetum variegatum Schleich. Common, especially at middle altitudes and above timber line; about pools, on lake shores, along streams, and in wet meadows or thickets, often in sand or gravel. Alaska to Colo., N. Y., and Lab.; also in Eur. and Asia.—Stems slender, 10 to 30 cm. high, 2 to 4 mm. thick, tufted; sheaths loose, the teeth black, with a broad white border.

This species is particularly abundant in meadows above or near timber line, and often forms dense, almost pure stands of decumbent or ascending stems. Frequently it grows up to the very edges of the snow banks. Occasionally it is found in cultivated ground at low altitudes.

4. Equisetum kansanum J. H. Schaffner. Found only at the foot of Sherburne Lake, along a small gully in aspen woods. Mont. to Utah and Mo.—Stems 30 to 50 cm. high, rough, with a large central cavity; cones 1 to 2.5 cm. long.

5. Equisetum fluviatile L. Frequent at low and middle altitudes, in marshes, bogs, or swamps; in sphagnum bog at Fish Lake. Alaska to Wash., Wyo., N. Y., and Newf.; also in Eur. and Asia.—Stems smooth, bright green, the central cavity very large.

The stems are weak and sometimes procumbent. In the marshes along Swiftcurrent Creek below Lake McDermott this species is very abundant, growing in shallow water and forming dense pure stands, which at a short distance are strikingly suggestive of the similar colonies of *Scirpus occidentalis* found about the east entrance.

6. Equisetum palustre L. Apparently rare; a few plants at Belton, in sand along the river. Alaska to Oreg., Wyo., Conn., and Newf.; also in Eur. and Asia.—Stems slender, 20 to 40 cm. high, bright green, much branched, deeply grooved, the branches slender, simple.

7. Equisetum litorale Kuehlwein. Occasional at low altitudes, in wet ground or swampy thickets. B. C. to Pa. and N. B.; also in Eur.—Stems erect or decumbent, 20 to 40 cm. high, much branched, deeply grooved; sheaths with dark brown teeth; branches 3 to 5-angled.

This form is now believed to be a hybrid between *E. fluviatile* and *E. arvense*. Some of the material referred here may consist of sterile shoots of *E. arvense* with abortive cones.

8. Equisetum arvense L. Common and often abundant, at all altitudes except the highest; in wet meadows or thickets or along streams or lake shores; frequent on rocky slopes or in wet gravelly soil above timber line. Widely distributed in N. Amer., Eur., and Asia.—Sterile stems 10 to 30 cm. high, much branched, bright green, 6 to 20-grooved, deeply furrowed; sheaths of the fertile stems with about 12 teeth.

The fertile stems develop in early spring. In late summer the buds that produce them may be found about the bases of the sterile stems. Some of the plants above timber line, especially near snow banks, are nearly prostrate and are very sparsely branched. This species is common about the east entrance, extending out upon the prairie. It thrives particularly well upon railroad embankments, where dense patches grow from dry gravel and cinders.

9. Equisetum sylvaticum L. Rare on the east slope and found only in a boggy place in woods at the edge of Lake Josephine; occasional on the west slope at middle altitudes, in boggy places in woods. Alaska to B. C., Va., and Newf.; also in Eur. and Asia.—Stems 10 to 40 cm. high, 8 to 14-ridged, 3 to 4 mm. thick, the branches compound and feathery, bright green; cones long-stalked.

This is very different in appearance from our other species, and it is the only one which is at all attractive in appearance. The plants often form dense tangled masses.

4. LYCOPODIACEAE. Clubmoss Family.

1. LYCOPODIUM L. Clubmoss.

Low plants with leafy, simple or branched stems; leaves small, resembling those of cedar or juniper; spores in sporangia, or spore cases, these borne in the axils of ordinary leaves or in yellowish club-shaped spikes of reduced leaves.

Sporangia borne in the axils of ordinary leaves. Leaves rather closely appressed.
1. L. selago.

Sporangia borne in club-shaped spikes composed of much reduced leaves.
Fruit spikes not stalked.
Leaves arranged in 4 rows on the branches, bluish green, closely appressed.
2. L. alpinum.

Leaves in 6 or 8 rows, never bluish green, spreading.
Erect branches of plants treelike, with numerous small branches.
3. L. obscurum.
Erect branches of plants not treelike, with a few large branches.
4. L. annotinum.
Fruit spikes on stalks 2 cm. long or longer.
Leaves arranged in 4 rows, closely appressed to the stem, the branches thus appearing slender and flattened . . . . . **5. L. complanatum.**
Leaves in many rows, rather loose, the branches rounded . . . **6. L. clavatum.**

1. Lycopodium selago L. FIR CLUBMOSS. PLATE 45, A. Under bushes at Sperry Glacier and Gunsight Pass; in sphagnum bog at Johns Lake. Widely distributed in N. Amer. and Eur.—Stems erect, simple or sparsely branched, 10 to 20 cm. high; leaves hollow at the base.

Essentially an alpine species.

2. Lycopodium alpinum L. ALPINE GROUND-CEDAR. Under whortleberry bushes along the edge of a rock slide at Snyder Lake. Alaska and B. C. to Que. and Greenl.; also in Eur. and Asia.—Main stems creeping, the aerial branches 3 to 10 cm. high, branched.

A rare species, apparently; known in the United States only from this locality. The pale glaucous branches are strikingly like those of creeping cedar (*Juniperus prostrata*). In habit the plant is much like *L. complanatum*.

3. Lycopodium obscurum L. GROUND-PINE. In moss in deep woods at Belton. Alaska to Wash., Ind., Newf. and N. C.—Main stems creeping under the ground, the aerial branches erect, bushy, 10 to 20 cm. high; leaves dark green, twisted.

4. Lycopodium annotinum L. STIFF CLUBMOSS. PLATE 45, B. Common in deep moist woods, but more abundant on the west slope. Alaska to Oreg., Colo., Greenl., and Pa.—Main stems creeping above ground, leafy; aerial branches erect, 5 to 30 cm. high, simple or forked; spikes one to several.

This is the only clubmoss which is common on the east slope, and it is not certain that any other species occurs there. The plants usually form large mats of loosely tangled branches. Many of the plants are sterile.

5. Lycopodium complanatum L. GROUND-CEDAR. Common on the west slope at low altitudes, in deep moist woods; reported from Gunsight Lake. Alaska to Wash., Lab., and N. Y.; also in Eur.—Main stems creeping on or below the surface of the ground, the aerial branches pale green, 4 to 25 cm. high, forking.

The plants are very slender and creep widely over the ground; the branches are often much twisted.

6. Lycopodium clavatum L. RUNNING-PINE. PLATE 46, A. Johns Lake, about the edge of sphagnum bog. Alaska to Oreg., Newf., and N. C.; also in Eur. and Asia.—Main stems creeping over the ground, leafy; aerial branches rather thick, 5 to 20 cm. high, branched, densely covered with soft leaves; leaves mostly bristle-tipped.

Our form is *L. clavatum monostachyon* Hook. & Grev.

5. SELAGINELLACEAE. Selaginella Family.

1. SELAGINELLA Beauv.

Low perennial plants with branching stems; leaves 4 to 6-ranked, very small, imbricate, appressed; spores borne in sporangia sessile in the axils of leaflike bracts.—No species of the genus were seen on the west slope, but they are found almost everywhere on the east slope. The plants curl up in dry weather and lose their color, but

soon after a rain they become bright green. The well-known resurrection plant is a species of this genus which grows in Texas and Mexico.

Stems laxly cespitose, with numerous elongate ascending cordlike branches.
1. S. wallacei.

Stems densely cespitose, the branches short and congested.
Plants bronze-green; apical bristle stout, yellowish throughout . . . **2. S. standleyi.**
Plants ashy-green; apical bristle white, at least above the base.
Apical bristle 0.3 to 0.5 mm. long, white from a yellowish base . **3. S. montanensis.**
Apical bristle 0.6 to 1.5 mm. long, white throughout . . . . . **4. S. densa.**

1. Selaginella wallacei Hieron. Common or abundant on the east slope at low and middle altitudes and sometimes above timber line, on open, grassy or rocky slopes, on dry hilltops, and in dry meadows. B. C. to Calif. and Mont.—Stems 3 to 10 cm. long, loosely branched; leaves pale green at first, yellowish when dry, linear-oblong, 2.5 mm. long or shorter, with 7 to 12 cilia on each side; fertile spikes 1.5 cm. long or shorter.

2. Selaginella standleyi Maxon. Frequent above timber line, on moist open rocky slopes. Alta. and Mont.—Stems prostrate, 6 cm. long, or less, pinnately branched; leaves dull green, oblong-linear, 2.1 to 2.5 mm. long, with 10 to 14 cilia on each side; fertile spikes 7 to 11 mm. long.

3. Selaginella montanensis Hieron. Frequent at all altitudes, often occurring above timber line; on open rocky slopes or bare rocks or in moist alpine meadows. B. C. and Wash. to Mont. and Colo.—Stems prostrate, short-creeping, 3 to 10 cm. long; leaves pale glaucous when young, yellowish cinerascent in age, linear-oblong, with 6 to 9 cilia on each side.

4. Selaginella densa Rydb. Common at low altitudes, especially on prairie. B. C. to Utah and N. Mex.—Stems usually short and densely tufted; leaves pale green at first, dark grayish in age, linear-oblong, 2 to 3.5 mm. long, with 5 to 12 cilia on each side; spikes 1 to 3 cm. long.

On the dry rocky flats at St. Mary this is one of the most common plants, densely covering large patches of ground. The bristles of the apical leaves form conspicuous soft white tufts at the ends of the branches.

6. TAXACEAE. Yew Family.

1. TAXUS L.

1. Taxus brevifolia Nutt. WESTERN YEW. PLATE 47, A. Common on the west slope, at low and middle altitudes. Alaska to Calif. and Mont.—Usually a shrub, 1 to 4 meters high, but sometimes a small tree, the branches spreading from the base and often procumbent; bark brownish and smooth, or on old branches purplish and flaky; leaves 2-ranked, spreading, linear, sharp-pointed, 1 to 2 cm. long, yellowish green; fruit red, fleshy, cuplike, nearly inclosing the large naked seed.

This species reaches the eastern limit of its range in Glacier Park. It is one of the characteristic shrubs of the west slope, growing only in the heavier forest, where it often forms dense thickets, with young hemlocks. In its foliage the plant closely resembles the firs and spruces, but the fleshy fruit and small size, as well as the peculiar green of the leaves, enable one to distinguish it readily. The fruit is sweet and rather insipid. It is not advisable to eat much of it, for the yews have the reputation of being poisonous. Their poisonous properties are not well understood, however, and in many localities the trees are considered quite harmless, stock sometimes eating the branches with impunity. The fruit, too, is eaten by birds.

7. PINACEAE. Pine Family.

Trees or shrubs; leaves evergreen (except in *Larix*), needle-shaped, scalelike, or awl-shaped; stamens several together, subtended by a bract, forming catkins; fruit a dry cone or often fleshy and berry-like.

Leaves scalelike or awl-shaped, 1 cm. long or smaller, opposite or whorled.
- Fruit a small dry cone; branchlets flattened; a large tree . . . . . **7. THUJA.**
- Fruit berry-like; branchlets not flattened; small trees or low shrubs. **8. JUNIPERUS.**

Leaves linear or needle-like, usually much more than 1 cm. long, clustered or alternate.
- Leaves in clusters of 2 or more.
  - Leaves 2 to 5 in a cluster, evergreen, the cluster surrounded by a sheath at the base; cones not with projecting scales . . . . . **1. PINUS.**
  - Leaves 15 to 40 in a cluster, deciduous, the cluster without a sheath; cones with scales projecting from between the hard bracts . . . . . **2. LARIX.**
- Leaves attached singly to the branches.
  - Leaves sharp-pointed, 4-angled or rounded. Cones drooping, not falling apart at maturity; branches (from which the leaves have fallen) very rough; bark rough . . . . . **3. PICEA.**
  - Leaves blunt, flat.
    - Leaves sessile; cones erect, falling apart at maturity; bark smooth, with resin blisters . . . . . **4. ABIES.**
    - Leaves contracted at the base into a short stalk; cones drooping, not falling apart; bark very rough.
      - Leaves mostly 2 to 3 cm. long, green; branchlets smooth; cones 5 to 10 cm. long, with projecting 3-lobed bracts . . . . . **5. PSEUDOTSUGA.**
      - Leaves mostly 1 to 2 cm. long, whitish beneath; branchlets rough with the leaf bases left by the fallen leaves; cones 1.5 to 2.5 cm. long, without projecting bracts . . . . . **6. TSUGA.**

1. PINUS L. Pine.

Large trees, or near timber line often only shrubs, usually with rough bark; leaves long, needle-like; flowers appearing very early in spring; cones not maturing until the second season.

Leaves in clusters of 2 or 3; cone scales with short sharp spinelike tips.
- Leaves 8 to 20 cm. long; cones 6 to 15 cm. long . . . . . **1. P. ponderosa.**
- Leaves 3 to 6 cm. long; cones 3 to 4 cm. long . . . . . **2. P. contorta murrayana.**

Leaves in clusters of 5; cone scales without spinelike tips.
- Bark whitish; low stunted tree or shrub, found only about timber line; cones 5 to 8 cm. long; leaves 4 to 6 cm. long . . . . . **3. P. albicaulis.**
- Bark brown or blackish; usually large trees, most common far below timber line; cones 8 to 25 cm. long.
  - Tree low, with a heavy trunk and large top; cones not stalked, spreading, 7 to 20 cm. long, only about twice as long as thick; leaves 3.5 to 7 cm. long. **4. P. flexilis.**
  - Tree very tall and slender, with a small top; cones distinctly stalked, drooping, 15 to 25 cm. long, several times as long as thick; leaves 5 to 10 cm. long. **5. P. monticola.**

1. Pinus ponderosa Dougl. Western yellow pine. A few scattered trees about Lake McDonald; forming stands along the North Fork of the Flathead at low elevations. B. C. to S. Dak., N. Mex., and Mex. (*P. scopulorum* Lemmon.)—Large tree with tall heavy trunk covered with large reddish scales, the crown usually large but narrow; cones spreading.

The yellow pine is one of the common trees of the Rockies, and its scarcity about Glacier Park is due only to the high elevation of most of the country. It is one of the important lumber trees of the West.

2. **Pinus contorta murrayana** (Balf.) Engelm. LODGEPOLE PINE. Very abundant on the east slope at low altitudes and frequent at middle elevations; less common on the west slope, but widely distributed. Alaska to Calif., Colo., and Sask. (*P. murrayana* Balf.)—Small or large tree, the trunk covered with reddish brown scales, the top broad or narrow.

At low altitudes on the east slope this often forms dense pure stands, but at higher altitudes, and everywhere on the west slope, the trees are mixed with spruce, fir, and Douglas fir. The seedlings soon spring up abundantly in burnt-over areas, and the species is therefore a valuable means of reforestation. Lodgepole pine, however, has few attractive characteristics, and often seems more like a weed than a forest tree. No one who attempts to cross one of the slopes which are covered with fallen logs and a thick stand of the young trees will ever afterward be able to see anything attractive about this pine. One striking feature of the tree is found in the fact that the cones persist upon the branches for a long time, even after the trees are dead. In heavy timber the trunks are very tall and slender, and in the wind they sway in an alarming fashion. Indeed, the trees often do fall over and lodge against other trees, and it is this fact that has suggested the name "lodgepole."

3. **Pinus albicaulis** Engelm. WHITEBARK PINE. PLATE 38, A. Common about timber line, associated with alpine fir. Alta. and B. C. to Calif. and Wyo. (*Apinus albicaulis* Rydb.)—Low tree or more often a shrub, the branches often prostrate upon the ground; bark only slightly fissured or smooth; cones purplish, not stalked, remaining closed when mature.

The species is confined to a narrow belt about timber line.

4. **Pinus flexilis** James. LIMBER PINE. Occasional at nearly all altitudes, usually on exposed slopes or mountain tops. Alta. to Calif. and Tex. (*Apinus flexilis* Rydb.)—Heavy tree, usually 10 to 15 meters high, with rough bark.

In some localities the limber pine forms small groves, but usually it is associated with other trees. Some very large trees grow about Granite Park. In exposed places the trees are often lopsided, and frequently the trunks are deformed. On the slopes above Many Glacier Chalets there are numerous dwarfed and gnarled individuals that suggest the trees which are artificially dwarfed by Japanese gardeners. About Sun Camp the limber pine grows with the lodgepole pine, and one scarcely recognizes that there are two species until the number of leaves in a cluster is noticed. This tree is often known in the West as white pine.

5. **Pinus monticola** Dougl. WESTERN WHITE PINE. Common on the west slope at low and middle altitudes, mixed with other trees. B. C. to Calif. and Mont. (*Strobus monticola* Rydb.)—Trunk often 30 meters high, covered with brown or grayish purple bark broken into small blocks; crown short and narrow; leaves bluish green.

This is by far the finest pine of the park, and the clean, slender, symmetric trunks have a very attractive appearance. The handsome cones are abundant on the ground along the trails, and often appear to be strangely out of place, for the tops of the trees are so high above one's head that they are not noticed. The tree reaches the eastern limit of its range in Glacier Park.

2. **LARIX** Adans. Larch.

Large or small trees with rough bark; leaves resembling those of pines, but shorter, soft, and deciduous; cones short-stalked or sessile; seeds winged.

Branchlets glabrous or nearly so . . . . . **1. L. occidentalis.**
Branchlets very hairy . . . . . **2. L. lyallii.**

1. Larix occidentalis Nutt. Western larch. Abundant on the west slope at low and middle altitudes. B. C. to Oreg. and Mont.—Large tree, often 30 meters high or more; bark bright reddish brown, deeply furrowed at the base of the trunk, but only slightly furrowed above; leaves 3 to 5 cm. long; cones 3 to 4 cm. long.

Often known as tamarack. Western larch appears to be absent on the east slope, but soon after crossing the pass, along the railroad, it becomes a conspicuous feature of the lansdcape. About Belton it is the most abundant tree, and it is common all about Lake McDonald and well up toward Sperry Chalets. It reproduces abundantly, and in many places the young trees form dense, almost impenetrable thickets. The leaves turn bright yellow in late summer. The wood is valuable for lumber. The species reaches the eastern limit of its range in Glacier Park.

2. Larix lyallii Parl. Alpine larch. Said to grow in a few places about timber line, but not seen by the writer. Alta. and B. C. to Oreg. and Mont.—A small, often stunted tree, with slightly furrowed bark; leaves 3 to 4 cm. long; cones 4 to 5 cm. long.

3. **PICEA** Link. Spruce.

Large trees with dark rough bark and narrow crowns; leaves pointing in all directions, stiff; cones maturing the first season, the scales thin; seeds with thin wings.

Twigs glabrous . . . . . **1. P. canadensis.**
Twigs finely hairy . . . . . **2. P. engelmanni.**

1. Picea canadensis (Mill.) B. S. P. White spruce. Frequent at middle altitudes. Alaska to Lab., N. C., Wis., Wyo., and B. C.—Tree 10 to 20 meters high, with dark scaly bark; leaves bluish green, 1.5 to 2.5 cm. long, curved; cones 3 to 5 cm. long, the scales entire or finely toothed.

2. Picea engelmanni (Parry) Engelm. Engelmann spruce. Common, especially on the east slope, at middle altitudes. B. C. and Yukon to N. Mex. and Ariz.—Large tree, often 25 to 30 meters high, with a narrow pyramidal crown composed of short branches; bark dark purplish brown, with small loose scales; leaves 2 to 3 cm. long, bluish green; cones 3 to 6 cm. long.

Engelmann spruce is usually associated with fir and Douglas fir, but occasionally it forms almost pure stands. It is a very handsome tree.

4. **ABIES** Hill. Fir.

Large or small trees; leaves leaving rounded scars on the twigs, each leaf with 2 longitudinal resin ducts and a solitary fibro-vascular bundle; cones maturing the first year; seeds winged.—The trees of this genus are often known as balsam firs.

Leaves of the lowest branches arranged in 2 rows (on two sides of the twigs), usually notched at the end; resin ducts of the leaves (as seen in cross section) close to the epidermis on the lower side . . . . . **1. A. grandis.**
Leaves more or less crowded on the upper sides of the twigs, not notched at the end; resin ducts within the soft tissue of the leaf, remote from the epidermis.
2. A. lasiocarpa.

1. Abies grandis Lindl. Great silver fir. Occasional on the west slope at low altitudes. B. C. to Calif., Wyo., and Mont.—Large tree, often 50 to 75 meters high; twigs finely hairy or glabrous; leaves 2 to 5 cm. long, green above, white beneath; cones 5 to 10 cm. long.

2. **Abies lasiocarpa** (Hook.) Nutt. ALPINE FIR. Common about timber line, and on the east slope at middle altitudes; infrequent on the west slope. Alaska to Oreg., N. Mex., and Alta.—Tree, often 30 meters high, at timber line stunted and usually a shrub, often with long prostrate branches; trunk short, the crown (at low altitudes) long, narrow, and pointed; leaves blue-green, 2.5 to 4 cm. long; cones 5 to 10 cm. long, purplish.

Associated on the east slope with spruces and Douglas fir. The firs are easily recognized in the heavy timber by their smooth, pale bark, all our other evergreen trees (except whitebark pine) having rough, dark bark.

The Blackfoot Indians used the resin for incense in their ceremonials, for perfume, for poultices in the treatment of fevers and colds, and, when mixed with grease, as hair oil.

5. PSEUDOTSUGA Carr.

1. **Pseudotsuga mucronata** (Raf.) Sudw. DOUGLAS FIR. Common in the forested areas of both slopes, nearly throughout the timber belt. B. C. and Alta. to Mex. (*P. taxifolia* Britton.)—A large tree with heavy trunk covered with deeply furrowed, dark brown bark; crown pyramidal and sharp-pointed or sometimes broad and rounded; lower branches often drooping and with long pendent side branches; cones maturing the first year.

Sometimes known as red fir or Douglas spruce. Excepting only the giant sequoias of California, this is the largest tree of the United States, but in Glacier Park the trees do not attain the size of those which grow in the humid regions of the Pacific coast. In some places within the park there are large trees, especially about St. Mary, where there are dense stands. Near timber line Douglas fir is often stunted and shrubby, but these low shrubs are sometimes loaded with cones. A striking feature of this tree is its habit of bearing cones on the lower as well as on the upper branches; in the firs and spruces the cones are borne only near the top of the tree. Very young plants at low altitudes sometimes bear cones. In late summer cones cut from the trees by squirrels are plentiful on the ground.

6. TSUGA Carr.

1. **Tsuga heterophylla** (Raf.) Sarg. WESTERN HEMLOCK. Abundant on the west slope at low altitudes. B. C. to Calif. and Mont.—Large tree with gradually tapering trunk, covered with dark brown, somewhat reddish, ridged bark; crown usually narrow and pointed, the branches with slender drooping branchlets; leaves soft, apparently 2-ranked; cones maturing the first year.

The tree reaches the eastern limit of its range here. It grows mixed with giant cedar, white pine, Douglas fir, and larch. Seedlings are abundant in the heavy forest and often form dense underbrush in association with the yew.

7. THUJA L.

1. **Thuja plicata** Don. GIANT CEDAR. Abundant on the west slope at low altitudes about Lake McDonald; isolated trees are said to occur on the east slope, and the writer found seedlings near Sun Camp. Alaska to Calif. and Mont.—Large tree, sometimes 50 meters high; bark reddish brown, shallowly furrowed, easily separating into long shreds; lower branches drooping; leaves scalelike, 4-ranked, about 3 mm. long; cones about 12 mm. long.

The dense stands of giant cedar at the head of Lake McDonald are one of the finest sights of the park. The graceful branches suggest the fronds of some giant fern. On young trees and on the smaller branches the bark is quite smooth. Small saplings often bear cones. Giant cedar is sometimes known as arbor-vitae; the cultivated arbor-vitae is a closely related species of eastern North America.

8. JUNIPERUS L.

Trees or shrubs; leaves scalelike or awl-shaped, opposite or in whorls of 3; pistillate and staminate flowers borne on the same or separate plants; cones berry-like, with resinous flesh.

Plants trees or large erect shrubs. Leaves scalelike, 1 to 1.5 mm. long.
1. J. scopulorum.

Plants low, spreading or creeping shrubs.
Leaves scalelike, 1 to 1.5 mm. long, opposite, appressed to the branchlets.
2. J. horizontalis.

Leaves awl-shaped, 5 to 10 mm. long, in whorls of 3, spreading . . **3. J. sibirica.**

1. Juniperus scopulorum Sarg. WESTERN RED CEDAR. Occasional at low altitudes on the west slope, in rocky places. B. C. and Alta. to Tex. and Ariz. (*Sabina scopulorum* Rydb.)—Small tree or shrub, with fissured brown bark and rounded or pointed crown; leaves opposite; fruit dark blue.

Small trees grow along the river at Belton.

2. Juniperus horizontalis Moench. CREEPING CEDAR. Common on the east slope in open places up to timber line or even above. B. C. to Wyo., Minn., N. Y., and N. S. (*Sabina horizontalis* Rydb.)—Prostrate shrub, often forming great mats; leaves green or bluish; fruit dark blue, 1 to 3-seeded.

This species is most abundant at low altitudes; at St. Mary it forms great carpets over the flats, the branches usually lying close against the ground. On shale slopes of a canyon near the east entrance two forms of this plant were observed, one with bright green leaves, the other with bluish leaves. At a short distance the difference in color was very striking.

3. Juniperus sibirica Burgsd. GROUND JUNIPER. Common in woods or on open slopes up to, and sometimes above, timber line; most abundant on the east slope. Alaska to Calif., N. Y., and Lab.; also in Asia.—Prostrate or spreading shrub, sometimes a meter high, usually forming broad clumps or carpets; leaves sharp-pointed, twisted at the base, white on the upper surface; fruit pale blue, 1 to 3-seeded.

Perhaps only a form of *J. communis* L. On exposed slopes, at either high or low elevations, the plants are often prostrate, and form extensive slippery mats over which it is difficult to climb. Ground juniper frequently grows with creeping cedar.

8. TYPHACEAE. Cat-tail Family.

1. TYPHA L.

1. Typha latifolia L. CAT-TAIL. In small ponds or pools about the east entrance. Widely distributed in N. Amer. and in the Old World.—Plants perennial, usually about a meter high; leaves linear, 5 to 25 mm. wide, glabrous, spongy; flowers small, consisting of stamens and a pistil surrounded by bristles, crowded in a very dense, cylindric spike; staminate flowers borne in the upper part of the spike, the dark brown pistillate flowers in the lower part.

9. SPARGANIACEAE. Bur-reed Family.

1. SPARGANIUM L. BUR-REED.

Glabrous perennial aquatic plants with rootstocks; leaves linear; flowers green, in dense spheric heads, the pistillate and staminate ones in separate heads; fruit nutlike, containing 1 or 2 seeds.

Leaves mostly 5 to 10 mm. wide; fruit heads about 2 cm. wide; fruit gradually tapering into a beak . . . . . **1. S. multipedunculatum.**
Leaves 3 to 4 mm. wide; heads about 1.5 cm. wide; fruit abruptly beaked.
2. S. angustifolium.

1. **Sparganium multipedunculatum** (Morong) Rydb. Occasional at low and middle altitudes, about ponds. B. C. to Calif., Colo., and Ont.—Leaves 20 to 50 cm. long; fruit heads 2 to 6, the lower ones stalked.

2. **Sparganium angustifolium** Michx. Frequent at low and middle altitudes, in lakes, ponds, or slow-flowing streams. B. C. to Calif., N. Mex., Pa., and Newf.—Plants slender, the leaves usually floating, 30 to 60 cm. long; fruit heads 2 to 4, sessile or the lowest one stalked.

10. POTAMOGETONACEAE. Pondweed Family.

Aquatic perennials with slender, usually branched stems; leaves broad or narrow; flowers very small, green, in axillary clusters or spikes; petals and sepals none; fruit a small achene or drupelet.

Leaves opposite; flowers sessile in the leaf axils; fruit with a long slender beak. **1. ZANNICHELLIA.**

Leaves alternate; flowers in spikes; fruit with a very short beak. **2. POTAMOGETON.**

1. ZANNICHELLIA L.

1. **Zannichellia palustris** L. HORNED PONDWEED. Collected in pools at east entrance by Umbach. Widely distributed in N. Amer. and the Old World.—Stems very slender, submerged; leaves threadlike, 3 to 6 cm. long, 0.5 mm. wide or less, 1-nerved; fruit 2 to 6 mm. long.

2. POTAMOGETON L. PONDWEED.

Leaves often of two kinds, some floating and some submerged, with stipules.—It is probable that several other species besides those listed below occur in the park, for the writer was unable to make very extensive collections. The water in many of the lakes appears to be too cold for the growth of the plants, but they are plentiful in Lake McDonald and St. Mary Lake.

Plants with both floating and submerged leaves.
- Floating leaves mostly 1.5 to 4 cm. long . . . . . **1. P. heterophyllus.**
- Floating leaves mostly 5 to 12 cm. long.
  - Submerged leaves without blades . . . . . **2. P. natans.**
  - Submerged leaves with large blades . . . . . **3. P. amplifolius.**

Plants with submerged leaves only.
- Leaves lanceolate or linear-lanceolate, many-nerved, 8 to 30 mm. wide.
  - Leaves sessile or short-petioled, not clasping . . . . . **4. P. lucens.**
  - Leaves clasping . . . . . **5. P. richardsonii.**
- Leaves linear or threadlike, few-nerved, 3 mm. wide or less.
  - Stipules free from the petioles and blades.
    - Leaves with 2 glands at the base, 1 to 1.5 mm. wide . . . . . **6. P. pusillus.**
    - Leaves without glands, 2 to 4 mm. wide . . . . . **7. P. compressus.**
  - Stipules united with the bases of the leaves.
    - Leaves linear, about 1 mm. wide . . . . . **8. P. interior.**
    - Leaves threadlike, 0.5 mm. wide or less . . . . . **9. P. pectinatus.**

1. **Potamogeton heterophyllus** Schreb. Fish Lake. B. C. to Calif., Fla., and Lab.; also in Eur.—Floating leaves oval, green, 9 to 19-nerved; submerged leaves linear or linear-lanceolate, 2 to 12 mm. wide.

2. **Potamogeton natans** L. Small pond along trail to Avalanche Lake. Widely distributed in N. Amer., Eur., and Asia.—Floating leaves oval or ovate, 5 to 10 cm. long, rounded at the apex, usually subcordate at base, thick, 21 to 29-nerved.

3. **Potamogeton amplifolius** Tuckerm. Fish Lake. B. C. to N. B. and Ga.—Floating leaves oval or ovate, usually acute, rounded or subcordate at base, 6 to 15 cm. long; submerged leaves lanceolate or elliptic, ruffled, thin.

The plants are abundant in Fish Lake, in shallow or deep water, and some of the stems must be several meters long.

4. Potamogeton lucens L. Swiftcurrent Creek below Lake McDermott; pools at St. Mary. Widely distributed in N. Amer. and Eur.—Plants reddish or brownish; leaves 6 to 15 cm. long, 1 to 4 cm. wide, acute or obtuse, thin.

5. Potamogeton richardsonii (A. Benn.) Rydb. Pond near east entrance, *Umbach*. Alaska to Calif., Wyo., Del., and N. Y.—Leaves lanceolate, 5 to 10 cm. long, acute or acuminate, 13 to 23-nerved, thin.

6. Potamogeton pusillus L. Swiftcurrent Creek below Lake McDermott. Widely distributed in N. Amer. and Eur.—Stems very slender; leaves 2 to 10 cm. long, 1 or 3-nerved.

7. Potamogeton compressus L. Fish Lake. B. C. to Oreg., N. J., and N. B.; also in Eur.—Stems slender, flattened; leaves thin, 5 to 20 cm. long, 3-nerved.

8. Potamogeton interior Rydb. Swiftcurrent Creek below Lake McDermott. Mont. to N. Mex. and Ont.—Stems slender, much branched, very leafy; leaves 3 to 15 cm. long, 1-nerved.

9. Potamogeton pectinatus L. Ponds at east entrance, *Umbach*. Widely distributed in N. Amer. and Eur.—Stems much branched, very leafy; leaves 3 to 15 cm. long, very slender.

11. SCHEUCHZERIACEAE. Scheuchzeria Family.

1. SCHEUCHZERIA L.

1. Scheuchzeria palustris L. In sphagnum bogs at Johns and Fish lakes, and probably elsewhere on the west slope. Alaska to Calif., N. J., and Lab.; also in Eur. and Asia.—Glabrous perennial, 10 to 25 cm. high; leaves linear, 10 to 30 cm. long; flowers white, the 6 segments about 3 mm. long; stamens 6; fruit of 3 to 6 spreading pods about 5 mm. long.

12. ALISMACEAE. Waterplantain Family.

Glabrous perennials with naked stems; leaves long-petioled, parallel-veined but with numerous cross veins; flowers white, long-stalked, whorled, in racemes or panicles; petals 3; fruit of numerous achenes.

Leaves arrow-shaped, with sharp lobes at the base; achenes in several series on a convex receptacle . . . . . **1. SAGITTARIA.**

Leaves oblong or ovate, never with lobes; achenes in a ring on a flat receptacle. **2. ALISMA.**

1. SAGITTARIA L.

1. Sagittaria cuneata Sheld. ARROWHEAD. Low places on prairie at east entrance. B. C. to Calif., N. Mex., N. Dak., Conn., and Me.—Plants 20 to 40 cm. high, with spongy stems and petioles; leaves 6 to 15 cm. long, with 2 long basal lobes; flowers in racemes, the lower ones pistillate, the upper ones staminate; petals about 1 cm. long; fruit heads 1 to 1.5 cm. in diameter, the achenes with a short beak.

2. ALISMA L.

1. Alisma brevipes Greene. WATERPLANTAIN. Low places on prairie at east entrance. B. C. to Calif., N. Mex., N. Dak., and N. S.—Plants 20 to 60 cm. high; leaves 5 to 15 cm. long, acute or obtuse, rounded or subcordate at base; petals 5 to 6 mm. long; fruit heads 5 to 7 mm. broad.

This may be the same as the Old World *A. plantago-aquatica* L. The common plant of eastern North America is a distinct species.

13. POACEAE. Grass Family.

Annual or perennial herbs, with round or flattened, jointed stems (*culms*), closed at the nodes and hollow between them; leaves parallel-veined, 2-ranked, consisting of a sheath, enveloping the culm like a split tube, and a blade, usually linear; flowers minute, arranged in spikelets, these consisting of a series of 2-ranked bracts, the lower pair (*glumes*) empty, the others (*lemmas*) bearing the minute flowers surrounded by a second 2-nerved bract (*palea*) in their axils (lemma, palea, and flower termed the *floret*); spikelets with 1 to many florets, borne in spikes or panicles.—The lemmas are variously modified. They may contain no flower (being *sterile*) or may be greatly reduced. The palea, also, is sometimes reduced or obsolete. The cultivated grains—wheat, rye, barley, oats, and corn, as well as bluegrass and timothy—belong to this family.

Spikelets ovate, blunt, nearly sessile, subtended by bristles, borne in a compact spikelike panicle . . . . . **1. CHAETOCHLOA.**

Spikelets more or less compressed, not subtended by bristles. (In the barley-grasses the bristles are the glumes, that is, part of the spikelet itself.)

Spikelets absolutely sessile on the axis, forming spikes (the rudimentary spikelets in *Hordeum* pedicellate, but the central fertile spikelet sessile).

Spikes several, racemose on a main axis and appressed to it; spikelets small, flat, somewhat heart-shaped, borne on one side of the axis; sheaths not auricled. **17. BECKMANNIA.**

Spikes solitary; spikelets borne on opposite sides of the axis, they, or their parts, pointed or awned; sheaths with a pair of spreading auricles at the summit.

Axis disjointing with the spikelets attached; spikelets borne 3 together, the central one 1-flowered, fertile, the lateral ones reduced to awns, pedicellate. **28. HORDEUM.**

Axis not disjointing; spikelets 3 to 8-flowered, all sessile.

Spikelets borne 2 or 3 together (or the upper and lower ones of the spike sometimes solitary) . . . . . **29. ELYMUS.**

Spikelets borne singly.

Plants annual; glumes ovate . . . . . **27. TRITICUM.**

Plants perennial; glumes narrowly lanceolate or subulate. **26. AGROPYRON.**

Spikelets on long or short pedicels, often in spikelike panicles but never in one-sided spikes or on opposite sides of the main axis.

Fertile floret with a pair of sterile or rudimentary florets below and falling with it.

Panicle contracted, dense; sterile florets reduced to minute obscure lemmas; plant odorless . . . . . **2. PHALARIS.**

Panicle open; sterile florets as large as the fertile one; plant strongly fragrant. **3. TORRESIA.**

Fertile florets with no sterile florets below them, sometimes with sterile florets above.

Spikelets 1-flowered.

Lemma indurate, the nerves obscure, awned from the tip, the awn much longer than the body.

Awn twisted; base of floret sharp-pointed; flowering culms erect, leafy. **4. STIPA.**

Awn not twisted; base of floret blunt; flowering culms decumbent, naked, the sheaths bladeless, the sterile shoots erect, with long blades. **5. ORYZOPSIS.**

Lemma membranaceous, awnless or minutely awn-tipped or awned from the back.

Panicles cylindric or nearly so, dense, spikelike. Glumes exceeding the florets.

Glumes awn-tipped, stiffly ciliate on the keel; panicle harsh to the touch . . . . . **7. PHLEUM.**

Glumes not awn-tipped, silky-ciliate on the keel; panicle soft and silky to the touch . . . . . **8. ALOPECURUS.**

Panicles open or contracted, but not subcylindric.

Glumes shorter than the floret. Panicle very slender, contracted; plants low and wiry . . . . . **6. MUHLENBERGIA.**

Glumes as long as the floret or exceeding it.

Spikelets falling entire; panicle open, drooping. Florets without silky hairs at base . . . . . **9. CINNA.**

Spikelets not falling entire, the florets falling from the persistent glumes. Florets without silky hairs at base or with very obscure ones. **10. AGROSTIS.**

Florets with copious silky hairs at base; lemmas awned from the back . . . . . **11. CALAMAGROSTIS.**

Spikelets 2 to many-flowered.

Glumes equaling or exceeding all the florets; lemmas awned from the back or from between the teeth of the prominently 2-toothed apex (the awn often obsolete in *Trisetum wolfii*).

Spikelets not over 8 mm. long; awn delicate.

Lemmas rounded on the back, dentate at the broad summit . **12. AIRA.**

Lemmas keeled on the back, the apex acute, 2-toothed. **13. TRISETUM.**

Spikelets 12 mm. or more long; awns stouter.

Spikelets about 3 cm. long; lemmas over 12 mm. long, awned from the back, the awn not flattened . . . . . **15. AVENA.**

Spikelets mostly 12 to 15 mm. long; lemmas not over 8 mm. long, awned from between two long teeth, the awn flattened and twisted below. **16. DANTHONIA.**

Glumes not exceeding the lowest floret; lemmas awnless or awned from the apex or from just below it.

Lemmas broad at the summit, the nerves not converging at the apex.

Spikelets 2-flowered; lemmas prominently 3-nerved. **18. CATABROSA.**

Spikelets 4 to 8-flowered; lemmas 5 to 7-nerved.

Lemmas indistinctly nerved . . . . . **23. PUCCINELLIA.**

Lemmas very strongly nerved . . . . . **22. PANICULARIA.**

Lemmas acute, pointed or awned, the nerves converging toward the apex.

Lemmas keeled on the back, awnless.

Spikelets 10 to 15 mm. long; lemmas firm, finely and obscurely many-nerved; plants dioecious . . . . . **20. DISTICHLIS.**

Spikelets mostly less than 8 mm. long; lemmas membranaceous, 5-nerved; spikelets perfect.

Second glume noticeably larger than the first; culm pubescent below the panicle; blades not boat-shaped at the tip. **14. KOELERIA;**

Second glume scarcely larger than the first; culm not pubescent, blades boat-shaped at the tip . . . . . **21. POA.**

Lemmas rounded on the back, or slightly keeled toward the summit only, awned or awnless.

Glumes papery; lemmas firm, scarious-margined; upper florets sterile, folded together, forming a club-shaped rudiment behind the uppermost palea . . . . . **19. MELICA.**

Glumes not papery; upper florets similar to the others.

Lemmas entire, awned from the tip or pointed . . **24. FESTUCA.**

Lemmas awned or awn-tipped from a minutely 2-toothed apex. **25. BROMUS.**

1. CHAETOCHLOA Scribn.

1. Chaetochloa viridis (L.) Scribn. GREEN FOXTAIL. Dry gravel bank, Belton, only one or two plants seen. Native of Eur.; naturalized in N. Amer.—Plants annual, 30 to 50 cm. tall, with flat blades about 1 cm. wide and a single dense green bristly head 3 to 10 cm. long.

2. PHALARIS L. CANARY GRASS.

1. Phalaris arundinacea L. East entrance, in wet soil. B. C. to Nev., N. J., and N. S.; also in Eur. and Asia.—Plants perennial, with running rootstocks, pale green, 1 meter or more tall, the culms simple, with drooping blades 1 to 2 cm. broad, and a pale dense narrow panicle 8 to 15 cm. long; spikelets flattened, the glumes keeled and abruptly pointed, the hard, shining, flat, minutely pubescent fruits readily shelling out.

3. TORRESIA Ruiz & Pav.

1. Torresia odorata (L.) Hitchc. VANILLA GRASS. Meadows about the east entrance, and doubtless elsewhere. Alaska to N. Mex., N. J., and Lab.; also in Eur. and Asia. (*Hierochloa odorata* Wahl.; *Sarastana odorata* Scribn.)—Plants perennial, with brownish rootstocks, growing in small colonies, the simple culms 30 to 50 cm. tall, with soft flat blades and an open panicle 5 to 8 cm. long with spreading or drooping branches and broad, shining, pale bronze spikelets.

Known also as holy grass, Seneca grass, and sweetgrass. The entire plant is fragrant, even when dry. The fragrant grass baskets woven by the Indians are made from this species. The Blackfoot Indians used the grass as incense in some of their ceremonials, and a decoction of it was employed as a hair tonic. The Sweetgrass Hills, which lie east of the park, derive their name from the plant.

4. STIPA L. PORCUPINE GRASS.

Erect perennial bunchgrasses with simple culms, narrow blades, and terminal panicles; glumes thin; longer than the body of the terete (nearly cylindric) floret; awn 3 to 5 times as long as the body, twice bent.

Panicle open, the branches spreading or drooping . . . . . **1. S. richardsonii.**

Panicle narrow, the short branches erect.

Sheaths hairy at the throat . . . . . **2. S. viridula.**

Sheaths not hairy at the throat . . . . . **3. S. nelsonii.**

1. Stipa richardsonii Link. At St. Mary Lake and doubtless elsewhere at low altitudes. Alta. to Colo. and S. Dak.—Leaves involute, rough, 10 to 15 cm. long, crowded at the base of the slender, nearly naked culms; panicles 10 to 20 cm. long, the long capillary branches mostly in pairs, with bronze-purple spikelets on capillary pedicels borne toward the ends.

2. Stipa viridula Trin. Frequent at middle altitudes, in woods or on cliffs or open slopes. Mont. to Utah, Kans., and Sask.—Plants 0.6 to 1 meter tall, leafy throughout, the blades rough, more or less involute, 20 to 40 cm. long; panicle pale and shining, 15 to 30 cm. long, about 2 cm. wide, rather densely flowered; glumes 8 to 10 mm. long; body of the floret usually 5 to 6 mm. long, the awn 3 to 4 cm. long.

3. Stipa nelsonii Scribn. Reported from Blackfoot Glacier. Alta. to Utah, Colo., and Sask.—Closely related to *S. viridula*, on the average taller, with smooth, slightly broader blades, and slightly larger spikelets.

5. ORYZOPSIS Michx. Mountain rice.

1. Oryzopsis asperifolia Michx. Belton, in thin woods or on rocky slopes. B. C. to N. Mex., Pa., and N. S.—Perennial with erect sterile shoots bearing elongate flat rough blades 5 to 10 mm. wide, and nearly naked, inconspicuous, simple flowering culms 20 to 30 cm. long, nearly prostrate on the ground; panicle narrow; spikelets plump, the awn about 12 mm. long, readily falling from the body of the floret.

In habit the plants resemble species of *Carex*.

6. MUHLENBERGIA Schreb.

1. Muhlenbergia squarrosa (Trin.) Rydb. On prairie at east entrance, especially in low alkaline places about ponds. Wash. to Calif., Colo., and Mont.—Plants tufted and producing running rootstocks; culms 15 to 20 cm. tall, wiry, the blades short and spreading; spikelets about 2.5 mm. long, the lemma tipped with a minute awn.

7. PHLEUM L.

Perennials with simple erect culms, flat blades, and compact spikelike panicles.

Panicles cylindric, mostly more than 5 cm. long; culms swollen at base. **1. A. pratense.**

Panicles ovate-cylindric, rarely over 3 cm. long; culms not swollen at base. **2. A. alpinum.**

1. Phleum pratense L. Timothy. Common at low altitudes and in many places abundant, in woods and on open slopes; often found high up along the trails. Native of Eur.; cultivated and naturalized in N. Amer.—Culms 30 to 80 cm. tall; panicles commonly 8 to 10 cm. long, 5 to 7 mm. thick.

2. Phleum alpinum L. Mountain timothy. Common above timber line, in meadows; sometimes in wet places at middle altitudes. Alaska to Calif., N. Mex., N. H., and Lab.; also in Eur. and Asia.—Culms 15 to 30 cm. tall; panicles commonly 2.5 to 3 cm. long, 10 to 12 mm. thick in the middle.

The most common grass of alpine meadows.

8. ALOPECURUS L. Marsh foxtail.

Weak-stemmed perennials, growing in moist ground; culms simple; blades flat, lax; panicle very dense; spikelets falling entire.

Panicle 2 to 4 mm. thick . . . . . **1. A. aristulatus.**
Panicle 7 to 9 mm. thick . . . . . **2. A. alpinus.**

1. Alopecurus aristulatus Michx. Common at low altitudes, in boggy meadows and about ponds. Alaska to Calif., Pa., and Me.—Plants commonly in tufts; culms 15 to 25 cm. long, decumbent at the base, the nodes geniculate; panicles pale and shining; spikelets long-silky on the keel.

2. Alopecurus alpinus J. E. Smith. Common on the east slope at low altitudes, chiefly on prairie or moist open slopes. Alaska to Utah, Colo., Alta., and Lab.; also in Eur. and Asia. (*A. occidentalis* Scribn. & Tweedy.)—Plants single or few together; culms 25 to 70 cm. tall, nearly erect; panicles gray or drab; spikelets long-silky all over.

9. CINNA L.

1. **Cinna latifolia** (Trevir.) Griseb. REEDGRASS. Common at low and middle altitudes, in moist woods or meadows. B. C. to Utah, N. C., and Newf.; also in Eur.—Plants perennial, with simple erect culms, 1 meter or more tall, flat blades 1 to 1.5 cm. wide, and handsome drooping panicles 20 to 30 cm. long, the spikelets 3 to 4 mm. long, falling entire.

10. AGROSTIS L. BENTGRASS.

Plants perennial, with simple culms, flat blades, and open or contracted panicles of V-shaped spikelets, 2 to 4 mm. long, the glumes persistent after the fall of the florets.

Floret nearly equaling the glumes. Palea developed . . . . . **1. A. thurberiana.**
Floret noticeably shorter than the glumes.
  Plants producing running rootstocks; palea well developed . . . . **2. A. palustris.**
  Plants without rootstocks; palea obsolete.
    Panicle dense, its branches verticillate, with short branchlets spikelet-bearing to the base in their axils . . . . . **3. A. exarata.**
    Panicle loose and open, the branches naked at the base.
      Panicle very diffuse, the lower branches commonly 10 cm. or more long. **4. A. hiemalis.**
      Panicle open but not diffuse, the lower branches rarely over 5 cm. long. **4a. A. hiemalis geminata.**

1. **Agrostis thurberiana** Hitchc. At middle altitudes and above timber line, in moist soil. B. C. to Calif., Utah, and Mont.—Plants tufted, rather lax, the delicate culms 20 to 40 cm. tall, the soft blades mostly clustered at the base; panicles 5 to 8 cm. long, loosely flowered, the branches and branchlets flexuous, divaricate.

2. **Agrostis palustris** Huds. REDTOP. Common at low altitudes, in wet or moist soil, often in sphagnum bogs. Widely distributed in N. Amer., partly or wholly naturalized; often cultivated as a meadow or pasture grass; also in Eur. (*A. alba* of American authors.)—Plants relatively stout the culms mostly 50 cm. or more tall: blades rough, 3 to 6 mm. wide; panicle pyramidal, mostly purple and 10 to 20 cm. long, the rather closely flowered branches in distant fascicles on the main axis, the branchlets spreading in flower but contracted at maturity.

3. **Agrostis exarata** Trin. Chiefly at low and middle altitudes, but sometimes about timber line, in meadows or moist woods or along streams. Alaska to Calif., N. Mex., and Nebr.; also in Siberia. (*A. grandis* Trin.; *A. asperifolia* Trin.)—Plants tufted, often rather stout, 30 to 75 cm. tall; blades rough, 2 to 5 mm. wide; panicle yellowish green, narrow, 10 to 20 cm. long, the short, densely flowered branches crowded in whorls, the lower distant, the upper close together; glumes long-pointed.

Plants at high altitudes are often low and delicate, with less densely flowered panicles.

4. **Agrostis hiemalis** (Walt.) B. S. P. TICKLE GRASS. Common nearly everywhere at low and middle altitudes, in moist woods and thickets or in meadows. Alaska to Mex., Fla., and Lab.—Plants tufted, leafy at the base, 30 to 50 cm. tall; blades mostly less than 2 mm. wide; culms slender, brittle; panicles often nearly half the entire height of the plant and about as broad as long, the few capillary branches widely spreading, spikelet-bearing toward the ends only.

At maturity the panicles break away and roll before the wind, scattering the seed.

4a. **Agrostis hiemalis geminata** (Trin.) Hitchc. Granite Park, on moist rocky slopes, and doubtless elsewhere. Alaska to Calif. and Colo. (*A. geminata* Trin.)—Plants mostly not over 20 cm. tall; panicles less diffuse than in the species, the lemmas often awned from the back.

11. CALAMAGROSTIS Adans. Reedgrass.

Erect perennials resembling *Agrostis*, distinguished from that genus by the tuft of silky hairs at the base of the floret, by the well-developed palea, and by the development of a rachilla joint in the form of a little bristle back of the palea; lemma always awned from below the middle of the back.

Awn about twice as long as the glumes, geniculate. Panicles contracted, densely flowered; glumes 5 to 6 mm. long.
- Blades coarse, 4 to 5 mm. wide; sheaths mostly overlapping; spikelets short-pediceled . . . . . **1. C. purpurascens.**
- Blades 2 to 3 mm. wide, subinvolute; sheaths not overlapping; most of the spikelets on pedicels nearly as long as the glumes . . . . . **2. C. vaseyi.**

Awn scarcely exceeding the glumes or included in them.
- Panicle loose and nodding . . . . . **6. C. canadensis.**
- Panicle contracted, rather densely flowered.
  - Leaves densely pubescent at the junction of sheath and blade; awn geniculate, protruding sidewise from the glumes; hairs at base of floret less than half as long as the lemma . . . . . **3. C. rubescens.**
  - Leaves glabrous at the junction of sheath and blade; awn straight, not protruding sidewise; hairs at base of floret copious, nearly as long as the lemma.
    - Blades rough, firm, 2 to 7 mm. wide . . . . . **4. C. inexpansa.**
    - Blades smooth, soft, not over 3 mm. wide . . . . . **5. C. neglecta.**

1. Calamagrostis purpurascens R. Br. Found at all altitudes, on shaded banks, rocky slopes, or cliffs. Alaska to Calif., Colo., S. Dak., and Greenl.—Plants in small tufts, 20 to 30 cm. tall, rather stout, the base of the culms clothed with old weather-worn leaves; panicle purplish, 5 to 10 cm. long, 1 to 1.5 cm. thick.

2. Calamagrostis vaseyi Beal. Collected on trail to Sperry Glacier by Holzinger. Wash. and Oreg. to Mont.—Plants in tufts, the knotty base with numerous leafy shoots, the culms sometimes spreading and geniculate below; panicle mostly tawny or pale, less dense than in *P. purpurascens*.

3. Calamagrostis rubescens Buckl. At low and middle altitudes, in thin woods or on open slopes or rocks. B. C. and Alta. to Wyo. and Calif.—Plants in small tufts, 50 to 90 cm. tall, with numerous long rough blades 2 to 5 mm. wide, and pale or purplish, shining panicles 10 to 15 cm. long; glumes glabrous, acuminate.

4. Calamagrostis inexpansa A. Gray. Frequent at low altitudes, in woods. B. C. and Wash. to Colo., N. J., and N. Y.—Plants single or few together, often with running rootstocks; culms 0.7 to 1 meter or more tall; blades elongate, involute toward the very rough ends; panicles mostly tawny and 12 to 20 cm. long; glumes scabrous, abruptly acute.

5. Calamagrostis neglecta (Ehrh.) Gaertn. Collected in clearings at Summit by Griffiths. Alaska to Colo., Wis., Me., and Greenl.; also in Eur.—Plants more slender than in *C. inexpansa*, and not so tall, the foliage smooth and softer, the panicles on the average smaller.

6. Calamagrostis canadensis (Michx.) Beauv. Frequent at low and middle altitudes, sometimes above timber line, in meadows or swamps. Alaska to Calif., N. Mex., N. C., and Newf.—Plants tufted and with running rootstocks, the numerous rough elongate blades 4 to 6 mm. wide; panicle 15 to 30 cm. long, about one-third as wide, the capillary branches drooping; hairs at the base of the floret copious and as long as the lemma; awn inconspicuous.

12. AIRA L. Hairgrass.

Erect perennial bunchgrasses with slender simple culms and shining few-flowered spikelets, the florets awned from the back below the middle.

Panicles long and narrow; blades filiform . . . . . 1. **A. elongata.**
Panicle open, commonly nearly or quite as wide as long; blades not filiform.
Blades firm, folded, mostly 2 to 4 mm. wide . . . . . 2. **A. caespitosa.**
Blades soft, flat, 5 to 10 mm. wide . . . . . 3. **A. atropurpurea.**

1. Aira elongata Hook. At low and middle altitudes, in meadows or on open slopes. B. C. to Ariz. and Wyo. (*Deschampsia elongata* Munro.)—Plants 30 to 60 cm. tall, the loose narrow panicle being one-fourth to one-third the entire height of the plant; spikelets commonly purple-tinged; awns exceeding the glumes.

2. Aira caespitosa L. Common at low altitudes, in meadows, on stream or lake banks, or on open hillsides. Alaska to Calif., N. Mex., N. J., and Newf.; also in Eur. and Asia. (*Deschampsia caespitosa* Beauv.)—Plants 20 to 60 cm. tall, often forming dense cushions, the spreading leaves mostly crowded toward the base of the culms; panicles with spreading capillary branches in distant fascicles; spikelets from pale to purplish bronze; awns inconspicuous.

3. Aira atropurpurea Wahl. At middle and high altitudes, in woods or on open slopes. Alaska to Calif., Colo., N. H., and Greenl.; also in Eur. (*Deschampsia atropurpurea* Scheele.)—Plants 30 to 50 cm. tall, with abundant soft green foliage and drooping panicles, the purplish spikelets 5 mm. long, the bent awns about reaching the apex of the glumes.

13. TRISETUM Pers.

Erect perennials resembling *Aira*, the spikelets as in that genus, but the lemmas keeled, awned from the back above the middle (the awn obsolete in one species) and 2-toothed at the acute apex.

Panicles loose, drooping or nodding; blades elongate, lax, 8 to 15 mm. wide. Awns more than twice as long as the spikelet.
Panicle branches capillary, drooping, 5 to 10 cm. long . . . . . 1. **T. cernuum.**
Panicle branches slender but rather stiffly ascending . . . . . 2. **T. canescens.**
Panicles mostly dense (if rather loose, the awns nearly obsolete), erect; blades rarely over 5 mm. wide.
Awns minute or obsolete . . . . . 3. **T. wolfii.**
Awns conspicuous . . . . . 4. **T. spicatum.**

1. Trisetum cernuum Trin. Frequent at middle altitudes. Alaska to Calif. and Mont.—A woodland grass, often 1 meter tall, with drooping scabrous blades; panicle branches spikelet-bearing toward the ends only; spikelets about 1 cm. long, excluding the spreading awns; rachilla joints half as long as the florets.

2. Trisetum canescens Buckl. At low and middle altitudes, in damp or rocky woods. B. C. and Mont. to Calif.—A woodland grass resembling the preceding, but the leaves softly pubescent, the panicle more densely flowered, the stiffer panicle branches spikelet-bearing nearly to the base, the rachilla joints short, bringing the florets close together in the spikelet.

3. Trisetum wolfii Vasey. At low and middle altitudes, in meadows or moist woods or on open slopes. Wash. to Calif., Colo., and Mont. (*Graphephorum wolfii* Vasey.)—Plants tufted, 50 to 90 cm. tall, leafy, the panicles mostly dense but not spikelike, the awns minute or obsolete.

4. Trisetum spicatum (L.) Richt. Very common above timber line in meadows; sometimes also at middle elevations. Alaska to Calif., N. Mex., N. H., and Greenl.; also in Eur. and Asia.—Plants densely tufted, 15 to 50 cm. tall, the foliage relatively scant and crowded toward the base, commonly grayish-velvety, the panicles dense, spikelike, the awns spreading.

14. KOELERIA Pers.

1. Koeleria cristata (L.) Pers. JUNEGRASS. Common at low and middle altitudes, chiefly on open slopes. B. C. to Calif., Tex., and Ill.; also in Eur. and Asia. (*K. gracilis* Pers.)—An erect perennial bunchgrass, 25 to 40 cm. tall; leaves mostly confined to the lower half of the slender simple culms, the blades narrow, mostly flat; panicle 5 to 10 cm. long, dense, spikelike, shining.

This grass resembles species of *Poa*, even to having blades boat-shaped at the tip as in that genus. It may be distinguished by the sharp-pointed, indistinctly nerved lemmas and the shining white hyaline paleas. An important forage grass.

15. AVENA L.

1. Avena sativa L. OATS. Scattered plants in waste ground and along the railroad at Belton and east entrance. Native of the Old World; widely cultivated and often escaping.—The cultivated oat, readily recognized by its open panicle of large V-shaped drooping spikelets, comes up where stock has been fed. Under cultivation the awns are much reduced, but they are usually well developed in plants growing spontaneously.

16. DANTHONIA DC.

Tufted perennials with narrow blades and rather small panicles of relatively large spikelets.

Culms bearing a single spikelet (sometimes a second partly developed one on an appressed pedicel below) . . . . . **1. D. unispicata.**
Culms bearing panicles of few to several spikelets.
Panicle open, the branches divergent; spikelets few . . . . . **2. D. americana.**
Panicles narrow, dense; spikelets several . . . . . **3. D. intermedia.**

1. Danthonia unispicata Munro. At low and middle altitudes on the east slope, on open hillsides. B. C. to Calif. and Wis.—Plants in dense tufts, mostly less than 20 cm. tall, the culms somewhat spreading; sheaths conspicuously pilose; spikelet 12 to 15 mm. long.

2. Danthonia americana Scribn. Meadows at the east entrance, *Umbach*. B. C. to Calif. and Wyo.; also in Chile.—Plants in dense tufts or cushions, 25 to 70 cm. tall; sheaths pilose; panicles of 2 to 5 mostly purple spikelets on divergent pedicels.

3. Danthonia intermedia Vasey. Found at nearly all altitudes, on plains or open slopes. B. C. to Calif., N. Mex., and Que.—Plants tufted, 30 to 70 cm. tall; sheaths glabrous; spikelets 5 to 10 or more on erect pedicels and crowded in a narrow, purple or pale, glistening panicle.

17. BECKMANNIA Host.

1. Beckmannia erucaeformis (L.) Host. SLOUGH GRASS. Common at low altitudes, along streams or in swampy ground. Alaska to Calif., N. Mex., and Ont.; also in Eur. and Asia.—An erect, rather stout, glabrous annual, with flat blades and numerous short erect spikes on an elongate axis; spikelets flattened, somewhat heart-shaped in outline, overlapping.

18. CATABROSA Beauv.

1. Catabrosa aquatica (L.) Beauv. East entrance, about pools. Alaska to Colo., Que., and Lab.; also in Eur. and Asia.—A semiaquatic perennial, 20 to 30 cm. tall, with creeping base, soft flat blades, and open panicles of brown spikelets tipped with white.

19. MELICA L.

Rather tall perennials with simple culms, narrow flat blades, and open or narrow panicles; spikelets relatively large, the glumes thin, the lemmas firm, with strong nerves.

Lemmas awned from a 2-toothed apex; panicle branches long and divergent; culms not thickened at base . . . . . **4. M. smithii.**
Lemmas awnless; panicle branches ascending; culms with a cormlike base.
Spikelets narrow; lemmas acuminate . . . . . **3. M. subulata.**
Spikelets broad; lemmas obtuse or abruptly acute.
Pedicels capillary, flexuous . . . . . **1. M. spectabilis.**
Pedicels stouter, appressed . . . . . **2. M. bella.**

1. Melica spectabilis Scribn. ONION GRASS. At middle altitudes, in meadows or thin woods. B. C. to Oreg., Colo., and Mont.—Culms tall and slender, from an onion-shaped base; panicle nodding, the beautiful bronze-purple spikelets about 12 mm. long.

2. Melica bella Piper. West slope, in meadows at middle altitudes. Wash. and Oreg. to Colo. and Alta.—Plants resembling the preceding, but not so tall, the culm bases less thickened, the panicles stiffer, and the spikelets somewhat smaller.

3. Melica subulata (Griseb.) Scribn. At low altitudes, in thin woods or on open slopes. Alaska to Calif. and Mont.—Culms commonly 1 meter tall, the base a little thickened; panicles elongate, the stiff branches ascending, the pale spikelets on short erect pedicels.

4. Melica smithii (Porter) Vasey. At low and middle altitudes, in woods. Wash. and Oreg. to Wyo. and Mich.—A tall slender woodland grass with lax blades and few-flowered, very open, nodding panicles.

20. DISTICHLIS Raf.

1. Distichlis spicata (L.) Greene. SALTGRASS. East entrance, frequent in alkali spots about dried-up pools on prairie. Widely distributed in N. Amer.—A low, rather pale, sod-forming perennial, with numerous stiff spreading blades and narrow compact panicles of smooth spikelets, the pistillate shorter and broader than the staminate.

21. POA L. BLUEGRASS.

Slender grasses with simple, mostly erect culms, narrow blades with boat-shaped tips, and open or compact panicles of relatively small spikelets.

Plants annual, low . . . . . **1. P. annua.**
Plants perennial.
Plants producing rootstocks and forming a sod.
Culms conspicuously flattened, wiry; panicle rather narrow and compact. **2. P. compressa.**
Culms terete or nearly so; panicle open.
Spikelets mostly less than 6 mm. long; lemmas pubescent on the nerves and with a cottony tuft at base . . . . . **3. P. pratensis.**
Spikelets mostly 8 to 10 mm. long; lemmas glabrous on the nerves and not cottony at base . . . . . **4. P. wheeleri.**
Plants not producing rootstocks; bunchgrasses.
Lemmas pubescent on the nerves and sometimes cottony at base.
Lemmas cottony at base (with a few long fine crinkly hairs) distinct from the pubescence of the nerves.

Plants slender and lax, growing in mossy bogs, the culms simple or few in a tuft; sheaths slightly retrose-scabrous; panicle open, the few branches slender and drooping, bearing spikelets toward the ends.
5. P. leptocoma.

Plants erect and firm, sometimes decumbent at base; sheaths glabrous; panicle erect or nodding, much branched.

Culms erect at base, the sheaths terete; panicles usually averaging less than 10 cm. long . . . . . **6. P. crocata.**

Culms decumbent at base, the lower sheaths compressed-keeled; panicle often 30 cm. long, usually over 10 cm. long . . . . . **7. P. palustris.**

Lemmas not cottony at base, though the pubescence on the nerves may be more dense toward the base . . . . . **8. P. alpina.**

Lemmas not pubescent on the nerves, sometimes pubescent all over the lower part of the back.

Lemmas glabrous; panicle narrow and compact, almost spikelike.
9. P. epilis.

Lemmas pubescent on the lower part, convex on the back; panicle rather open.

Culms spreading and loosely decumbent at base . . . . . **10. P. gracillima.**

Culms erect at base.

Leaves mostly basal, a reduced blade about the middle of the slender naked culm; blades folded . . . . . **11. P. sandbergii.**

Leaves scattered along the tall culm; blades flat . . . . . **12. P. lucida.**

1. Poa annua L. ANNUAL BLUEGRASS. Open places along McDonald Creek. Widely distributed in N. Amer., Eur., and Asia.—Plants in tufts or mats, with glossy green foliage and small pale open panicles.

Blooming earlier than any other grass in the region.

2. Poa compressa L. CANADA BLUEGRASS. About Belton and the east entrance, in waste ground; adventive. Widely naturalized in N. Amer.; native of Eur. and Asia.—Plants bluish green, with flat culms and rather scant foliage; spikelets green, with bronze tips.

3. Poa pratensis L. KENTUCKY BLUEGRASS. Frequent at low and middle altitudes, in meadows or thin woods; planted for lawns at Belton and elsewhere. Widely distributed in N. Amer., Eur., and Asia; in N. Amer., at least in part, naturalized from Eur.—Plants leafy, the culms 30 to 70 mm. tall; panicles pyramidal, nearly as broad as long, the lower branches mostly in fives.

4. Poa wheeleri Vasey. Belton, in open woods. B. C. to Colo. and Alta.—Plants resembling the preceding, on the average taller and coarser, with larger panicle, its lower branches mostly in twos.

5. Poa leptocoma Trin. Above or near timber line, in meadows or woods or on open slopes. Alaska to Wash. and Colo.—Plants in loose tufts, with weak culms, soft blades, and few-flowered, very open panicles.

6. Poa crocata Michx. Common at low and middle altitudes, in woods or meadows. Alaska to Ariz., Mont., and Lab.—Plants in dense tufts, the rather wiry culms 40 to 75 cm. tall, the rather small purplish spikelets on short divergent pedicels, giving the panicle a delicate lacy aspect.

7. Poa palustris L. East entrance, in aspen thicket. Widely distributed in N. Amer., Eur., and Asia. (*P. triflora* Gilib.)—Culms commonly 70 to 100 cm. tall, often decumbent at base; blades somewhat scabrous; panicles nodding, with slender branches in distant fascicles, the small spikelets commonly bronze or golden.

8. Poa alpina L. Common, chiefly above timber line, but sometimes at low or middle altitudes, in woods or meadows or along streams. Alaska to Colo., Que., and Greenl.; also in Eur. and Asia.—Plants densely tufted, commonly with a

cushion of soft foliage at base, the short blades spreading; panicles rather densely flowered, the broad spikelets commonly purple or bronze.

9. Poa epilis Scribn. Frequent above timber line, in meadows. B. C. to Colo. and Mont.—Plants pale, in dense leafy tufts, the blades narrow, flexuous, folded, rough; panicles dense, pale, and shining.

10. Poa gracillima Vasey. Frequent above or near timber line, in meadows or on rocky slopes. B. C. to Calif. and Mont.—Plants in loose bunches with a mass of spreading foliage at the base, the culms commonly 25 to 40 cm. tall, the pale purple-tinged spikelets 6 to 10 mm. long.

11. Poa sandbergii Vasey. At high and middle altitudes, in meadows or on rocky slopes. B. C. to Calif., Colo., and Mont.—Plants in small dense tufts, often purplish at base, the leaves crowded at the base, the short blades commonly curled, the flexuous panicles mostly 5 to 8 cm. long, the spikelets ashy-purple.

12. Poa lucida Vasey. Belton, in open gravelly soil. Alta. to N. Mex. and S. Dak.—Plants in dense tufts, with slightly scabrous blades and narrow pale shining panicles, the short erect branches spikelet-bearing from near the base.

22. PANICULARIA Fabr.

Tall marsh grasses with flat blades and open panicles, the spikelets with short thin glumes and strongly nerved, obtuse lemmas.

Spikelets linear, 12 mm. or more long, pale . . . . . **1. P. borealis.**
Spikelets oval, not over 6 mm. long, dark green or purple.
Lemmas with 5 prominent nerves, the summit white and delicate. **2. P. pauciflora.**
Lemmas with 7 prominent nerves, only the very tip delicate.
Blades mostly 3 to 7 mm. wide . . . . . **3. P. nervata.**
Blades 8 to 10 mm. wide . . . . . **4. P. nervata elata.**

1. Panicularia borealis Nash. Bog at Johns Lake, *Vreeland*. Alaska to Calif., N. Mex., N. Y., and Me. (*Glyceria borealis* Batchelder.)—Culms commonly 1 meter tall, rather thick and lush; blades ascending, 5 to 8 mm. wide; panicle 20 to 40 cm. long, the rather few slender branches stiffly ascending or spreading, the spikelets short-pediceled toward their ends.

2. Panicularia pauciflora (Presl) Kuntze. At low altitudes, in swamps or along streams. B. C. to Calif., Colo., and Mont. (*Glyceria pauciflora* Presl.)—Plants rather stout, 40 to 80 cm. tall, with creeping rootstocks, rough spreading blades 8 to 12 mm. wide, and nodding many-flowered panicles with flexuous branches; spikelets 4 to 6 mm. long, the white summits of the lemmas contrasting with the green or purple body.

3. Panicularia nervata (Willd.) Kuntze. At low altitudes, in wet soil. Alaska to Mex., Fla., and Lab. (*Glyceria nervata* Trin.)—Culms 60 to 100 cm. tall, often in large clumps; blades spreading; panicles drooping; spikelets 3 to 4 mm. long.

4. Panicularia nervata elata (Nash) Piper. At low and middle altitudes, in wet soil. B. C. to Calif. and Mont. (*Glyceria elata* Hitchc.)—Plants on the average taller than in the preceding, with broader laxer blades and larger panicle, the spikelets 4 to 5 mm. long.

23. PUCCINELLIA Parl.

1. Puccinellia nuttalliana (Schult.) Hitchc. East entrance, in low alkali spots on prairie. B. C. to Calif., N. Mex., and N. Dak.—A tufted slender perennial with narrow blades and a relatively large, erect panicle with slender stiff flexuous spreading branches naked at the base; spikelets grayish purple, 4 to 7 mm. long.

24. FESTUCA L. Fescue.

Perennials (in this region), commonly tufted, with narrow blades and open or contracted panicles.

Plants with stout rootstocks. Lemmas awnless . . . . . **1. F. confinis.**
Plants tufted, without rootstocks (dark red rootstocks sometimes developed in no. 3).
Blades flat, broad, and thin . . . . . **2. F. subulata.**
Blades narrow or involute, usually rather stiff.
Blades smooth.
Culms slender and decumbent at the reddish base; blades not filiform. **3. F. rubra.**
Culms not decumbent and red at base; blades filiform.
Plants 50 cm. or more tall . . . . . **4. F. occidentalis.**
Plants mostly less than 20 cm. tall . . . . . **5. F. brachyphylla.**
Blades very rough.
Lemmas awnless, 6 to 7 mm. long; blades not filiform . . . . **6. F. scabrella.**
Lemmas awned; blades filiform.
Plants usually 40 cm. or more tall; blades 15 to 25 cm. long. **7. F. idahoensis.**
Plants usually less than 30 cm. tall; blades 5 to 10 cm. long. **8. F. saximontana.**

1. Festuca confinis Vasey. Hills at east entrance, *Umbach*. Oreg. and Calif. to Colo. and Mont.—Plants in large clumps, 50 to 80 cm. tall, relatively stout, with firm flat blades and narrow, rather compact, pale panicles; glumes thin and shining; lemmas very scabrous.

2. Festuca subulata Bong. At low and middle altitudes, in moist woods. Alaska to Calif., Colo., and Mont.—A slender lax woodland grass, with soft blades and open drooping panicle; spikelets about 1 cm. long, excluding the slender awns, these as long as the body of the lemma.

3. Festuca rubra L. Granite Park, on open moist rocky slope, and doubtless elsewhere. Alaska to Colo., Va., and Greenl.; also in Eur. and Asia.—Plants in loose clumps, the basal sheaths commonly shredded; culms usually 40 to 50 cm. tall; panicles somewhat nodding, the slender branches spreading, rather compactly flowered toward the ends; spikelets dull or grayish purple, short-awned.

4. Festuca occidentalis Hook. Frequent at low and middle altitudes, in thin woods or on open slopes. B. C. to Calif., Wyo., and Mont.—Culms 50 to 75 cm. tall, with a dense tuft of laxly spreading filiform blades at base; panicles open, nodding, the long-awned spikelets borne toward the ends of the few slender branches.

5. Festuca brachyphylla Schult. Above timber line, in meadows or on rocky slopes. Alaska to Calif., N. Mex., Vt., and Greenl.—Plants in dense tufts or cushions, the leaves crowded at the base; panicles narrow, mostly rather compact, the spikelets short-awned.

6. Festuca scabrella Torr. Grassy slopes, at middle altitudes. B. C. and Wash. to Colo. and Mont.—Plants densely tufted, pale, the blades elongate, rather wiry; panicles nodding, the branches ascending.

7. Festuca idahoensis Elmer. Frequent at low and middle altitudes, on prairie or open slopes. Idaho and Mont.—Culms few together, from a dense tuft of rough, laxly spreading, filiform blades; panicles loose, nodding; spikelets short-awned.

Resembles no. 4, but readily distinguished by the very rough blades.

8. Festuca saximontana Rydb. Rocky slopes about Lake McDermott. B. C. to Colo. and Mich.—In dense tufts or cushions; like the preceding, but culms and blades usually less than half as tall; panicles narrow, the spikelets smaller.

25. BROMUS L. Brome grass.

Erect annuals or perennials, with flat blades and several to many-flowered, relatively large spikelets, borne in open or narrow panicles.

Plants annual, introduced weeds.
- Culms in low tufts; spikelets long-awned.
  - Spikelets villous . . . . . 1. **B. tectorum.**
  - Spikelets glabrous or nearly so . . . . . 1a. **B. tectorum nudus.**
- Culms 50 cm. or more tall; spikelets short-awned . . . . . 2. **B. secalinus.**

Plants perennial, native except no. 5.
- Spikelets strongly flattened, the glumes compressed-keeled.
  - Lemmas glabrous or scabrous only . . . . . 3. **B. polyanthus.**
  - Lemmas pubescent . . . . . 4. **B. marginatus.**
- Spikelets not flattened, the glumes convex.
  - Plants with creeping rootstocks.
    - Lemmas glabrous, mostly awnless . . . . . 5. **B. inermis.**
    - Lemmas pubescent on the margin, short-awned . . . . . 6. **B. pumpellianus.**
  - Plants without rootstocks.
    - Ligule prominent, 3 to 5 mm. long . . . . . 7. **B. vulgaris.**
    - Ligule obscure, about 1 mm. long . . . . . 8. **B. richardsonii.**

1. **Bromus tectorum** L. Belton, in waste ground. Native of Eur.; widely naturalized in N. Amer.—Plants often in extensive colonies, softly pubescent, with conspicuously drooping panicles of narrowly V-shaped, long-awned spikelets.

Young plants rather handsome but becoming unsightly in age; the awned florets injurious to grazing animals.

1a. **Bromus tectorum nudus** Klett & Richt. East entrance, on open slopes. Native of Eur.; naturalized in N. Amer.—Plants less pubescent than in the species, the spikelets glabrous or nearly so.

This and the typical form are very common in the park at low altitudes, in cultivated or waste ground and on open slopes.

2. **Bromus secalinus** L. Chess or cheat. Belton, in gravelly open ground. Native of Eur.; widely naturalized in N. Amer., especially in grain fields.—Plants glabrous; panicles nodding, with rather heavy plump glabrous spikelets.

3. **Bromus polyanthus** Scribn. At middle altitudes, in woods. Oreg. to N. Mex. and Mont.—Plants tufted, leafy, commonly 1 meter or more tall, with flat lax blades and narrow, rather stiff panicles; lemmas with shining yellowish margins and short awns.

4. **Bromus marginatus** Nees. Common at low and middle altitudes, in woods or on open slopes. B. C. to Calif., Ariz., and Alta.—Plants in small tufts, 60 to 100 cm. tall, with elongate blades, 5 to 12 mm. wide, and rather stiff panicles, the purplish short-awned spikelets 2.5 to 4.5 cm. long.

5. **Bromus inermis** Leyss. East entrance, on dry bank. Native of Eur.; adventive in N. Amer.—Culms commonly 1 meter or more tall, with glabrous leaves and many-flowered panicles, the numerous branches whorled and ascending, the spikelets loosely flowered, rather soft, oblong, 2 to 3 cm. long.

6. **Bromus pumpellianus** Scribn. At low and middle altitudes, sometimes about timber line, on prairie or open slopes. Alaska to Colo. and S. Dak.—Culms 50 to 100 cm. tall, the leaves more or less pubescent; panicle narrow, the fascicled branches often spikelet-bearing nearly to the base; spikelets 2 to 3 cm. long.

7. **Bromus vulgaris** (Hook.) Shear. At low and middle altitudes, in woods or on open slopes. B. C. to Calif. and Mont.—A slender, yellowish green, woodland grass with softly pubescent leaves and nodding panicles, the spikelets pubescent and with slender awns.

8. Bromus richardsonii Link. Common at low and middle altitudes, in woods or meadows. B. C. to N. Mex. and Sask.—Plants rather robust, 1 meter or more tall; blades elongate, glabrous or nearly so; panicles drooping, the slender flexuous branches fascicled; spikelets 2 to 3 cm. long, on flexuous pedicels.

26. AGROPYRON Gaertn. Wheatgrass.

Erect perennials with simple culms and slender, mostly erect spikes.

Plants with creeping rootstocks, forming a tough sod.
- Lemmas pubescent . . . . . **1. A. dasystachyum.**
- Lemmas glabrous . . . . . **2. A. smithii.**

Plants without rootstocks; bunchgrasses.
- Blades, or most of them, involute.
  - Lemmas awned . . . . . **3. A. spicatum.**
  - Lemmas awnless . . . . . **4. A. inerme.**
- Blades flat or involute-pointed only.
  - Spikelets awned . . . . . **5. A. caninum.**
  - Spikelets awnless.
    - Spikes slender, the spikelets rather distant, green . . . . . **6. A. tenerum.**
    - Spikes relatively short and thick, the spikelets closely overlapping, usually violet-tinged . . . . . **7. A. violaceum.**

1. Agropyron dasystachyum (Hook.) Scribn. Collected at Summit by Griffiths. Idaho to Sask. and Wis.—Culms 50 to 100 cm. tall, with narrow, commonly somewhat involute blades, and grayish spikes 8 to 15 cm. long; lemmas awnless.

2. Agropyron smithii Rydb. Colorado bluestem. Frequent on the east slope at low or middle altitudes, on prairie or open hillsides. B. C. to Ariz., Tex., and Mo.—Culms 40 to 100 cm. tall, rather wiry; blades firm, more or less involute; spikes 10 to 15 cm. long, the spikelets overlapping, the lemmas firm, sharp-pointed.

3. Agropyron spicatum (Pursh) Scribn. & Smith. Frequent at low and middle altitudes, on open slopes or prairie. Yukon to Calif., N. Mex., and Mich.—Culms in dense tufts, slender, wiry; blades usually elongate; spike slender, the axis sometimes flexuous; lemmas with a divergent awn 1.5 to 3 cm. long.

4. Agropyron inerme (Scribn. & Smith) Rydb. Granite Park, on open rocky slopes. B. C. to Utah and Wyo.—Plants resembling the preceding, but the lemmas blunt or with an occasional one awned.

5. Agropyron caninum (L.) Beauv. Frequent at nearly all altitudes, on prairie or open slopes or in woods. Calif. to N. Mex., Mich., and N. S.; also in Eur.—Culms 60 to 100 cm. tall, often rather robust; blades 3 to 8 mm. wide; spike sometimes elongate, usually dense, often somewhat 1-sided because of the twisting of the axis; awns slender, 10 to 25 cm. long.

6. Agropyron tenerum Vasey. At low and middle altitudes, on open slopes or in woods. B. C. to Calif., N. Mex., and Minn.—Plants commonly in large clumps, 60 to 100 cm. tall; blades 3 to 6 mm. wide; spike slender, mostly 15 to 20 cm. long, often nodding at the summit.

7. Agropyron violaceum (Hornem.) Lange. Frequent, chiefly above timber line, but also in exposed places at middle altitudes. Alaska to N. Mex., Nebr., N. Y., and Greenl.—Culms mostly less than 60 cm. tall, often geniculate at base; blades relatively thin; spike mostly short and thick, with crowded, rather soft spikelets.

27. TRITICUM L.

1. Triticum aestivum L. Wheat. East entrance, along the railroad, both the bearded and beardless forms collected. Native of the Old World; cultivated and sometimes escaping.—An erect annual, forming stools, 50 to 100 cm. tall, with flat blades and thick stiff spikes, the broad plump spikelets awned or awnless.

28. HORDEUM L. Barley grass.

Perennial bunchgrasses (in this region) with flat blades and dense bristly spikes, the axis readily disjointing.

Awns 4 to 6 cm. long . . . . . 1. **H. jubatum.**
Awns about 1 cm. long or less . . . . . 2. **H. nodosum.**

1. **Hordeum jubatum** L. Squirreltail. Common at low and middle altitudes, in meadows or prairie. Alaska to Calif., Tex., N. J., and Lab.—Culms erect or spreading, 30 to 50 cm. tall, with pale nodding spikes 5 to 10 cm. long, the slender awns widely spreading.

2. **Hordeum nodosum** L. East entrance, on wet prairie. Alaska to Calif. and Tex.; also in Eur.—Culms often geniculate at base, 30 to 60 cm. tall, with slender spikes 3 to 10 cm. long and scarcely 1 cm. wide.

29. ELYMUS L. Wild rye.

Tall, erect, rather coarse perennials with flat blades and bristly spikes, the axis not disjointing.

Spikelets awnless. Glumes subulate.
Plants with long creeping rootstocks; spike relatively loose, some of the joints with a single spikelet . . . . . 1. **E. triticoides.**
Plants without rootstocks or with very short ones; spike dense, with 2 to 4 spikelets at a joint . . . . . 2. **E. condensatus**
Spikelets awned.
Awns erect or nearly so . . . . . 3. **E. glaucus;**
Awns strongly divergent . . . . . 4. **E. canadensis.**

1. **Elymus triticoides** Buckl. Reported by Jones from Blackfoot Glacier. Wash. to Calif., N. Mex., and Alta.—Culms rather wiry; blades involute toward the apex spike mostly 8 to 15 cm. long; lemmas commonly brownish, very smooth.

2. **Elymus condensatus** Presl. East entrance, on prairie and open slopes. B. C. to Calif., N. Mex., and Nebr.—Plants in large clumps, robust; blades elongate, 5 to 12 mm. wide; spikes 12 to 20 cm. long, 15 to 20 mm. thick; lemmas pale, more or less scabrous.

3. **Elymus glaucus** Buckl. At low and middle altitudes, on open slopes, in woods, or along streams. B. C. to Calif., N. Mex., and Mich.—Culms often geniculate at base; blades lax, spreading; spike erect or nearly so, the slender awns 1 to 2 cm. long.

4. **Elymus canadensis** L. Belton, in low flat-woods, scarce. B. C. to N. Mex., Ga., and N. S.—Culms in large clumps; blades rather thick; spikes drooping, often grayish, the flexuous divergent awns 2 to 4 cm. long.

14. CYPERACEAE. Sedge Family.

Grasslike perennials with usually solid stems; leaves 3-ranked, narrow (sometimes reduced to a sheath), the sheaths close; flowers small, in spikelets; perianth of bristles or sacklike; fruit an achene.—The species of this family are difficult to distinguish, but in Glacier Park they are not numerous, except in the genus *Carex*.

Achene inclosed in a sacklike perianth (perigynium) . . . . . 5. **CAREX.**
Achenes not inclosed, the perianth consisting of bristles.
Bristles of the perianth very long (much longer than the scales) and silky, white or brown . . . . . 1. **ERIOPHORUM.**
Bristles very short and inconspicuous.
Stem with only one spikelet, not leafy . . . . . 2. **ELEOCHARIS.**
Stem with few or many spikelets, often leafy.
Stems hollow; spikelets flat, linear, the scales 2-ranked . . . 3. **DULICHIUM.**
Stems solid; spikelets not flattened, broad, the scales spirally arranged. 4. **SCIRPUS.**

1. ERIOPHORUM L. Cottongrass.

Glabrous perennials; leaves linear, the stem leaves often reduced to sheaths; spikelets 1 or few, the scales spirally arranged; perianth of 6 scales, but these divided into numerous long, soft, white or brownish bristles; achenes narrow, 3-angled.

Spikelet one on each stem . . . . . 1. E. chamissonis.
Spikelets several . . . . . 2. E. angustifolium.

1. **Eriophorum chamissonis** Mey. Bog below Lake McDermott; sphagnum bogs on the west slope. Alaska to Oreg., Wyo., and N. B.; also in Eur. and Asia.—Stems 20 to 60 cm. high, slender; bristles usually brownish, about 2 cm. long.

The silky heads are very handsome and conspicuous.

2. **Eriophorum angustifolium** Roth. Wet meadow below Grinnell Glacier. Alaska to Oreg., N. Mex., Ill., and Newf.—Plants slender, 30 to 60 cm. high; leaves 3 to 6 mm. wide; bracts often blackish; bristles white or brownish.

2. ELEOCHARIS R. Br. Spikerush.

Glabrous perennials; leaves represented only by sheaths; spikelet 1, erect, the scales spirally arranged; perianth of few bristles; achene 3-angled or lenticular, the base of the style persistent as a tubercle.

Achene whitish, with longitudinal ribs . . . . . 1. E. acicularis.
Achene yellow or brownish, not ribbed.
Style branches 2; stems 1.5 to 2 mm. thick . . . . . 2. E. palustris.
Style branches 3; stems about 0.5 mm. thick . . . . . 3. E. tenuis.

1. **Eleocharis acicularis** (L.) Roem. & Schult. Low open ground, east entrance. Widely distributed in N. Amer., Eur., and Asia.—Stems very slender, 2 to 15 cm. high; spikelets 3 to 6 mm. long, the scales brownish.

The plants often form dense mats.

2. **Eleocharis palustris** (L.) Roem. & Schult. Occasional at low or rarely at middle altitudes, in wet soil. Widely distributed in N. Amer., Eur., and Asia.—Plants rather stout, 15 to 60 cm. high, green or somewhat glaucous; spikelets 6 to 20 mm. long, the scales purplish brown; achene yellowish, with a large tubercle.

3. **Eleocharis tenuis** (Willd.) Schult. Wet meadow below Grinnell Glacier. Sask. to Colo., Fla., and N. S.—Stems 5 to 30 cm. high, green; spikelets 3 to 10 mm. long; achenes yellowish brown, roughened, with a small tubercle.

3. DULICHIUM L. Rich.

1. **Dulichium arundinaceum** (L.) Britton. Sphagnum bogs on the west slope. B. C. to Tex., Fla., and Newf.; also in Centr. Amer.—Perennial, 30 to 60 cm. high, with rootstocks and slender hollow leafy stems; leaves linear, 2 to 8 cm. long, spreading; spikelets 12 to 20 mm. long, in axillary spikes.

4. SCIRPUS L.

Glabrous perennials; leaves linear, often reduced to sheaths; spikelets few or many, clustered, ovoid, the scales spirally arranged; perianth of few bristles.

Stems 3-angled, leafy; spikelets very numerous, in large umbels . 1. S. microcarpus.
Stems round, not leafy; spikelets few, in a loose cluster, this appearing to rise from the side of the stem near the top . . . . . 2. S. occidentalis.

1. **Scirpus microcarpus** Presl. Banks at Johns Lake; low places about east entrance. Alaska to Calif., N. Mex., Conn., and Newf.—Plants 0.5 to 1 meter high; leaves long, rough-edged; spikelets greenish, 3 to 4 mm. long, in dense clusters, these arranged in umbels; achenes whitish.

2. **Scirpus occidentalis** (S. Wats.) Chase. Bulrush. About ponds on prairie at east entrance. B. C. to Calif., N. Mex., Mo., N. Y., and Newf.—Stems about a meter high, dark green, soft and spongy; leaves all reduced to sheaths at the base of the stem; spikelets 6 to 15 mm. long, brown.

5. CAREX L. Sedge.

(Contributed by Mr. Kenneth K. Mackenzie.)

Perennials; culms mostly triangular; leaves 3-ranked; plants monoecious or sometimes dioecious; flowers solitary in the axils of glumes; spikes pistillate or staminate or partly both with the pistillate flowers either at the top or bottom of the spikes; perianth none; staminate flowers of 3 (rarely 2) stamens, the filaments filiform; pistillate flowers of a single pistil, with a style and 2 or 3 stigmas; achenes triangular or lenticular, completely surrounded by the perigynium.

I. Spike solitary.

Stigmas 2; achenes lenticular.

Plants very densely cespitose; spikes staminate at top; perigynia appressed. **1. C. hepburnii.**

Plants with slender elongate rootstocks; spikes usually pistillate or staminate; perigynia widely spreading at maturity . . . . . **4. C. gynocrates.**

Stigmas 3; achenes triangular.

Perigynia widely spreading or reflexed at maturity, conspicuously stipitate; pistillate scales deciduous.

Plants densely cespitose; leaf blades involute, 1 mm. wide; staminate flowers few; perigynia erect until full maturity . . . . . **2. C. pyrenaica.**

Plants short-stoloniferous; leaf blades flat, 1.5 mm. wide or more; staminate flowers conspicuous; perigynia early deflexed . . . . . **3. C. nigricans.**

Perigynia appressed or ascending, little if at all stipitate; pistillate scales persistent.

Spikes staminate at top.

Perigynia short-beaked; leaf blades acicular.

Perigynia glabrous, the upper half empty . . . . . **1. C. hepburnii.**

Perigynia puberulent, nearly filled by the achene . . . . . **29. C. filifolia.**

Perigynia beakless or very nearly so; leaf blades not acicular.

Perigynia rounded at apex, many-nerved; scales not chartaceous. **27. C. leptalea.**

Perigynia not rounded at apex, 2-ribbed, otherwise nerveless; scales chartaceous . . . . . **28. C. geyeri.**

Spikes entirely staminate or entirely pistillate, the culms dioecious.

Perigynia strongly pubescent . . . . . **30. C. scirpoidea.**

Perigynia glabrous . . . . . **36. C. parryana.**

II. Spikes more than one.

A. Stigmas 2; achenes lenticular.

B. Lateral spikes short, sessile, the terminal spike pistillate at top or bottom, or throughout.

C. Perigynia not white-punctulate.

Plants with long-creeping rootstocks, the culms arising one or few together; spikes staminate at top or throughout.

Sheaths white-hyaline opposite the blades.

Rootstocks slender, light brownish; culms obtusely triangular, normally smooth; heads dioecious or nearly so; perigynia strongly nerved ventrally. **5. C. douglasii.**

Rootstocks stout, blackish; culms sharply triangular, normally rough above; heads not dioecious; perigynia nerveless or nearly so ventrally. **6. C. praegracilis.**

Sheaths green-striate opposite the blades nearly to the mouth. Heads not dioecious; perigynia strongly striate ventrally . . . . . **7. C. sartwellii.**

Plants cespitose, the rootstocks short; spikes staminate at top or bottom.
Spikes staminate at top.
Spikes not very numerous, capitate; perigynia 4 to 5 mm. long, plano-convex, green, at least on margin . . . . . 8. C. hoodii.
Spikes very numerous, in a compound head; perigynia 2 to 2.75 mm. long, unequally biconvex, brown, shining . . . . . 9. C. diandra.
Spikes (at least the terminal one) staminate at bottom.
Perigynia at most sharp-margined.
Perigynia spreading at maturity.
Perigynia broadest in middle, the beak sparingly serrulate; culms weak. 10. C. laeviculmis,
Perigynia broadest near base, the beak strongly serrulate; culms stiff. 11. C. interior.
Perigynia appressed . . . . . 12. C. leptopoda.
Perigynia narrowly to strongly wing-margined, the beak serrulate.
Bracts conspicuous, exceeding the head . . . . . 13. C. athrostachya.
Bracts not conspicuous, shorter than the head.
Scales about the length of the perigynia and of the same width above and concealing them.
Perigynia with beak not hyaline at tip, flattened and serrulate nearly to tip. 14. C. aenea.
Perigynia with beak hyaline at tip, the tip terete and little if at all serrulate.
Culms and head stiff and rigid; culms 10 to 30 cm. high, in large stools. 16. C. phaeocephala.
Culms in clumps, slender; head flexuous or moniliform.
Scales tinged with light reddish brown . . . . . 17. C. praticola.
Scales tinged with chestnut brown . . . . . 18. C. piperi.
Scales shorter than perigynia and narrower above, the upper part of the perigynia conspicuous in the spikes.
Perigynia with beak flat and serrulate to tip . . . . . 15. C. bebbii.
Perigynia with tip of beak terete and little if at all serrulate.
Perigynia thin and flattened, except where distended by achene.
Perigynia 3.5 to 5 mm. long, appressed; culms tall, 20 to 70 cm. high. 19. C. festivella.
Perigynia 4.5 to 6 mm. long, the beaks conspicuously spreading; culms low, 10 to 40 cm. high . . . . . 20. C. nubicola.
Perigynia strongly plano-convex, thick.
Spikes densely capitate; perigynia with beak obliquely cut, dark-tipped . . . . . 21. C. pachystachya.
Spikes not capitate; perigynia with beak bidentate, reddish-tipped. 22. C. preslii.

CC. Perigynia white-puncticulate.

Spikes staminate at top; perigynia 1 to 5 to a spike, unequally biconvex. 23. C. disperma.

Spikes staminate at bottom; perigynia more numerous, plano-convex.
Perigynia broadest near middle; beak short, smooth or moderately serrulate.
Spikes closely approximate; scales strongly tinged with reddish brown; perigynia with beak smooth or essentially so . . . . . 24. C. lachenalii.
Spikes not closely approximate, the lower spikes separated; scales little if at all tinged with reddish brown; perigynia with beak usually more or less serrulate . . . . . 25. C. canescens.
Perigynia ovate, broadest near the base; beak conspicuous, strongly serrulate. 26. C. arcta.

BB. Lateral spikes elongate, more or less peduncled; terminal spike or spikes normally staminate.

Culms 3 to 40 cm. high; pistillate spikes 4 to 20-flowered; perigynia golden-yellow and translucent at maturity . . . . . **32. C. aurea.**

Culms 20 to 140 cm. high; pistillate spikes many-flowered; perigynia not golden-yellow and not translucent at maturity.

Perigynia green or straw-colored, dull; style jointed with achene.

Perigynia with beak not bidentate.

Perigynia conspicuously nerved; leaf blades 1 to 3 mm. wide; stolons absent. **45. C. kelloggii.**

Perigynia nerveless ventrally or nearly so; leaf blades 4 to 8 mm. wide; long horizontal stolons present . . . . . **46. C. substricta.**

Perigynia with beak markedly bidentate and with body strongly ribbed. **47. C. nebraskensis.**

Perigynia tinged with yellowish brown, shining; style continuous with achene. **52. C. miliaris.**

AA. Stigmas 3; achenes triangular.

Perigynia hairy.

Culms 5 to 25 cm. high; pistillate spikes few-flowered; perigynia 2-ribbed, otherwise nerveless . . . . . **31. C. rossii.**

Culms 60 to 90 cm. high; pistillate spikes many-flowered; perigynia many-nerved.

Leaf blades flat, more than 2 mm. wide . . . . . **48. C. lanuginosa.**

Leaf blades involute, 2 mm. wide or less . . . . . **49. C. lasiocarpa.**

Perigynia not hairy.

Bract of lowest pistillate spike sheathing.

Pistillate spikes drooping, on capillary peduncles, 2 to 12-flowered; perigynia not bidentate . . . . . **33. C. capillaris.**

Pistillate spikes erect, many-flowered; perigynia bidentate.

Perigynia 2 to 3 mm. long, the beak scarcely half as long as the body. **50. C. viridula.**

Perigynia 4 to 6 mm. long, the beak about as long as the body . . . **51. C. flava.**

Bract of lowest pistillate spike not sheathing.

D. Perigynia with beak entire or shallowly bidentate with very short teeth.

Perigynia glaucous-green.

Pistillate spikes drooping; plants loosely long-stoloniferous; terminal spike staminate . . . . . **34. C. limosa.**

Spikes erect, the terminal pistillate at top; culms densely tufted, sending forth long horizontal stolons . . . . . **35. C. buxbaumii.**

Perigynia not glaucous-green.

Terminal spike in some plants pistillate and linear-cylindric or staminate only at apex, in others staminate . . . . . **36. C. parryana.**

Terminal spike staminate or pistillate at top and staminate below; not pistillate and linear-cylindric.

Terminal spike staminate.

Culms few-leaved, purplish-tinged at base, the lower leaves reduced to bladeless sheaths . . . . . **37. C. podocarpa.**

Culms many-leaved, clothed at base with dried-up leaves of previous year, not purplish-tinged at base.

Perigynia flat . . . . . **38. C. tolmiei.**

Perigynia round in cross section, many-nerved . . **39. C. raynoldsii.**

Terminal spike pistillate at top and staminate below.

Perigynia small, 2.5 mm. long or less, triangular in cross section. **40. C. halleri.**

Perigynia larger, 2.5 to 5 mm. long, compressed or subtriangular.
Spikes contiguous, sessile or short-peduncled, forming a dense head.
Culms stiff, erect; scales with conspicuous white hyaline apex and upper margins . . . . . **41. C. albo-nigra.**
Spikes not contiguous, the lowest spike (or spikes) strongly peduncled, usually distant, erect or nodding.
Spikes 3 to 5, not oblong-cylindric; walls of perigynia not papery; perigynia 2.5 to 4.5 mm. long, dull green to brownish black, nerveless ventrally or obscurely nerved; scales about the length of the perigynia.
Perigynia slightly inflated and subtriangular, not strongly compressed . . . . . **42. C. atrosquama.**
Perigynia strongly compressed . . . . . **43. C. chalciolepis.**
Spikes 6 to 10, oblong-cylindric; walls of perigynia papery; perigynia 5 mm. long, light green, finely 3-nerved ventrally; scales much shorter than the perigynia . . . **44. C. mertensii.**

DD. Perigynia deeply bidentate with stiff slender teeth.
Perigynia ascending; rootstocks short-creeping; lower sheaths more or less strongly filamentose; culms sharply triangular above leaves. **53. C. vesicaria.**
Perigynia spreading at maturity; plants cespitose and sending forth long horizontal stolons; lower sheaths not filamentose; culms bluntly triangular above leaves . . . . . **54. C. rostrata.**

1. Carex hepburnii Boott. On a wind-swept rocky summit above Sexton Glacier. Alta. to Colo., Wash., and southeastern Alaska.—Culms 2 to 15 cm. high; leaf blades acicular; spike 5 to 12 mm. long; perigynia 3 to 4 mm. long, elliptic-ovate, membranaceous, stipitate, the beak hyaline-tipped.

2. Carex pyrenaica Wahl. Frequent on rocky alpine slopes. Mack. to Colo., Oreg., and southeastern Alaska; also in Eurasia.—Culms 3 to 20 cm. high, slender, wiry; leaves 2 or 3 to a culm; spike 5 to 20 mm. long; scales chestnut-tinged; perigynia 3 to 4 mm. long, obscurely triangular, long-beaked, the beak obliquely cut.

3. Carex nigricans C. A. Meyer. Abundant in wet meadows above timber line; sometimes in meadows at lower altitudes, as at Grinnell Lake and below Granite Park. Alta. to Colo., Calif., and Alaska.—Culms 5 to 20 cm. high, stiff, firm; leaves 4 to 9 to a culm; spike 8 to 15 mm. long; scales tinged with dark brown; perigynia 4 mm. long, obscurely triangular, long-beaked, the beak obliquely cut.

One of the most abundant plants in alpine meadows, often forming large pure stands. To a large extent it replaces the grasses that commonly compose the alpine meadows farther south in the Rockies.

4. Carex gynocrates Wormskj. In a marsh along Swiftcurrent Creek below Lake McDermott; abundant in this one locality, growing with *Petasites sagittata*, *Eriophorum*, etc. Greenl. to Alaska, south to N. Y., Mich., and Colo.; also in Siberia.—Culms 10 to 30 cm. high, smooth; leaf blades filiform; spike bractless, 5 to 15 mm. long; perigynia 3 mm. long, biconvex, subcoriaceous, strongly beaked, the apex hyaline.

5. Carex douglasii Boott. Plains near east entrance, *Umbach*. Man. to B. C., south to Nebr., N. Mex., and Calif.—Culms 6 to 30 cm. high; leaf blades 1 to 2.5 mm. wide; spikes oblong-elliptic, aggregate in an oblong-ovoid head; perigynia concealed by scales, lanceolate, 4 mm. long.

6. Carex praegracilis W. Boott. On a dry gravelly slope along the railroad near Belton. Man. to Yukon and B. C., south to Kans., Mex., and southern Calif. (*C. marcida* Boott).—Culms 20 to 50 cm. high; leaf blades 1.5 to 3 mm. wide; spikes ovoid; perigynia nearly concealed by scales, blackish in age, 3 to 4 mm. long, 1.5 mm. wide.

7. Carex sartwellii Dewey. Frequent in wet open places about the east entrance. N. Y. to Mont., south to Ill. and Colo.—Culms 40 to 70 cm. high, rough above; leaf blades 2.5 to 4 mm. wide; spikes densely aggregate in an oblong head; perigynia 2.5 to 4 mm. long, very short-beaked.

8. Carex hoodii Boott. On shaded cliffs near Many Glacier Hotel; in deep damp woods at Sun Camp. Alta. to B. C., south to Colo. and Calif.—Densely cespitose; culms 30 to 60 cm. high; leaf blades 1.5 to 3.5 mm. wide; head 1 to 2 cm. long; perigynia ascending, serrulate to middle, 4 to 5 mm. long, margined above, sharply bidentate.

9. Carex diandra Schrank. Common in sphagnum bog at Johns Lake. N. S. to Alaska, south to Pa., Colo., and in the mountains to southern Calif.; also in Eurasia.—Culms loosely cespitose, slender, 30 to 70 cm. high; leaf blades 1 to 2.5 mm. wide; head 2.5 to 5 cm. long, not interrupted, compound; perigynia not concealed by scales, coriaceous, conspicuously rough-beaked.

10. Carex laeviculmis Meinshaus. In a low thicket along Snyder Creek. Alaska to Mont., south to Calif.; also in Siberia.—Culms 30 to 70 cm. high, weak; leaf blades 1.5 to 2 mm. wide, flat, soft; spikes 3 to 8, with 3 to 10 perigynia; scales with sharply defined green midvein; perigynia 2.5 to 3 mm. long, the beak slightly bidentate.

11. Carex interior Bailey. Marsh near Swiftcurrent Creek below Lake McDermott. Me. to B. C., south to Pa., Ind., northern Mex., and Calif.—Culms 20 to 40 cm. high, stiff, slender, wiry; leaf blades 1 to 2 mm. wide; spikes 2 to 4, approximate; scales very obtuse, with light center; perigynia ovoid, 2.5 mm. long, abruptly short-beaked, he teeth short.

12. Carex leptopoda Mackenz. Common in deep woods and on lake shores at middle altitudes; sometimes on open slopes, and occasionally found above timber line. B. C. to Mont. and Calif.—Rootstocks slender, elongate; culms slender, 30 to 75 cm. high; leaf blades 2.5 to 5 mm. wide; spikes 4 to 7, narrow, approximate; scales short; perigynia 3.5 to 4.5 mm. long, substipitate, the beak shallowly bidentate.

13. Carex athrostachya Olney. Swales near east entrance, *Umbach*. Sask. to Yukon, south to Colo. and Calif.—Culms 5 to 30 cm. high; leaf blades 1.5 to 2.5 mm, wide; spikes 4 to 15, densely aggregate; perigynia exceeding scales, lanceolate-ovate. 3 to 4 mm. long, slenderly beaked, hyaline at orifice.

14. Carex aenea Fernald. Low thicket along Swiftcurrent Creek below Lake McDermott. Lab. to Yukon, south to Conn., Mont., and B. C.—Culms 40 to 90 cm. high; leaf blades 2.5 to 4 mm. wide; spikes 3 to 12 in a flexuous head; scales light brownish, hyaline-margined; perigynia ascending, ovate, 4 mm. long.

15. Carex bebbii Olney. On sandbar along Lake McDonald near Lewis's. Newf. to B. C., south to N. J. and Mont.—Culms 20 to 80 cm. high, rough beneath head; leaf blades 2 to 4.5 mm. wide; spikes 5 to 10, closely aggregate; perigynia brownish, ascending, ovate, 3 to 4 mm. long.

16. Carex phaeocephala Piper. Frequent on open rocky slopes at middle and high altitudes. Alta. to southeastern Alaska, south to Colo. and Calif.—Leaf blades 1.5 to 2 mm. wide, more or less involute; spikes 2 to 5 (7), aggregate; scales reddish brown, strongly hyaline-margined; perigynia ascending, oblong-ovate, obscurely nerved ventrally, short-beaked.

17. Carex praticola Rydb. In dense moist woods along Swiftcurrent Creek below Lake McDermott; in low aspen thickets about the east entrance. Greenl. to Alaska, south to Me., Colo., and northern Calif.—Culms 25 to 60 cm. high; leaf blades 1 to 2 mm. wide; spikes 2 to 6; scales shining; perigynia appressed, ovate-lanceolate, 4.5 to 6.5 mm. long, nerveless ventrally, short-beaked.

18. Carex piperi Mackenz. Fields near east entrance, *Umbach*. B. C. to Alta., south to Wyo. and Oreg.—Culms 30 to 80 cm. high; leaf blades 2 to 3.5 mm. wide,

spikes 3 to 9; scales shining; perigynia appressed, ovate-lanceolate, 4 to 5 mm. long, nearly nerveless ventrally, rather short-beaked.

19. **Carex festivella** Mackenz. Frequent on the east slope at nearly all altitudes; in moist woods or thickets or on high open slopes. Alta. to B. C., south to N. Mex., Ariz., and Calif.—Leaf blades 2.5 to 4 mm. wide; spikes 3 to 8, densely aggregate; scales ovate, dark reddish brown; perigynia numerous, lightly nerved ventrally, the beak one-third the length of body.

20. **Carex nubicola** Mackenz. Abundant in meadows and on rocky slopes above timber line. Alta. to Wash., south to Colo. and Calif.—Leaf blades 2 to 3 mm. wide; spikes 4 to 7, densely aggregate; scales ovate, blackish; perigynia 15 to 30, ovate, nerveless ventrally, abruptly beaked, the beak half the length of body.

21. **Carex pachystachya** Cham. On a moist shaded bank at the east entrance. Alaska to Alta., south to Colo. and Calif.—Culms 30 to 80 cm. high; leaf blades 2 to 4 mm. wide; spikes 4 to 8; scales narrowly hyaline-margined; perigynia 3.5 to 4 mm. long, ovate, nerveless ventrally, the beak half the length of body.

22. **Carex preslii** Steud. Common in deep woods at middle altitudes, and on rocky slopes and in meadows above timber line. B. C. to Mont. and Oreg.—Culms 25 to 75 cm. high; leaf blades 1.5 to 4 mm. wide; spikes 3 to 8, well defined; scales reddish brown, narrowly margined; perigynia ovate, 3.5 mm. long, abruptly beaked, the beak 1 mm. long.

23. **Carex disperma** Dewey. Frequent at low or middle altitudes, in bogs, swampy woods, or wet thickets; abundant in some localities and forming dense mats of loosely interlaced leaves and stems. Newf. to Alaska, south to N. J., Ind., N. Mex., and Calif.; also in Eurasia.—In large clumps but rootstocks slender; culms weak, 15 to 60 cm. high; leaf blades 1 to 1.5 mm. wide; perigynia elliptic-ovoid, 2 mm. long, finely nerved, the minute beak smooth.

24. **Carex lachenalii** Schkuhr. Moist meadow at Sperry Glacier. Greenl. to Alaska, south to Mont.; also in Eurasia.—Culms stiff, erect, 7 to 40 cm. high, rough above; leaf blades 1 to 3 mm. wide; spikes 2 to 6, the terminal strongly tapering; perigynia 2 to 3.5 mm. long, several-nerved, abruptly short-beaked.

25. **Carex canescens** L. Open bog near Swiftcurrent Creek below Lake McDermott. Lab. to Alaska, south to Va. and Calif.; also in Eurasia, S. Amer., and Australia.—In large clumps, the culms 25 to 80 cm. high, slender; leaf blades 2 to 4 mm. wide, glaucous; spikes 4 to 9, many-flowered; perigynia appressed-ascending, 1.8 to 2.8 mm. long, faintly few-nerved, minutely beaked, the orifice entire or emarginate.

26. **Carex arcta** Boott. Abundant in a wet thicket at the upper end of Lake McDonald. N. B. to B. C., south to N. Y., Mont., and northern Calif.—Culms 15 to 80 cm. high; leaf blades 2 to 4 mm. wide; spikes 5 to 15, many-flowered, aggregate; perigynia 2 to 3 mm. long, many-nerved, ascending or somewhat spreading.

27. **Carex leptalea** Wahl. Frequent on the east slope at low and middle altitudes, in bogs, marshes, or low thickets. Lab. to Alaska, south to Fla., Tex., Colo., and northern Calif.—Densely tufted; culms 20 to 60 cm. high, very slender; leaf blades 0.5 to 1.25 mm. wide; spikes 4 to 15 mm. long; perigynia 2.5 to 4.25 mm. long, oblong-elliptic, membranaceous.

28. **Carex geyeri** Boott. Frequent on the east slope, at middle altitudes, or above timber line, on open gravelly slopes. Alta. to Wash., south to Colo., Utah, and northern Calif.—Rootstock woody, elongate; culms up to 35 cm. high, very rough, leaf blades thick, 2 to 3.5 mm. wide; perigynia 1 to 3.6 mm. long, obtusely triangular, very minutely beaked.

29. **Carex filifolia** Nutt. Hills near east entrance. Sask. to Yukon, south to Tex., N. Mex., and Wash.—Densely cespitose, the culms 8 to 30 cm. high; spike 1 to 2 cm.

long, with 5 to 10 perigynia; scales strongly bright white margined; perigynia 3 mm. long, obovoid-globose, rounded on the angles.

30. Carex scirpoidea Michx. Near a snow bank on Altyn Mountain; wet mossy cliffs at Baring Falls. Greenl. to Alaska, south to N. Y., Mich., Mont., and B. C.—Rootstocks creeping; culms 20 to 35 cm. high, purplish at base; spikes 1.5 to 3 cm. long; scales ciliate; perigynia 3 mm. long, flattened-triangular, short-beaked.

31. Carex rossii Boott. Frequent on the east slope at middle altitudes, in deep woods or in wet meadows. Mich. to Yukon, south to Colo. and Calif.—Rootstocks stout; culms 5 to 25 cm. high, wiry; leaf blades 1 to 2.5 mm. wide; staminate spike conspicuous, 3 to 10 mm. long; perigynia 3.25 to 4.5 mm. long, strongly stipitate, the beak deeply bidentate.

32. Carex aurea Nutt. At low and middle altitudes in moist soil, usually at the edge of water; infrequent. Newf. to Yukon, south to Conn., Mich., N. Mex., and Calif.—Leaf blades 2 to 4 mm. wide; bracts sheathing; pistillate spikes 2 to 5, on erect exserted peduncles; scales usually reddish brown tinged; perigynia ascending, broadly oval, 2 mm. wide, many-nerved, subumbonate.

33. Carex capillaris L. Occasional on open rocky slopes just below Sperry Glacier. Greenl. to Alaska, south to N. H., Mich., Colo., and Nev.; also in Eurasia.—Culms 5 to 60 cm. high, slender; leaf blades 1 to 2 mm. wide; pistillate spikes 2 to 4; scales broadly hyaline-margined; perigynia ovoid, appressed, 2.5 to 3 mm. long, the beak slender, conic.

34. Carex limosa L. Abundant in sphagnum bogs at Johns and Fish lakes. Lab. to Alaska, south to N. J., Iowa, Mont., and Wash.; also in Eurasia.—Culms 15 to 60 cm. high, sharply triangular; leaf blades glaucous, 1.5 to 3 mm. wide; pistillate spikes 8 to 30-flowered; scales acute or short-cuspidate; perigynia broadly ovate, flattened, 2-edged, 2.5 mm. long, several-nerved.

35. Carex buxbaumii Wahl. Boggy meadow along Swiftcurrent Creek below Lake McDermott; abundant in sphagnum bog at Johns Lake. Greenl. to Alaska, south to Ga., Ark., Colo., and Calif.; also in Eurasia.—Culms 20 to 90 cm. high, strongly reddish purple at base; lower sheaths filamentose; leaf blades 2 to 4 mm. wide; scales awned; perigynia numerous, shorter than scales, 3 to 4 mm. long, lightly many-nerved.

36. Carex parryana Dewey. Open rocky slope at Gunsight Pass. Hudson Bay to Alta., south to N. Dak. and Colo.—Stoloniferous; culms 10 to 35 cm. high; leaf blades 2.5 to 4 mm. wide; spikes 1 to 5, approximate; perigynia 2.5 mm. long, flattened and sharp-edged, the beak minute, bidentulate.

37. Carex podocarpa R. Br. Abundant in moist meadows and on rocky slopes above timber line; occasionally found on moist rocky slopes at lower altitudes. Northern Alaska, south to Mont. and Idaho.—Rootstocks stout; culms 20 to 40 cm. high, slender; leaf blades 2 to 4 mm. wide; pistillate spikes 2 to 4, oblong or linear-oblong, drooping; pistillate scales brownish black, the midvein nearly obsolete; perigynia ovate, flat, nerveless, 4 mm. long; achenes stipitate.

38. Carex tolmiei Boott. Abundant above timber line, in meadows and on rocky slopes. Alta. to Alaska, south to Wyo. and Wash.—Rootstocks tough, densely matted; culms 25 to 50 cm. high; leaf blades 2.5 to 4.5 mm. wide; pistillate spikes 3 to 6, spreading, oblong; pistillate scales with conspicuous midvein; perigynia flat, 3 mm. long; achenes short-stipitate.

Both this and *C. podocarpa* are common in all the alpine meadows, and they are very conspicuous because of their handsome dark spikes.

39. Carex raynoldsii Dewey. Frequent on the east slope in woods or thickets, at low and middle altitudes, and on open slopes above timber line. Alta. to Wash., south to Colo. and Calif.—Rootstocks stout; culms 20 to 40 cm. high; leaf blades

3 to 8 mm. wide; pistillate spikes 2 to 3, erect, oblong; scales blackish, with light midvein; perigynia 4.5 mm. long, oblong-oval, the short beak bidentate.

40. Carex halleri Gunn. Edge of a pool in marsh along Swiftcurrent Creek below Lake McDermott. Greenl. to Alaska, south to Ont. and N. Mex.; also in Eurasia.—Culms 15 to 60 cm. high, slender; leaf blades 1 to 3 mm. wide; spikes 2 to 4, clustered, erect, sessile or short-peduncled, closely 8 to 25-flowered; scales black; perigynia minutely bidentate.

41. Carex albo-nigra Mackenz. Mount Henry, *Umbach*. Mont. to Colo., Ariz., and Utah.—Culms 15 to 30 cm. high; leaf blades 3 mm. wide; spikes usually 3, closely 8 to 15-flowered; midvein of scales nearly obsolete; perigynia blackish, 3 mm. long, minutely roughened.

42. Carex atrosquama Mackenz. Occasional on the moraine of Grinnell Glacier. Alta. and B. C. to Mont. and Idaho.—Culms 30 to 45 cm. high, slender; leaf blades 25 to 35 mm. wide; spikes 3 or 4, oblong, densely 15 to 30-flowered; scales black, with obsolete midvein; perigynia 3.25 mm. long, olive-green, abruptly and minutely beaked.

43. Carex chalciolepis Holm. In marsh at Grinnell Lake. Mont. to Nev., south to Colo. and Ariz.—Culms 20 to 70 cm. high, slender; leaf blades 3 to 6 mm. wide; spikes 2 to 4, the lateral ones ovoid, rather short-peduncled; scales very thin, copper-brown, the midvein indistinct; perigynia 3 to 4 mm. long, obovate, shorter than the scales, granular-roughened; achenes short-stipitate.

44. Carex mertensii Prescott. Frequent at middle altitudes, in moist woods or thickets; sometimes found on open slopes above timber line. A handsome species, ranging from Alaska to Mont. and northern Calif.—Culms 30 to 100 cm. high, sharply triangular, rough; leaf blades 4 to 7 mm. wide; spikes 1 to 4 cm. long; scales acute, with light midvein; perigynia numerous, appressed, tapering at apex, minutely beaked.

45. Carex kelloggii W. Boott. Common at middle altitudes, in wet meadows or marshes or along streams; also in subalpine meadows. Alaska to Calif., east to Mont. and Colo.—Culms 30 to 70 cm. high, slender; staminate spike usually one; pistillate spikes 3 to 5, sessile or nearly so, linear, 1.5 to 4 cm. long, 4 to 6 mm. wide; scales with broad light-colored center; perigynia light green, 2.5 mm. long, strongly stipitate.

46. Carex substricta (Kükenth.) Mackenz. In willow thickets or low open places about the east entrance; in boggy meadows along Swiftcurrent Creek below Lake McDermott. Me. to Sask. and Mont., south to N. Y. and Nebr.—Culms 60 to 140 cm. high; staminate spikes 2 or 3; pistillate spikes 2 to 4, sessile or short-peduncled, linear, 2 to 7 cm. long, 4 to 6 mm. wide; scales with broad light-colored center; perigynia 3 mm. long, obovate, stipitate.

47. Carex nebraskensis Dewey. About a dried-up pool near the east entrance. S. Dak. to Kans., west to Calif. and B. C.—Culms 25 to 100 cm. high; leaf blades 4 to 8 mm. wide, flat; staminate spikes 1 or 2; pistillate spikes 2 to 5, sessile or short-peduncled; scales with light midvein; perigynia 3 to 3.5 mm. long.

48. Carex lanuginosa Michx. In low open ground, or in low thickets, about St. Mary and the east entrance. N. S. to B. C., south to Tenn., Mo., N. Mex., and Calif.—Stoloniferous; culms 60 to 90 cm. high, rough above, reddened and filamentose at base; staminate spikes 1 to 3; pistillate spikes 1 to 3, 1 to 5 cm. long; scales sharp-pointed; perigynia ovoid, the beak strongly bidentate.

49. Carex lasiocarpa Ehrh. Abundant in sphagnum bog at Fish Lake. Newf. to B. C., south to N. J., Iowa, and Colo.; also in Eurasia.—Stoloniferous; culms 60 to 90 cm. high, smooth, strongly reddened and filamentose at base; staminate spikes 1 to 3; pistillate spikes 1 to 3, 1 to 5 cm. long; scales sharp-pointed; perigynia oval-ovoid, the beak sharply bidentate.

50. Carex viridula Michx. On the rocky beach of Lake St. Mary at Sun Camp. Newf. to southeastern Alaska, south to N. J., Colo., and northern Calif.—Culms 7 to 40 cm. high; leaf blades 1.5 to 3 mm. wide; staminate spike sessile or nearly so; pistillate spikes 2 to 10, aggregate or the lower separate; scales much shorter than the perigynia, the latter white-tipped.

51. Carex flava L. Common at low and middle altitudes, on lake shores or stream banks or in bogs. Newf. to southeastern Alaska, south to N. J., Ohio, Mont., and B. C.—Culms 15 to 60 cm. high; leaf blades 2 to 5 mm. wide; yellowish green; staminate spike sessile or stalked; pistillate spikes 1 to 4, the lower separate; scales strongly reddish-tinged; perigynia reddish-tipped.

52. Carex miliaris Michx. Common at low and middle altitudes, in bogs or low thickets and meadows, or along streams; sometimes in meadows above timber line. Lab. to B. C., south to Me. and Mont.—Rootstocks creeping; culms 30 to 60 cm. tall, smooth; leaf blades 2 mm. wide; staminate spikes 1 or 2; pistillate spikes 1 to 3, oblong-cylindric; perigynia faintly nerved, scarcely inflated, 2 to 3 mm. long, exceeding the scales, the beak entire or nearly so.

53. Carex vesicaria L. Common at low and middle altitudes, in bogs or low thickets, or on brushy hillsides. Que. to B. C., south to Pa., Ohio, and Calif.—Culms 30 to 90 cm. high; leaf blades 3 to 6 mm. wide; staminate spikes 2 to 4, pistillate spikes 1 to 3, oblong-cylindric, 2.5 to 7 cm. long; scales sharp-pointed; perigynia 5 to 8 mm. long, yellowish green.

54. Carex rostrata Stokes. Common at low and middle altitudes, in low thickets, wet meadows, marshes, or sphagnum bogs. Lab. to northern Alaska, south to Del., N. Mex., and Calif.—Culms stout, 30 to 120 cm. high; leaf blades 2 to 12 mm. wide; staminate spikes 2 to 4; pistillate spikes 2 to 4, cylindric, 5 to 15 cm. long; scales sharp-pointed; perigynia ovoid, yellowish, 4 to 8 mm. long.

Very abundant in some localities. Near the east entrance there are extensive meadows which are cut for hay that are covered almost exclusively with this sedge. The plants are large and coarse, and often form great tufts in bogs.

15. ARACEAE. Arum Family.

1. LYSICHITON Schott.

1. Lysichiton kamtschatcensis Schott. WESTERN SKUNKCABBAGE. In deep swamps at low altitudes on the west slope; flowering in spring. Alaska to Calif. and Mont.; also in eastern Asia.—Plants glabrous, succulent; leaves elliptic to lance-oblong, 30 to 50 cm. long, acute; flowers small, in a dense clublike spike, this surrounded by a large lemon-yellow corolla-like spathe.

The eastern skunkcabbage (*Spathyema foetidum*) belongs to this family. False hellebore (species of *Veratrum*) is sometimes known as skunkcabbage in the West.

16. LEMNACEAE. Duckweed Family.

1. LEMNA L. DUCKWEED.

Plants floating on water, consisting of a thallus-like frond, without leaves, each frond with a slender rootlet; flowers minute, borne on the upper side of the frond.

Frond oblong, 5 to 10 mm. long . . . . . **1. L. trisulca.**
Frond oval or rounded, 2 to 3 mm. long . . . . . **2. L. minor.**

1. Lemna trisulca L. Collected in ponds at east entrance by Umbach. Widely distributed in N. Amer., Eur., Asia, and Australia.—Plants bright green, submerged or floating, several plants usually attached to each other.

2. Lemna minor L. Collected in ponds at east entrance by Umbach. Widely distributed in N. Amer., Eur., Asia, and Australia.—Fronds floating, solitary or a few together.

17. JUNCACEAE. Rush Family.

Grasslike annual or perennial herbs, with narrow leaves; flowers small, green or brown; sepals and petals each 3, scalelike; stamens 6 or 3; fruit a 1 or 3-celled capsule, containing 3 to many seeds.

Plants glabrous; leaf sheaths open; seeds numerous . . . . . **1. JUNCUS.**
Plants hairy, at least on the edges of the leaves; leaf sheaths closed; seeds 3.
2. JUNCOIDES.

1. JUNCUS L. Rush.

Leaves flat or terete; flowers in heads, cymes, or panicles, each flower with a bract and sometimes 2 bractlets at the base; stamens 6 or 3; capsule 1 or 3-celled; seeds often with tail-like appendages at the ends.

Lowest bract of the inflorescence terete, appearing like a continuation of the stem, the inflorescence apparently lateral.
Seeds with a tail-like appendage at each end; flowers 1 to 5.
Capsule acute; lowest bract usually twice as long as the inflorescence or longer; upper leaf sheaths usually with blades . . . . . **1. J. parryi.**
Capsule obtuse or shallowly notched; bract only slightly, if at all, longer than the inflorescence; leaf sheaths without blades, merely bristle-pointed.
2. J. drummondii.
Seeds without tail-like appendages; flowers often more numerous.
Sepals and petals green or straw-colored . . . . . **3. J. filiformis.**
Sepals with a dark brown stripe on each side of the midrib . . . . . **4. J. balticus.**
Lowest bract not appearing as a continuation of the stem or, if so, channeled on the upper side.
Flowers not in heads, inserted singly on the branches of the inflorescence; leaves flat, with their faces turned to the stem.
Plants annual, branched, usually 5 to 15 cm. high; inflorescence more than half the height of the plant; capsule rounded at the apex . . . **5. J. bufonius.**
Plants perennial, simple, tufted, usually 25 to 50 cm. high; inflorescence very short, less than one-tenth the height of the plant; capsule notched at the apex . . . . . **6. J. confusus.**
Flowers in dense heads; leaves various.
Leaves compressed, inserted with one edge toward the stem.
Stamens 6; ligule of the sheath usually produced into small auricles.
7. J. saximontanus.
Stamens 3; ligule without auricles . . . . . **8. J. ensifolius.**
Leaves terete, or flat, but with one face turned toward the stem.
Leaves flat, not hollow, inserted with one face toward the stem, without cross partitions.
Seeds with tail-like appendages . . . . . **9. J. regelii.**
Seeds not appendaged . . . . . **10. J. longistylis.**
Leaves terete or channeled on the upper surface, hollow, provided inside with cross partitions.
Leaves channeled along the upper side.
Heads 2 to 5, about 6 mm. broad; sepals pale brown . . . . **11. J. alpinus.**
Head 1, 8 to 12 mm. broad; sepals very dark brown.
12. J. mertensianus.
Leaves channeled along the upper side.
Capsule 6 to 9 mm. long; stems usually leafy, about 1.5 mm. thick.
13. J. castaneus.
Capsule 3 to 5 mm. long; stems naked or leafy only at the base, less than 1 mm. thick.

Capsule notched at the apex; lowest bract at the base of the head usually prolonged into a short terete blade; sepals dark purple or dark brown. **14. J. biglumis.**

Capsule obtuse; lowest bract without a blade; sepals cream-colored in flower, in age sometimes reddish . . . . . **15. J. triglumis.**

1. Juncus parryi Engelm. Frequent above timber line, in wet meadows or on open rocky slopes. B. C. to Calif., Colo., and Mont.—Plants 10 to 35 cm. high, densely tufted; leaf sheaths loose, brown, the blades 2 to 5 cm. long; sepals brown, 5 to 7 mm. long; capsule yellowish brown, 6 to 7 mm. long.

2. Juncus drummondii E. Mey. Common above timber line, in meadows or on rocky slopes; sometimes in moist woods at middle altitudes. Alaska to Calif., N. Mex., and Alta.—Plants 10 to 35 cm. high, usually densely tufted; sheaths close, pale brown, the blades bristle-like, 3 to 10 mm. long; sepals 5 to 7 mm. long, dark brown but green along the keel; capsule obtuse, about as long as the sepals.

3. Juncus filiformis L. Sandbar at edge of Lake McDonald; abundant in sphagnum bog at Fish Lake. Wash. to Utah, Pa., and Greenl.; also in Eur. and Asia.—Plants 20 to 60 cm. high, very slender, often in dense tufts; leaves reduced to pale brown sheaths; lowest bracts of the inflorescence often longer than the stem; flowers 6 to 10, in a loose cluster; sepals 2.5 to 3.5 mm. long; capsule obovoid, very obtuse, nearly as long as the sepals.

4. Juncus balticus Willd. Frequent on the east slope at low altitudes, in marshes or wet thickets, sometimes on open slopes, often about low places on prairie. Alaska to Calif., Mo., Pa., and Lab.; also in Eur. and Asia. (*J. ater* Rydb.)—Stems slender, 20 to 60 cm. high, rising at intervals from a stout creeping rootstock; leaves reduced to loose brownish sheaths; sepals 3 to 4 mm. long, lanceolate, acute; capsule narrowly ovoid, about as long as the sepals.

5. Juncus bufonius L. TOAD RUSH. Low muddy places about east entrance. Widely distributed in N. Amer. and in the other continents.—Plants slender, much branched from the base; leaves 0.5 to 1 mm. wide; sepals 4 to 6 mm. long, green with thin white margins; capsule oblong, obtuse, shorter than the sepals.

6. Juncus confusus Coville. Occasional on the east slope at middle altitudes, in woods or on open hillsides. B. C. to N. Mex. and Nebr.—Stems very slender; leaves less than 1 mm. wide, half to two-thirds as long as the stem; sepals about 4 mm. long, green, with a narrow brown stripe on each side and with broad thin whitish margins; capsule about as long as the sepals, pale brown.

7. Juncus saximontanus A. Nels. Frequent at low altitudes, in moist or wet woods or thickets or in mossy bogs. B. C. to Calif., N. Mex., and Alta.—Stems leafy, 20 to 50 cm. high, rising from creeping rootstocks; leaves iris-like, 5 to 20 cm. long, with interior cross partitions; heads 2 to 10 (rarely only 1), usually about 1 cm. wide; sepals dark brown, about 3 mm. long; capsule obtuse, short-beaked, about as long as the sepals.

8. Juncus ensifolius Wikstr. Frequent at low and middle altitudes, in bogs or along streams and lakes. Alaska to Calif., Utah, and Alta.—Stems 30 to 60 cm. high, from thick creeping rootstocks; leaves iris-like, 5 to 30 cm. long, 3 to 6 mm. wide; heads usually 2 or more, about 1 cm. broad; sepals dark brown, 3 mm. long; capsule usually slightly longer than the sepals.

9. Juncus regelii Buchenau. Occasional on the east slope at low and middle altitudes, on wet slopes or along streams and lakes. B. C. and Wash. to Utah and Mont.—Stems leafy, 20 to 50 cm. high; leaves 5 to 20 cm. long, 1 to 3 mm. wide; heads 1 to 3; sepals 4 to 5 mm. long, green, with broad, dark brown margins; capsule very obtuse, about as long as the sepals.

10. Juncus longistylis Torr. Occasional on the east slope at low altitudes, in wet thickets. Alta. to Calif., Mex., and S. Dak.—Stems 20 to 40 cm. high, slender,

leafy; leaves 1.5 to 3 mm. wide; heads 1 to 5, 1 cm. broad or larger; sepals 5 to 6 mm. long, brown, with thin pale margins; capsule brown, obtuse, shorter than the sepals.

11. Juncus alpinus Vill. Occasional at low and middle altitudes, in wet meadows or sphagnum bogs. Alaska to Wash., Nebr., Pa., and Greenl.; also in Eur. and Asia.—Stems leafy, 15 to 30 cm. high, from stout rootstocks; leaves 0.5 to 1 mm. thick; heads 3 to 12-flowered; sepals 2 to 2.5 mm. long, obtuse; capsule brownish, slightly longer than the sepals.

12. Juncus mertensianus Bong. Abundant above and near timber line, in wet meadows or on rock slides; sometimes at middle or even low altitudes, in moist woods or along streams. Alaska to Calif., N. Mex., and Alta.—Stems 10 to 30 cm. high, from thick rootstocks; leaves about 1 mm. thick; sepals about 4 mm. long; capsule dark brown, about as long as the sepals, obtuse or shallowly notched.

13. Juncus castaneus J. E. Smith. Open rocky slope, Gunsight Pass. Alaska to N. Mex., Newf., and Greenl.; also in Eur. and Asia.—Stems stout, 10 to 30 cm. high, from creeping rootstocks; leaves 1 to 2 mm. thick, 3 to 10 cm. long; heads 1 to 3, 3 to 12-flowered; sepals brown or dark brown, 4 to 7 mm. long; capsule dark brown, acute, often twice as long as the sepals.

14. Juncus biglumis L. Open rocky slope, Gunsight Pass. Alaska to Mont. and Greenl.; also in Eur. and Asia.—Stems 2.5 to 10 cm. high, loosely tufted, very slender; leaves 2 to 5 mm. long, about 1 mm. thick; head 1, 1 to 4-flowered; sepals 3 to 3.5 mm. long; capsule longer than the sepals.

Apparently the species has not been reported before from the United States.

15. Juncus triglumis L. Iceberg Lake, in wet meadow near snow banks. Alaska to N. Mex., N. Y., and Lab.; also in Eur. and Asia.—Stems very slender, 5 to 15 cm. high, loosely tufted; leaves 1 to 5 cm. long, 0.5 to 1 mm. thick; head 1, 1 to 5-flowered; sepals 3 to 4 mm. long; capsule about as long as the sepals.

2. JUNCOIDES Adans. Woodrush.

Perennials; leaves flat, hairy on the margins, at least at the base; flowers in loose panicles or in dense spikelike clusters, each flower with bractlets at the base, these usually toothed or lobed; stamens 6; capsule 1-celled; seeds not tailed.

Flowers sessile or nearly so in headlike or spikelike clusters.
Flowers in 1 to 3 dense spikelike clusters, these nodding; sepals dark brown. **1. J. spicatum.**
Flowers in several long-stalked spikes, these forming a corymb; sepals straw-colored or pale brown . . . . . **2. J. campestre.**
Flowers, at least many of them, solitary and slender-pediceled, forming a loose panicle.
Sepals and capsule pale green; leaves thin, shining . . . . . **3. J. parviflorum.**
Sepals and capsule dark brown; leaves thick, dull.
Panicle drooping; seeds constricted at each end; sepals about 1.5 mm. long. **4. J. piperi.**
Panicle erect; seeds not constricted; sepals about 3 mm. long . . **5. J. glabratum.**

1. Juncoides spicatum (L.) Kuntze. Common above timber line in meadows or on rocky slopes; occasional at middle or even low altitudes on open slopes or in moist woods or thickets. Alaska to Calif., N. Mex., N. H., and Greenl.; also in Eur. and Asia. (*Luzula spicata* DC.)—Stems slender, tufted, 10 to 30 cm. high, with 1 to 3 leaves; leaves 1 to 6 mm. wide; inflorescence 1 to 4 cm. long; sepals with thin pale margins; capsule shorter than the perianth.

2. Juncoides campestre (L.) Kuntze. Belton, in thin dry woods. Widely distributed in N. Amer., Eur., and Asia. (*J. comosum* Sheldon; *Luzula campestris* DC.)—Stems 15 to 40 cm. high, tufted; leaves 2 to 6 mm. wide; spikes 6 to 7 mm. thick; sepals 2 to 3 mm. long; capsule nearly as long as the sepals; seeds with a pale spongy appendage at one end.

3. Juncoides parviflorum (Ehrh.) Coville. Common at middle altitudes in moist woods or thickets; sometimes on rock slides above timber line. Alaska to Calif., N. Mex., N. Y., and Greenl. (*Luzula parviflora* Desv.)—Stems solitary or tufted, 30 to 70 cm. high, with 2 to 5 leaves; leaves 3 to 10 mm. wide, bright green; flowers solitary in the panicles or 2 or 3 together; sepals 1.5 to 2 mm. long; capsule slightly longer than the sepals; seeds brown.

4. Juncoides piperi Coville. Frequent above timber line, on rocky slopes or rock slides; also at east entrance, in willow thicket. Wash. and Oreg. to Mont.—Stems 20 to 40 cm. high, densely tufted; leaves 2 to 6 mm. wide, the basal ones short, about one-fourth as long as the stem; capsule equaling or slightly longer than the sepals; seeds yellow.

5. Juncoides glabratum (Hoppe) Sheldon. Common and often abundant above or near timber line, in meadows or on rock slides. Alaska to Wash. and Mont.; also in Eur. (*Luzula glabrata* Desv.)—Stems 20 to 50 cm. high, tufted; leaves 4 to 10 mm. wide, 3 to 10 cm. long; capsule about as long as the sepals.

In some places this species is very abundant and forms extensive pure stands.

18. LILIACEAE. Lily Family.

Perennial plants, sometimes with bulbs; leaves parallel-veined; flowers large or small, with 3 sepals and 3 petals; stamens 6; fruit dry or juicy.—The cultivated lilies, hyacinths, and daffodils and many other showy plants belong to this family.

Leaves linear or nearly so, with parallel sides, many times longer than wide (hollow in one species of *Allium*); fruit dry.
- Flowers 1 to 3; petals bearded inside, yellowish white . . **13. CALOCHORTUS.**
- Flowers more than 3, often very numerous; petals not bearded.
  - Flowers in umbels; plants with an onion odor . . . . . **6. ALLIUM.**
  - Flowers in dense or slender racemes; plants never with an onion odor.
    - Petals purplish blue, about 2 cm. long . . . . . **8. QUAMASIA.**
    - Petals never blue, much less than 2 cm. long.
      - Leaves very numerous, tough, rough-edged; stems usually about a meter high . . . . . **1. XEROPHYLLUM.**
      - Leaves few, succulent and easily broken, smooth-edged; stems usually less than 50 cm. high.
        - Flowers drooping, bronze and greenish yellow . . . **2. STENANTHIUM.**
        - Flowers not drooping, white, yellowish white, or greenish white.
          - Leaves with their edges turned toward the stem; plants with rootstocks. **3. TOFIELDIA.**
          - Leaves with their sides facing the stem; plants with bulbs. **4. ZYGADENUS.**

Leaves not linear, lanceolate or broader, not more than 5 times as long as wide, the sides curved, not parallel; fruit often juicy.
- Stems not leafy.
  - Flowers yellow; fruit a dry 3-angled capsule . . . . . **7. ERYTHRONIUM.**
  - Flowers white; fruit juicy, dark blue . . . . . **9. CLINTONIA**
- Stems leafy.
  - Flower one on each stem.
    - Flowers erect, pink or white; leaves ovate . . . . . **14. TRILLIUM**
    - Flowers recurved, yellow; leaves oblong . . . . . **15. FRITILLARIA.**
  - Flowers several or numerous on each stem.
    - Flowers green; fruit dry; plants usually a meter high or more, the stems not branched . . . . . **5. VERATRUM.**

Flowers white or yellowish; fruit juicy; plants usually much less than a meter high, the stems often branched.
Flowers in racemes or panicles at the ends of the stems, white; stems not branched . . . . . **10. VAGNERA.**
Flowers solitary at the ends of the branches or solitary or clustered in the leaf axils; stems nearly always branched.
Flowers greenish white, in the axils of the leaves; leaves pale on the under side . . . . . **11. STREPTOPUS.**
Flowers yellow or greenish yellow, solitary at the ends of the branches; leaves green . . . . . **12. DISPORUM.**

1. XEROPHYLLUM Michx.

1. Xerophyllum tenax (Pursh) Nutt. BEARGRASS. Common at middle altitudes, in thin or dense woods or on open slopes; frequent in meadows just above timber line, and occasional in woods at low altitudes. B. C. to Calif. and Mont.—Plants glabrous, 0.5 to 1.5 meters high, with thick woody rootstocks, the stem simple, leafy; leaves mostly basal, narrowly linear, 20 to 40 cm. long, green above, whitish underneath; flowers creamy white, long-stalked, in dense racemes; petals 5 to 8 mm. long; fruit a small capsule.

Known also as squawgrass, basketgrass, or bearpaw; there is no apparent explanation of the name beargrass. This is with little doubt the finest and most striking flower of the park, and it receives more attention than any other. In many places, especially near timber line, it often forms great patches which are almost a solid mass of the stately plumelike racemes (see pl. 41). One of these fields is a sight long to be remembered, and one which can be found only in the mountains of the Northwest. The beargrass reaches the eastern limit of its range in Glacier Park. It is said that during some seasons only a few plants bloom, while during others flowering plants abound everywhere. The plants bloom for a long time, beginning at the lowest altitudes; in 1919 a fine patch of them was in flower just below Sperry Chalets in early September, when snow fell. When the plants begin to bloom the racemes are globose, but as flowering proceeds they elongate and the pedicels finally stand erect. The flowers have a rather strong odor, which some people consider unpleasant. The sterile plants often form dense mats on steep slopes, and the leaves are so slippery that it is difficult to climb over them. The leaves are very tough, and they have rough edges almost as sharp as a knife; they were formerly employed by some of the northwestern Indians for making baskets. The specimens of *Xerophyllum* from Glacier Park are about intermediate in size of flowers between *X. tenax* and *X. douglasii* S. Wats. It seems very doubtful whether the latter is a distinct species.

2. STENANTHIUM (A. Gray) Kunth.

1. Stenanthium occidentale A. Gray. BRONZEBELLS. Frequent, but seldom very abundant, at nearly all altitudes; on open slopes, in woods, or in alpine meadows; seen on the west slope only at high altitudes. B. C. to Oreg., Mont., and Alta. (*Stenanthella occidentalis* Rydb.)—Plants 20 to 50 cm. high, glabrous, with bulbs; leaves linear or oblanceolate, usually 10 to 20 cm. long; flowers drooping, in racemes or panicles, pale yellow within, greenish yellow or more often bronze outside; petals about 1 cm. long, their tips spreading or recurved; capsule about 2 cm. long.

The plant is inconspicuous and often hidden among grasses or sedges. It grows usually in moist places, but plants were found on dry open slopes at the east entrance. Plants collected in a deep swamp had leaves as much as 4.5 cm. wide. The flowers have a characteristic spicy odor.

3. TOFIELDIA Huds. Bog-asphodel.

Plants with short rootstocks; leaves linear; flowers small, white, in dense recemes, each flower with 3 bractlets at the base of the calyx; petals without glands, persisting on the fruit; fruit a many-seeded capsule.

Stem very sticky above with short gland-tipped hairs; flower stem leafy. **1. T. intermedia.**

Stem glabrous; flower stem naked . . . . . **2. T. palustris.**

1. Tofieldia intermedia Rydb. Large bog-asphodel. Abundant in wet meadows and along brooks above timber line; occasionally found in cool wet places at lower altitudes. Alaska to Calif., Wyo., and Sask.—Stems 10 to 30 cm. high, often tinged with purple; leaves 5 to 20 cm. long, 2 to 5 mm. wide; petals 4 to 5 mm. long; capsule 5 mm. long.

Some plants in exposed places are only 2.5 to 5 cm. high. Bog-asphodel is conspicuous in flower, or when bearing its showy purplish capsules.

2. Tofieldia palustris Huds. Small bog-asphodel. Frequent about Gunsight Pass, in rocky places along brooks. Alaska, B. C., and Mont. to Minn., Que., and Greenl.; also in Eur.—Stems 4 to 15 cm. high; leaves all at the base of the stem, 2 to 10 cm. long.

Rydberg, in the Flora of the Rocky Mountains, apparently does not report this species from the western United States, but it has been reported from Glacier Park previously by Jones.

4. ZYGADENUS Michx.

Plants glabrous, with bulbs; leaves linear, mostly basal; flowers in racemes or panicles, stalked; petals and sepals each with a gland at the base; fruit a capsule.

Petals 6 to 8 mm. long . . . . . **1. Z. elegans.**

Petals 4 to 5 mm. long . . . . . **2. Z. paniculatus.**

1. Zygadenus elegans Pursh. Poison camas. Common, especially at high and middle altitudes; apparently rather scarce on the west slope; in woods, bogs, or moist meadows, sometimes on rock slides. Alaska to Nev., N. Mex., and N. Dak. (*Z. alpinus* Blankinship; *Anticlea alpina* Heller; *A. elegans* Rydb.)—Plants usually 10 to 40 cm. high, often forming dense clumps, the stems naked or leafy only at the base; leaves 6 to 25 cm. long; flowers greenish white or pale greenish yellow, in racemes or panicles.

The plants are poisonous to stock. They are most abundant above timber line. Plants of alpine localities (*Z. alpinus* Blankinship) are not as tall as those of low altitudes, and their flowers are often slightly smaller, but they grade insensibly into the larger form. Plants growing along the creek at St. Mary were 90 cm. high and had remarkably large panicles. The petals and sepals persist in fruit.

2. Zygadenus paniculatus (Nutt.) S. Wats. Death camas. Collected on plains at east entrance by Umbach. Wash. to Calif., N. Mex., and Mont. (*Toxicoscordion paniculatum* Rydb.)—Plants 30 to 60 cm. high; leaves 20 to 40 cm. long, 5 to 10 mm. wide; flowers in racemes or panicles, yellowish white.

The plant is poisonous if eaten.

5. VERATRUM L.

1. Veratrum viride Ait. False hellebore. Common at nearly all altitudes, in woods or on open slopes. B. C. to Oreg. and Mont. (*V. eschscholtzianum* Rydb.)—Stems 1 to 2 meters high, from thick rootstocks, somewhat hairy; leaves numerous, 10 to 30 cm. long, oblong to oval, sessile and sheathing at the base, with numerous conspicuous parallel veins; flowers panicled, the branches of the panicle drooping; petals 8 to 10 mm. long, without glands.

A very conspicuous plant, in the Rocky Mountain region sometimes erroneously known as skunkcabbage. In 1919 very few individuals were seen in flower. The

leaves are often badly eaten by insects. The plant is said to be poisonous to stock. The powdered roots of some species of *Veratrum* are used in insect powder, but the drug hellebore is obtained from a plant of the buttercup family. Small pieces of the dried roots of false hellebore were snuffed up the nose by the Blackfoot Indians as a remedy for headache.

6. ALLIUM L. Onion.

Plants glabrous, from bulbs, with a characteristic odor; flowers in umbels, the umbel with thin papery bracts at the base; fruit a small capsule.—The cultivated onions, garlic, and leek belong to the genus.

Leaves hollow; petals about 1 cm. long . . . . . 1. **A. sibiricum.**
Leaves flat, not hollow; petals 4 to 6 mm. long.
Flowers all or mostly replaced by bulblets . . . . . 2. **A. fibrosum.**
Flowers not replaced by bulblets.
Umbel recurved; outer bulb coats not separating into fibers . . . 3. **A. cernuum.**
Umbel erect; outer bulb coats separating into fibers . . . . . 4. **A. nuttallii.**

1. Allium sibiricum L. Purple onion. Frequent at middle altitudes and just above timber line; occasionally found at low altitudes, in moist meadows or in woods. Alaska to Oreg., Colo., N. Y., and Me.—Plants 30 to 60 cm. high; leaves 10 to 20 cm. long; flowers rose-colored or purplish pink, in large dense umbels.

A very handsome plant, often forming dense patches. As in other species, the sepals and petals persist in fruit. The bulbs have an extremely hot taste.

2. Allium fibrosum Rydb. On the east slope at low and middle altitudes, on open hillsides or in aspen woods; rare. Idaho, Mont., and Wyo.—Plants 20 to 30 cm. high, slender; bulbs with fibrous coats; petals 6 to 7 mm. long, but all or most of the flowers replaced by small bulbs.

3. Allium cernuum Roth. Nodding onion. Common at nearly all altitudes, in woods or thickets or on open slopes or rock slides. B. C. to N. Mex., W. Va., and N. Y. (*A. recurvatum* Rydb.)—Plants 30 to 60 cm. high, often in clumps; leaves 10 to 20 cm. long, 2 to 5 mm. wide; petals pale or deep pink, 5 mm. long, obtuse.

The Blackfoot Indians ate the bulbs raw, and used them for flavoring soups, etc.

4. Allium nuttallii S. Wats. Dry open hillside near foot of Sherburne Lake. Idaho to Ariz., Kans., and S. Dak.—Plants 10 to 30 cm. high, from large bulbs; leaves 10 to 15 cm. long, 2 to 3 mm. wide; petals 4 to 6 mm. long, acute, pink or white.

7. ERYTHRONIUM L.

1. Erythronium grandiflorum Pursh. Glacier lily. Common nearly everywhere on the east slope in open places or on brushy hillsides; on the west slope found chiefly at middle and high altitudes. B. C. and Wash. to Wyo. and Mont.—Plants glabrous, with bulbs; stems 20 to 40 cm. high, 1 to 5-flowered; leaves lanceolate to oval, sharp-pointed, 10 to 20 cm. long; petals yellow, 3 to 5 cm. long; fruit a 3-angled capsule, 3 to 4 cm. long.

Sometimes known as adder's-tongue or dog-tooth violet. Few flowers of the park attract as much attention as this, and few are as showy. Tourists get the impression that the plant grows only above timber line, for this is the only place where it is in flower during the tourist season, but in early spring the plant is common on the foothills of the east slope. It may be found in blossom all summer at high altitudes, the plants coming into flower very promptly as the snow melts; indeed, they are in bloom right up to the edges of the snow banks. The finest and most persistent display of the flowers in summer is at Iceberg Lake, but they are found in most similar situations. The petals usually hang on the flower for some time after they have withered. The bulbs are dug and eaten by bears. Specimens of *Erythronium* from Glacier Park have been determined as *E. obtusatum* Goodding, but they do not appear essentially different from typical *E. grandiflorum*.

8. QUAMASIA Raf.

1. Quamasia quamash (Pursh) Coville. CAMAS. Frequent at low altitudes, in woods, swamps, bogs, or meadows. B. C. to Calif., Utah, and Mont.—Plants glabrous, 30 to 60 cm. high, from bulbs; leaves basal, linear, 20 to 40 cm. long; flowers deep purplish blue, in loose racemes; petals about 2 cm. long, narrow; capsule 3-angled, 1 to 1.5 cm. long.

The word "camas" is much used in the geographic names of the region. The bulbs were formerly employed for food by the Indians of the Northwest. The Blackfoot Indians usually dug them in early or late summer after the flowers had fallen. The bulbs were baked by placing them in a deep hole in the ground with leaves and grass and heated stones, and above them a fire was kept burning. It is said that two days and nights were necessary for cooking them thoroughly.

9. CLINTONIA Raf.

1. Clintonia uniflora (Schult.) Kunth. QUEENCUP. PLATE 46, B. Common and often abundant at low and middle altitudes; usually in deep moist woods, but sometimes in open places. Alaska to Calif. and Mont.—Plants from slender creeping rootstocks; stem naked, 1 or rarely 2-flowered; leaves 2 to 5, usually 3, oblanceolate, 10 to 20 cm. long, with long scattered hairs; flowers pure white, about 2 cm. broad; fruit subglobose, nearly 1 cm. long, deep Prussian blue.

One of the handsomest flowers of the region. The plants often form great mats of dark green leaves, which are thickly studded with the starlike flowers. The fruit, too, is handsome, and particularly striking because of its unusual color; it is nearly flavorless, and falls from the stalk easily. The flowers, unfortunately, last only a short time, and most of them have disappeared by midsummer.

10. VAGNERA Adans. FALSE SOLOMON'S-SEAL.

Plants with rootstocks and with simple leafy stems; leaves broad, conspicuously parallel-veined; flowers small, white or yellowish white; fruit a globose berry.

Flowers in simple racemes.

Leaves usually folded, pale, ascending; flowers short-stalked . . . . **1. V. stellata.**

Leaves flat, green, spreading; flowers long-stalked . . . . . **2. V. sessilifolia.**

Flowers in panicles.

Leaves clasping, acute . . . . . **3. V. amplexicaulis.**

Leaves contracted at the base into a short narrow petiole, long-pointed. **4. V. racemosa.**

1. Vagnera stellata (L.) Morong. STAR SOLOMON'S-SEAL. Frequent, especially on the east slope, at low and middle altitudes, in swamps or moist woods. Alaska to Colo., Va., and Newf. (*Smilacina stellata* Desf.)—Plants 15 to 50 cm. high; leaves lance-oblong, 2 to 8 cm. long, sessile, minutely hairy beneath; petals 3 to 5 mm. long; fruit green, with 3 dark stripes, turning black.

2. Vagnera sessilifolia (Nutt.) Greene. Common at low and middle altitudes, in moist woods or thickets. Yukon to Calif., Wyo., and Mont. (*Smilacina sessilifolia* Nutt.)—Stems 20 to 50 cm. high; leaves narrowly or broadly lanceolate, 5 to 12 cm. long, minutely hairy beneath; petals 6 mm. long; fruit 5 to 8 mm. in diameter, red when ripe.

This is closely related to *V. stellata*, and it is rather doubtful whether it is a distinct species.

3. Vagnera amplexicaulis (Nutt.) Morong. Common on the east slope at low and middle altitudes, in moist woods or sometimes on open slopes. B. C. to Calif., N. Mex., and Alta. (*Smilacina amplexicaulis* Nutt.)—Plants 25 to 60 cm. high, finely hairy; leaves mostly ovate, 6 to 15 cm. long, green and often shining; petals 2 mm. long; fruit 5 to 6 mm. in diameter, at first green with dark red or purple dots, becoming red.

The plants often form dense patches.

4. Vagnera racemosa (L.) Morong. Occasional at low and middle altitudes, in moist woods or thickets. B. C. to Colo., Ga., and N. S. (*Smilacina racemosa* Desf.)—Plants 30 to 60 cm. high, finely hairy; leaves ovate or lanceolate, 6 to 12 cm. long, green; petals 2 mm. long; fruit similar to that of *V. amplexicaulis*.

11. STREPTOPUS Michx.

1. Streptopus amplexifolius (L.) DC. TWISTED-STALK. Common everywhere in moist or wet woods or thickets; frequent about bushes above timber line. Alaska to Oreg., N. Mex., N. C., and Greenl.; also in Eur.—Plants glabrous, 30 to 100 cm. high, from rootstocks; stems branched; leaves ovate, 5 to 12 cm. long, clasping, conspicuously parallel-veined; petals 8 to 12 mm. long, greenish white, with spreading tips; fruit bright red, oval, 1 to 1.5 cm. long.

When in flower the plant is not conspicuous, but when loaded with the handsome fruit it is very striking. The fruits are pendent below the leaves on slender stalks, and they are most conspicuous on slopes above the trails, where they are not hidden by the leaves. The slender flower stalks are abruptly bent, hence the name "twisted-stalk." The stems are commonly branched, but plants above timber line frequently have simple stems. The fruit is insipid and inedible. The leaves turn pale yellow in autumn.

12. DISPORUM Salisb. FAIRYBELLS.

Plants branched, with rootstocks, finely hairy; leaves ovate-lanceolate to oval, sharp-pointed, 3 to 10 cm. long, conspicuously parallel-veined, sessile or clasping; flowers yellowish white, 1 to 1.5 cm. long; fruit juicy.

Fruit usually broader than long, somewhat lobed, roughened with fine wartlike projections; stigma 3-parted . . . . . **1. D. trachycarpum.**
Fruit longer than broad, not lobed, narrowed to each end, smooth; stigma not parted. **2. D. oreganum.**

1. Disporum trachycarpum S. Wats. ROUGH FAIRYBELLS. Common in moist or wet woods and thickets at low and middle altitudes. B. C. to Man., N. Mex., and Ariz.—Plants 30 to 60 cm. high, with few branches; fruit about 1 cm. thick.

The fruit is short-stalked and hidden beneath the leaves; at first it is yellow but it soon turns orange and then deep red. When ripe it is very handsome, with a velvety appearance, and suggests a strawberry.

2. Disporum oreganum (S. Wats.) W. Mill. SMOOTH FAIRYBELLS. Frequent in the same situations as the last species. B. C. to Calif. and Mont.—Much like the last species except in form of fruit, the two usually growing together and equally common; fruit about 1 cm. long, usually somewhat shining, turning lemon-yellow and finally orange-red.

The fruit is scarcely as handsome as that of *D. trachycarpum*. In both species it is nearly flavorless.

13. CALOCHORTUS Pursh.

1. Calochortus elegans Lindl. MARIPOSA LILY. Frequent on open slopes, in meadows, or sometimes in woods, at nearly all elevations. Wash. to Calif., Utah, and Mont.—Plants glabrous, 10 to 20 cm. high, from bulbs; leaf one, 10 to 20 cm. long, 2 to 10 mm. wide; petals 12 to 20 mm. long and nearly as broad, much larger than the sepals, with a gland inside near the base; fruit a 3-angled capsule about 2 cm. long.

The flowers open early in the season and do not last long. The plants are usually scattered among grasses, and the delicate flowers suggest butterflies hovering over the meadows, a fact which doubtless suggested to the Spanish settlers of California the name "mariposa" (the Spanish word for butterfly). The species of *Calochortus* are most abundant on the Pacific coast; many of them are in cultivation.

14. TRILLIUM L.

1. **Trillium ovatum** Pursh. WAKE-ROBIN. Frequent on the west slope at low and middle altitudes, in moist woods or in swamps. B. C. to Calif., Colo., and Mont.—Plants 20 to 40 cm. high, glabrous, with rootstocks; leaves broadly ovate, 7 to 12 cm. long, sharp-pointed; flower long-stalked, the 3 petals pink or white, turning purplish; fruit a juicy berry.

In late summer the leaves turn pale and wither.

15. FRITILLARIA L.

1. **Fritillaria pudica** (Pursh) Spreng. YELLOW-BELL. East entrance, *Mrs. Otto Thompson*. B. C. to Calif., Utah, and Mont. (*Ochrocodon pudicus* Rydb.).—Plants glabrous, 10 to 30 cm. high, from scaly buds; leaves 3 to 10 cm. long, blunt; flowers 12 to 20 mm. long; capsule 3 to 4 cm. long.

The plant flowers in spring.

19. IRIDACEAE. Iris Family.

Perennial herbs with rootstocks; leaves narrow, their edges turned toward the stem; sepals and petals each 3, colored; stamens 3; fruit a capsule.

Flowers 10 to 12 mm. long, the sepals and petals alike; leaves 1 to 3 mm. wide. **1. SISYRINCHIUM.**

Flowers 6 to 8 cm. long, the sepals and petals very unlike; leaves 5 to 10 mm. wide. **2. IRIS.**

1. SISYRINCHIUM L.

1. **Sisyrinchium mucronatum** Michx. BLUE-EYED GRASS. A few plants found near a snow bank on Altyn Peak, and in a wet meadow below Lake McDermott. Alta. and Mont. to Md. and Ont.—Plants grasslike, 10 to 30 cm. high, glabrous, the stem leafy, narrowly winged; flowers few, purplish blue; capsule globose.

2. IRIS L.

1. **Iris missouriensis** Nutt. BLUE FLAG. Among aspens and in low places on the prairie near the east entrance. B. C. to Calif., N. Mex., and N. Dak.—Plants glabrous, 20 to 40 cm. high; leaves 10 to 40 cm. long, sharp-pointed, sword-shaped; flowers few, pale blue, the sepals recurved, the petals erect; capsule about 4 cm. long, 6-ridged.

A very handsome plant which, unfortunately, probably does not grow within the limits of the park.

20. ORCHIDACEAE. Orchis Family.

Perennial herbs, more or less succulent; leaves entire; flowers solitary or in spikes or racemes, very irregular; sepals 3; petals 3, the 2 lateral ones alike, the middle one (lip) usually very different, sometimes with a long or short spur at the base; stamens 3, but 1 or 2 of them abortive; fruit a capsule, containing very numerous small seeds.—All of our species grow upon the ground.

Plants without any green coloring; leaves all reduced to bracts. **1. CORALLORHIZA.**

Plants green; leaves present.

Leaves 2, opposite at about the middle of the stem . . . . . **2. OPHRYS.**

Leaves 1 to many, some or all of them at the base of the stem, the stem leaves alternate.

Lip petal 15 to 20 mm. long.

Leaf 1, at the base of the stem . . . . . **3. CYTHEREA.**

Leaves numerous, scattered along the stem . . . . . **4. SERAPIAS.**

Lip petal 10 mm. long or usually shorter; leaves 1 to many.
Flower stem finely hairy, especially above, with gland-tipped hairs; leaves green blotched with silvery white, forming a flat rosette at the base of the stem . . . . . **5. PERAMIUM.**
Flower stems glabrous; leaves not blotched, not in a rosette.
Flower spikes twisted, the flowers in 3 longitudinal rows . . . **6. IBIDIUM.**
Flower spikes not twisted, the flowers not in rows . . . . **7. HABENARIA.**

1. CORALLORHIZA R. Br. Coralroot.

Plants glabrous, purplish or yellowish, with coral-like roots; leaves reduced to scales; flowers in spikes; lip with 2 lobes or teeth below the middle, the spur very small.

Lip yellowish or whitish, not spotted; plants yellowish . . . . . **1. C. innata.**
Lip purple or with purple spots; plants purplish.
Lip purple; stamen column nearly as long as the petals . . . . . **2. C. mertensiana.**
Lip white with purple spots; column half as long as the petals . . **3. C. multiflora.**

1. Corallorhiza innata R. Br. Woods at east entrance, *Umbach*. Alaska to Colo., Ga., and N. S.; also in Eur. (*C. corallorrhiza* Karst.)—Stems 10 to 30 cm. high, 3 to 12-flowered; flowers greenish yellow, about 1 cm. long; spur very small; capsule 8 to 12 mm. long.

2. Corallorhiza mertensiana Bong. Occasional at middle altitudes, in deep woods. Alaska to Calif. and Mont.—Plants 20 to 40 cm. high, stout, often in small colonies; flowers 10 to 20, the spur conspicuous; capsule 1.5 to 2 cm. long.

3. Corallorhiza multiflora Nutt. Occasional in deep moist woods at low and middle altitudes. Alaska to Calif., Fla., and N. S.—Plants stout, 20 to 50 cm. high; flowers 10 to 30, about 1.5 cm. long; capsule 1.5 to 2 cm. long.

2. OPHRYS L. Twayblade.

Plants low, with rootstocks; leaves 2, large and broad, opposite near the middle of the stem; flowers small, in slender racemes.

Lip narrow, deeply cleft, the lobes acute, linear-lanceolate; leaves as broad as long . . . . . **1. O. cordata.**
Lip notched at the apex, the short lobes rounded; leaves usually longer than broad.
Lips about 5 mm. long, not clawed . . . . . **2. O. caurina.**
Lip 8 to 9 mm. long, short-clawed . . . . . **3. O. convallarioides.**

1. Ophrys cordata L. Heartleaf twayblade. Frequent on the east slope at middle or low altitudes, in deep moist woods. Alaska to Oreg., N. Mex., Mich., N. J., and Lab.; also in Eur. and Asia. (*O. nephrophylla* Rydb.; *Listera cordata* R. Br.)—Stems 10 to 20 cm. high, glabrous or minutely pubescent above; leaves rounded-reniform, 2 to 4 cm. wide; flowers green, the lip 4 to 5 mm. long.

2. Ophrys caurina (Piper) Rydb. Small twayblade. Frequent on the east slope at middle altitudes, in deep moist woods. B. C. to Oreg. and Mont. (*Listera caurina* Piper.)—Stems 10 to 20 cm. high, finely glandular-hairy above; leaves rounded to broadly ovate, 3 to 6 cm. long, sometimes acutish; flowers greenish.

3. Ophrys convallarioides (Swartz) W. F. Wight. Large twayblade. Common at low and middle altitudes, in bogs, swamps, or deep moist woods. Alaska to Calif., Mich., Vt., and N. S. (*Listera convallarioides* Torr.)—Stems slender, 10 to 25 cm. high, finely glandular-hairy above; leaves rounded or oval, 3 to 5 cm. long, obtuse or rounded at the apex; flowers pale green.

3. CYTHEREA Salisb.

1. Cytherea bulbosa (L.) House. CALYPSO. Occasional at low altitudes in moist woods. Alaska to Calif., N. Mex., Mich., Me., and Lab. (*Calypso bulbosa* Oakes.)—Plants glabrous, the stem naked, 5 to 15 cm. high, from a bulblike base; leaf 1, rounded, 2 to 5 cm. long; flowers variegated, the sepals and petals 10 to 15 mm. long, magenta, the lip 15 to 20 mm. long, yellow-hairy within.

Sometimes known as Venus'-slipper. The plants flower early in the season.

4. SERAPIAS L.

1. Serapias gigantea (Dougl.) A. A. Eaton. HELLEBORINE. Collected by Vreeland in meadow near Lake McDonald. B. C. to Calif., Tex., and Mont. (*Epipactis gigantea* Dougl.)—Stem very leafy, from a rootstock, 30 to 70 cm. high, nearly glabrous; leaves ovate to narrowly lanceolate, 5 to 15 cm. long, with numerous conspicuous parallel veins; flowers 3 to 10, in a leafy raceme, greenish, with purple veins; lip 1.5 to 1.8 cm. long, not spurred; capsule 1.5 cm. long.

5. PERAMIUM Salisb.

1. Peramium decipiens (Hook.) Piper. RATTLESNAKE-PLANTAIN. Frequent at low and middle altitudes, in deep woods. Alaska to Calif., N. Mex., N. H., and Que.—Stems 20 to 40 cm. high, covered above with fine glandular hairs; leaves mostly at the base of the stem, forming a rosette or sometimes erect, lance-ovate, 4 to 6 cm. long, sharp-pointed, blotched with pale green; flowers 7 to 9 mm. long, greenish white, in a one-sided spike.

The dead stems often persist for one or two years.

6. IBIDIUM Salisb.

1. Ibidium romanzoffianum (Cham.) House. LADY'S-TRESSES. PLATE 47, B. Occasional on the east slope at low altitudes, in wet thickets; in sphagnum bogs on the west slope. Alaska to Calif., N. Mex., Pa., and Newf. (*I. strictum* House; *Spiranthes romanzoffiana* Cham.)—Plants stout, glabrous, 15 to 30 cm. high, from fleshy roots, the stems leafy; leaves linear, 5 to 15 cm. long; flowers 6 to 8 mm. long, in dense 3-angled spikes, white, sweet-scented; lip not spurred.

7. HABENARIA Willd. BOG-ORCHIS.

Plants glabrous, with 1 to many leaves, the roots fleshy; flowers green or white, in racemes.

Leaves 1 or 2, at the base of the stem.
- Leaf 1; spur about as long as the lip . . . . . **1. H. obtusata.**
- Leaves 2; spur twice as long as the lip or longer . . . . . **2. H. orbiculata.**

Leaves several or numerous, always more than 2.
- Lip 3-toothed at the apex . . . . . **3. H. bracteata.**
- Lip entire.
  - Leaves all at or near the base of the stem, usually withering before the opening of the flowers . . . . . **4. H. unalaschensis.**
  - Leaves scattered along the stem, remaining green.
    - Flowers white; lip broadened at the base . . . . . **5. H. dilatata.**
    - Flowers green; lip linear.
      - Spur sacklike, much shorter than the lip . . . . . **6. H. stricta.**
      - Spur slender, nearly as long as the lip . . . . . **7. H. sparsiflora.**

1. Habenaria obtusata (Pursh) Richards. ONE-LEAF BOG-ORCHIS. Found only on mossy banks in wet woods along Swiftcurrent Creek just below Lake McDermott. Alaska to Colo., N. Y., and Newf. (*Lysiella obtusata* Rydb.)—Stems 10 to 20 cm. high, slender; leaf obovate, 5 to 10 cm. long, obtuse; spike loosely flowered, 2 to 5 cm. long,

the flowers greenish, 1 cm. long; lip linear-lanceolate, entire; spur slender, longer than the lip.

2. Habenaria orbiculata (Pursh) Torr. TWO-LEAF BOG-ORCHIS. Occasional on the west slope at low altitudes, in deep moist woods, the plants mostly solitary and scattered. B. C. and Wash. to Minn., N. C., and Newf. (*Lysias orbiculata* Rydb.)—Stems 30 to 50 cm. high, stout; leaves rounded or oval, 8 to 15 cm. long, rounded at the apex; flowers greenish, in a loose raceme; lip linear, 12 to 15 mm. long.

3. Habenaria bracteata (Willd.) R. Br. Wet woods at east entrance, *Umbach;* Duck Lake, *Weller.* B. C. to N. Mex., N. C., and N. B.; also in Asia. (*Coeloglossum bracteatum* Parl.)—Stems stout, 15 to 50 cm. high, very leafy; leaves oval to lanceolate, obtuse or acute, 5 to 12 cm. long; raceme dense, leafy-bracted; flowers greenish; lip 6 to 8 mm. long, the spur less than half as long.

4. Habenaria unalaschensis (Spreng.) S. Wats. WOOD-ORCHIS. Open brushy slopes or in woods, about the foot of Lake McDermott. Alaska to Calif., Colo., and Mont. (*Piperia unalaschensis* Rydb.)—Stems slender, 20 to 40 cm. high; leaves oblanceolate, 6 to 15 cm. long, the stem bracted above; flowers numerous, in a long loose spike, greenish white, 8 to 10 mm. long; lip oblong, slightly shorter than the spur.

5. Habenaria dilatata (Pursh) Hook. WHITE BOG-ORCHIS. Common at nearly all altitudes, in wet woods or thickets, in bogs, or on moist open slopes. Alaska to Calif., N. Mex., Nebr., N. Y., and Lab. (*Limnorchis dilatata* Rydb.)—Stems stout, 20 to 70 cm. high, hollow, very leafy; leaves mostly lanceolate, 6 to 20 cm. long, obtuse or acute; spikes long and dense; flowers about 1.5 cm. long, very fragrant.

A handsome plant, abundant in many places, and blooming for a long time.

6. Habenaria stricta (Lindl.) S. Wats. GREEN BOG-ORCHIS. Common at nearly all altitudes, in bogs, wet woods, or thickets, or on wet open slopes. Alaska to N. Mex. and Alta. (*Limnorchis stricta* Rydb.; *L. viridiflora* Rydb.)—Stems stout or slender, 20 to 80 cm. high; leaves mostly lanceolate or oblanceolate, 5 to 12 cm. long, obtuse or acute; spikes usually long and loose; flowers green, odorless, 12 to 14 mm. long.

7. Habenaria sparsiflora S. Wats. A few plants at Belton, in sandy thicket along river. Oreg. to Mont., N. Mex., and Calif. (*Limnorchis ensifolia* Rydb.; *L. laxiflora* Rydb.)—Stems 30 to 40 cm. high, leafy; leaves lanceolate or oblanceolate, 8 to 12 cm. long; flowers about 12 mm. long, greenish.

21. SALICACEAE. Willow Family.

Trees or shrubs; leaves alternate, entire or toothed, with stipules; flowers small, greenish, in catkins, the staminate and pistillate flowers on separate plants; sepals and petals none, represented only by a disk or by glands; fruit a capsule; seeds each with a tuft of white hairs.

Bractlets of the catkins lobed; stamens usually more than 10; leaves ovate to rounded . . . . . **1. POPULUS.**

Bractlets entire or minutely toothed; stamens usually 2, sometimes as many as 7; leaves usually narrow. . . . . **2. SALIX.**

1. POPULUS L.

Large or small trees, or sometimes shrubs; buds usually resinous; flowers appearing in early spring.

Petioles flattened; leaves about as broad as long; bark smooth . . **1. P. tremuloides.**

Petioles not flattened; leaves longer than broad; bark furrowed, at least on mature trees.

Capsule hairy . . . . . **2. P. trichocarpa.**

Capsule glabrous . . . . . **3. P. hastata.**

1. Populus tremuloides Michx. ASPEN. Common at low altitudes, usually forming dense pure stands. Alaska to Mex., Tenn., and Newf.—Slender small tree, or often only a shrub; bark thin, smooth, whitish or pale green; leaves slender-petioled, rounded, 2 to 5 cm. long, glabrous, pale green, finely toothed.

Known also as quaking aspen and often locally as "quaking asp." The leaves are often deformed by galls; in autumn they turn yellow. The aspen is very abundant along the automobile road on the east side of the park, often in dense stands, but it does not extend far up the slopes. In exposed places the plants are shrubby and often prostrate, probably as a result of heavy snowfall. Aspens seem to be absent about the head of Lake McDonald, but they are abundant about Belton. According to the writer's experience—and his observations have been confirmed by those of other persons—this tree is seldom found in fruit. If a cut is made in the smooth bark a scar is formed which remains throughout the life of the tree, but in Glacier Park visitors seem unaware of the possibility of leaving a permanent record of their visit upon the aspen trunks, and very few trees thus disfigured were noticed. In New Mexico the writer has often marveled at the great number of trees upon which people have cut their names or initials with dates and various designs. There, even in the most remote places, often almost every tree is thus marked, until one wonders if the whole population has conducted a concerted campaign for the purpose. Trees are often found upon which the inscriptions are 30 years old or more.

The aspen is one of the first trees to spring up on burned or cut-over areas, and it is thus important in reforestation. The reason for its rapid appearance in such places is, of course, the form of the seeds, which are scattered by the wind. The wide dissemination of the tree perhaps indicates that seeds are borne in greater profusion than casual observations would indicate. Aspen wood is useful for making paper.

2. Populus trichocarpa Torr. & Gray. BLACK COTTONWOOD. Common on the east slope, at low altitudes, usually along streams. Alaska to Calif. and Mont.—Large or small tree; bark on young trees and on younger branches smooth and resembling that of the aspen, on old trunks deeply furrowed, white, with a soft chalky appearance, in old age sometimes blackish; leaves slender-petioled, broadly ovate to lance-ovate, 6 to 12 cm. long (on sprouts often much larger), acute, finely toothed, green on the upper surface, pale beneath, usually hairy when young but soon glabrous.

3. Populus hastata Dode. WESTERN BALSAM POPLAR. Common on the west slope at low altitudes, along water or in woods. Idaho, Mont., and Alta.—Like *P. trichocarpa*, and differing only in the glabrous fruit.

It seems rather doubtful whether this is a distinct species. The writer is unable to give any information concerning the distribution and relative abundance of these two species (if they are species) in the park. It was taken for granted that only one species was represented until study of the collections in Washington revealed the presence of two. When the writer visited the park, the fruiting catkins had all fallen, but they were found, of course, under the trees. With leaf specimens alone it is impossible to determine which species is represented. Only two specimens of fruit were secured; one from the east entrance is *P. trichocarpa*, and one from Lake McDonald is *P. hastata*. Whether one species is confined to the east and one to the west slope, or whether the two grow together, it is impossible to say without further field study.

The cottonwoods are usually associated with other trees, especially aspens, but sometimes they form small pure stands. The trees on the west slope are often thickly covered with lichens. Some trees have leaves almost as narrow as those of *P. angustifolia*, and the leaves of small seedlings appear to be narrow always. Cottonwoods seem to have great vitality, and the writer noticed some logs that had been cut at least a year before which were sending out sprouts.

2. SALIX L. Willow.

(Contributed by Mr. C. R. Ball.)

Plants perennial, low and spreading to taller and erect, shrubs or small trees; bark bitter; bud scales single; leaves alternate, usually with stipules; flowers of the two sexes on different plants, in sessile or leafy-peduncled catkins, appearing before or with or after the leaves; flower scales yellow, brown, or black, entire or occasionally shallowly toothed at apex; fruit a dry, glabrous or pubescent capsule, lanceolate to lanceolate-ovoid, of 2 valves recurving at maturity; seeds minute, with a dense tuft of long silky hairs at the base; stamens usually 2 (3 to 8 in Nos. 1, 2, and 3).

Scales pale yellow, deciduous. Styles about 0.3 to 0.5 mm. long; leaves linear-lanceolate to broadly lanceolate, more than 5 cm. long.
- Leaves closely and finely toothed; petioles distinct; catkins solitary; stamens 3 to 8.
  - Petioles glandular at upper end; capsules 6 to 9 mm. long.
    - Flowers in early summer; leaves green beneath . . . . . **1. S. caudata.**
    - Flowers in late summer; leaves white beneath . . . . . **2. S. serissima.**
  - Petioles never glandular; capsules 4 to 5 mm. long . . . . . **3. S. amygdaloides.**
- Leaves remotely and irregularly toothed; petioles gradually merging into leaf blades; catkins often in pairs; stamens 2.
  - Leaves linear, light green or gray-green; teeth few to numerous, long, slender, sharp; capsules short-pediceled . . . . . **4. S. interior.**
  - Leaves narrowly elliptic, dark green; capsules sessile or subsessile. **5. S. melanopsis.**

Scales brownish, at least at the tip (yellow in Nos. 13, 14, and 20, but then persistent, and the leaves and capsules hairy).
- Capsules glabrous. Catkins appearing with the leaves.
  - Leaves lanceolate or oblanceolate, acuminate, glabrous; styles about 0.5 mm. long.
    - Leaves glaucous beneath.
      - Leaves 2 to 5 cm. long; pedicels 1 mm. long . . . . . **6. S. farrae.**
      - Leaves mostly 5 to 7 cm. long; pedicels 2 to 4 mm. long **7. S. mackenziana.**
    - Leaves green beneath . . . . . **8. S. pseudomyrsinites.**
  - Leaves elliptic-lanceolate or oval-lanceolate to oval, acute or obtuse; styles 1 to 2 mm. long.
    - Leaves glabrous. Catkins nearly sessile . . . . . **9. S. pseudomonticola.**
    - Leaves tomentose.
      - Catkins on leafy peduncles; styles about 1 mm. long . . **10. S. commutata.**
      - Catkins sessile; styles about 2 mm. long . . . . . **11. S. barrattiana.**
- Capsules hairy.
  - Styles elongate, 1 to 1.5 mm. long.
    - Leaves more or less woolly on both sides.
      - Plants ascending or erect, 0.2 to 2 meters high.
        - Styles 1.5 to 2.5 mm. long; catkins large, sessile . . . . **11. S. barrattiana.**
        - Styles 1 to 1.5 mm. long; catkins leafy-peduncled.
          - Leaves linear-oblong, 4 to 10 cm. long, white-woolly on both sides. **12. S. candida.**
          - Leaves elliptic or elliptic-oblong, 2 to 6 cm. long.
            - Catkins 1 to 1.5 cm. long; leaves and twigs yellow-woolly. **13. S. brachycarpa.**
            - Catkins 1.5 to 5 cm. long; leaves gray-woolly, glaucous beneath. **14. S. glaucops glabrescens.**

Plants low, creeping, alpine, less than 10 cm. high.
Leaves pale beneath . . . . . **15. S. petrophila.**
Leaves glaucous beneath . . . . . **16. S. anglorum.**
Leaves densely silvery-silky beneath. Capsules silvery-silky.
Leaves lanceolate to oblanceolate, pubescent; styles 0.8 to 1.5 mm. long; twigs often pruinose . . . . . **17. S. subcoerulea.**
Leaves obovate or obovate-oblong, tomentose; style 0.5 to 1 mm. long; twigs never pruinose . . . . . **18. S. drummondiana.**
Styles short, obsolete or only 0.2 to 0.3 mm. long.
Plants erect shrubs, mostly tall; capsules slender, 6 to 10 mm. long, on pedicels 1 to 5 mm. long.
Catkins dense, sessile or nearly so; scales black, densely silky with long hairs; stigmas long, slender . . . . . **19. S. scouleriana.**
Catkins loose, leafy-peduncled; scales yellowish, thinly hairy; stigmas very short.
Leaves elliptic-oval, strongly net-veined beneath.
Leaves more or less tomentose . . . . . **20. S. bebbiana.**
Leaves glabrate . . . . . **20a. S. bebbiana perrostrata.**
Leaves linear-oblanceolate, not net-veined beneath . . . **21. S. geyeriana.**
Plants low or creeping alpine shrubs; capsules ovate, 3 to 5 mm. long, sessile.
Plants ascending, 0.3 to 1 meter tall; leaves long-hairy beneath.
Leaves thick, broadly oval; capsules somewhat pointed . . **22. S. vestita.**
Leaves thinner, narrower; capsules blunter . . . . . **22a. S. vestita erecta.**
Plants creeping, 5 to 10 cm. tall; leaves glabrous beneath.
Leaves roundish-oval, glaucous beneath.
Blades 1.5 to 2.5 cm. long; aments usually many-flowered. **23. S. saximontana.**
Blades 7 to 12 mm. long; aments usually few-flowered . . **24. S. nivalis.**
Leaves narrowly elliptic, green beneath . . . . . **25. S. cascadensis.**

1. Salix caudata (Nutt.) Heller. Rare; at low altitudes, in wet thickets. Mountain streams from B. C. and Alta. to N. Mex. and Calif.—Stems few, 3 to 5 meters high; twigs chestnut, shining; leaves narrowly to broadly lanceolate, 6 to 13 cm. long, tapering to a long slender point; catkins stout, 1.2 to 2 cm. wide, 2 to 5 cm. long, becoming 3 to 6 cm. long in fruit; capsules thin-walled, 6 to 7 mm. long, yellowish.

2. Salix serissima (Bailey) Fernald. In cold bog about spring near Swiftcurrent Creek below Lake McDermott. East of the Divide, in southern Alta. and northern Mont. (the only other Montana specimen collected near Chouteau), eastward to northern Ohio, N. Eng., and Lower Can. — Plant similar to the last; leaves elliptic-lanceolate, acute or only short-pointed at the apex; capsules thick-walled, 7 to 9 mm. long, shining, olive-brown or darker.

Remarkable for its flowering in midsummer or later and producing fruit in late summer and autumn.

3. Salix amygdaloides Anderss. PEACHLEAF WILLOW. Belton, in thicket along the river. Along streams at low elevations, east of the Cascades from B. C. to Oreg., east to northwest Tex., central N. Y., and Que.—Tall shrub or small tree, yellowish green; twigs slender, yellowish, often drooping; petioles 1 to 2 cm. long, slender, twisted; leaves lanceolate or broadly lanceolate, 5 to 12 cm. long, long-pointed; catkins about 1 cm. wide, 3 to 5 cm. long, the pistillate becoming 4 to 7 cm. long in fruit; pedicels 2 mm. long, slender.

4. Salix interior Rowlee. SANDBAR WILLOW. East entrance, along the edge of Two Medicine Creek, at the foot of a steep shale slide. Alaska to Idaho and N. Mex., eastward to La., Del., and N. B.; not common west of the Divide, but abundant in

the Central States.—Bright green, clustered shrub, 1 to 5 meters high; twigs reddish; leaves linear or linear-lanceolate, very acute at both ends, 5 to 12 cm. long, 2 to 12 mm. wide, pure green on both sides, glabrate when mature, often thinly villous with long white hairs when young; catkins at the ends of leafy branches; capsules 5 to 8 (mostly 7) mm. long, glabrous when mature; pedicels 0.5 to 1.5 mm. long.

Forms with very narrow leaves, somewhat grayish rather than bright green, and with numerous long slender teeth, represent *S. longifolia tenerrima* Henderson, which Schneider makes a variety of *S. exigua* Nutt., but states that he is doubtful as to what specimens should be referred to this variety and what to *S. longifolia pedicellata* Anderss. They require further study.

5. Salix melanopsis Nutt. Common at low altitudes, on rocky slopes, in low thickets, or on stream and lake banks. Alta. to Idaho and west to Calif. and B. C.—Dark green clustered shrub, 1 to 5 meters high; twigs brownish; leaves oblanceolate or elliptic, acute, 4 to 8 cm. long, 6 to 15 mm. wide, usually subentire, sometimes with sharp slender teeth, deep green and glabrous above, pale green or subglaucous and often thinly hairy beneath (in the park and northward a form with leaves rather densely shining-hairy on both sides occurs rather commonly); catkins on short leafy branches; capsules glabrous, nearly sessile, 4 to 5 mm. long.

6. Salix farrae Ball. Frequent on the east slope at middle altitudes or about timber line; in bogs or wet meadows. Rocky Mts. of southern Alta. and B. C. and northern Mont.—Small shrub, probably 30 to 60 cm. high; twigs red or the youngest reddish yellow, shining; leaves oblanceolate to elliptic or broadly lanceolate, usually widest just above the middle, acute or abruptly short-acuminate at apex, 3 to 5 cm. long, entire or nearly so, glaucous and rather finely net-veined beneath at maturity; capsule 4 to 5 mm. long; pedicels 1 to 1.5 mm. long.

7. Salix mackenziana (Hook.) Barratt. Belton, on brushy rocky slope. Sask. to Wyo., Calif., and B. C.—Shrub 2 to 4 meters high; leaves oblanceolate, or the lower narrowly obovate, sometimes lanceolate, acute to short-acuminate, 4 to 7 or 10 cm. long, subentire to finely toothed; capsules 4 to 5 mm. long; pedicels 2 to 4 mm. long, 2 to 3 times as long as the scales.

8. Salix pseudomyrsinites Anderss. Frequent on the east slope at low altitudes, in wet thickets or along streams. Sask. to N. Mex., Calif., and Wash.—Shrub 1 to 3 meters high; twigs short, diverging, shining; leaves lanceolate-oblong to elliptic-lanceolate, 4 to 8 cm. long, thick, coarsely net-veined beneath, subentire to sharply gland-toothed, dark green on both sides; catkins 2 to 3 cm. long; capsules 4 to 5 mm. long; pedicels 1 to 1.5 mm. long.

9. Salix pseudomonticola Ball. Frequent on the east slope at low or middle altitudes; rarely found above timber line, on rock slides; usually in wet woods or thickets. Sask. and Alta. to northern Wyo.—Shrub 1 to 3 meters high; twigs stoutish, shining; leaves narrowly to broadly ovate (young obovate), 4 to 6 or 8 cm. long, 1.5 to 3 cm. wide, rounded to subcordate at base, acute to abruptly short-acuminate at apex, rather coarsely wavy-toothed or subentire; catkins 3 to 7 cm. long, nearly sessile; capsules 6 to 8 mm. long; pedicels 1 to 1.5 mm. long; styles about 1 mm. long.

10. Salix commutata Bebb. Common above timber line, in wet meadows or on open rocky slopes; one of the characteristic plants of alpine meadows. Alaska to northern Wyo. and Calif.—Shrub 1 to 3 meters high; twigs tomentose; leaves elliptic to broadly oblanceolate or obovate, 4 to 8 cm. long, entire or nearly so, cuspidate at apex, green and tomentose on both sides, becoming glabrate with age; catkins short, 2 to 3 or 4 cm. long, on leafy peduncles 2 to 4 cm. long; capsules 5 to 7 mm. long; pedicels about 1 mm. long.

11. Salix barrattiana Hook. Gunsight Pass, on rock slide. High elevations in the Rocky and Selkirk Mts. of Alta. and B. C.; not before collected in the U. S.—

Shrub 0.5 to 1.5 meters high; twigs stout, short, with wrinkled bark, the younger more or less gray-woolly; leaves elliptic-lanceolate, oblanceolate, or ovate-lanceolate, acute at apex, acutish to somewhat heart-shaped at base, entire or with a few glandular teeth, usually densely clothed with long gray hairs, becoming somewhat glabrate in age, 4 to 7 cm. long, 1 to 2 cm. wide; catkins stout, sessile, on old wood, 4 to 7 cm. long; capsules densely hairy, 7 to 9 mm. long, subsessile, bearing a style 1.5 to 2.5 mm. long.

The specimen collected in the park was only 30 to 60 cm. high and differs from typical material in the shorter and relatively broader, elliptic-oval leaves, 2 to 4 cm. long, and aments (one) only 4 cm. long. A similar collection has been made in the Rocky Mountain Park at Banff, Alberta.

12. Salix candida Fluegge. SAGELEAF WILLOW. In a cold bog about a spring near Swiftcurrent Creek below Lake McDermott. Alta. south to Wyo. and eastward to N. J. and Newf., in cold bogs and swamps.—Shrub 0.2 to 1 meter high; young twigs white-woolly; leaves linear to oblong or narrowly oblanceolate, the margins inrolled, entire, 3 to 8 cm. long, densely white-woolly beneath, thinly so above; catkins 1 to 3 cm. long, on short leafy peduncles; capsules subsessile, white-woolly, 6 to 8 mm. long; style reddish, 1 to 1.5 mm. long.

13. Salix brachycarpa Nutt. Occasional above timber line and in some localities abundant; on open slopes or rock slides or in wet meadows; also in an open mossy bog along Appekunny Creek. Sask. and Alta. to southern Colo., west to Utah, eastern Oreg., and B. C. (*S. stricta* Rydb.)—Alpine shrub 0.2 to 1 meter high; young twigs woolly; leaves elliptic-oblong or oblanceolate to narrowly obovate, 2 to 3.5 cm long, cutish at apex, mostly obtuse at base, yellowish green on both sides, somewhat woolly above, densely yellowish-woolly beneath, sometimes becoming glabrate, entire; catkins numerous, roundish to oblong, 0.5 to 2 cm. long; capsules ovoid-lanceolate, 5 to 7 mm. long, subsessile, woolly; styles 1 to 1.5 long.

14. Salix glaucops glabrescens Anderss. Frequent above or near timber line, in meadows, on gravelly slopes, or in moist woods; also in thicket along Swiftcurrent Creek below Lake McDermott. Yukon and Alaska south to N. Mex. and west to Utah and Idaho. (*S. glauca glabrescens* C. Schneid.; *S. pseudolapponum* Seem.)—Subalpine shrub, 0.4 to 1.5 meters high; twigs shining brown, the bark separating in gray papery flakes; leaves elliptic-lanceolate, oblanceolate, or obovate-oblong, entire, 3 to 6 cm. long, thinly gray-woolly to glabrate on both sides, glaucous beneath, often drying dark; catkins 2 to 5 cm. long, on leafy peduncles 2 to 3 cm. long; scales yellowish throughout or brownish at the tip; capsules gray-woolly, 6 to 8 mm. long; pedicel and style each about 1 mm. long.

15. Salix petrophila Rydb. Abundant above timber line, in meadows or on rocky slopes; a characteristic plant of alpine meadows, frequently forming large dense mats. Alta. and B. C., south to northern N. Mex. and west to Calif. and eastern Oreg.—Stems creeping; branches erect, 5 to 10 cm. high, glabrous; leaves broadly elliptic and acutish to narrowly obovate and often obtuse, entire, 1.5 to 4 cm. long, deep green above, pale and rather strongly veined beneath, sparingly hairy to glabrous, petioles slender, yellow; catkins 1 to 3 or 4 cm. long, on short leafy branches; capsules lanceolate, sessile, gray-woolly, 4 to 6 mm. long; style 1 to 1.5 mm. long.

16a. Salix anglorum araioclada C. Schneid. Frequent above timber line, in wet meadows or on rocky slopes. Rocky and Selkirk Mts., northern Mont. to B. C. and Alta., also eastern Que.—Plant prostrate; branches yellowish to purplish; leaves thin, papery, oval, elliptic, ovate-elliptic, or obovate-elliptic, usually obtuse at apex, entire, 2 to 5 cm. long, 1 to 3 cm. wide, usually glabrous at maturity, deep green above, glaucous beneath; catkins on leafy branches 3 to 4 cm. long, the pistillate 3 to 5 cm. long in fruit; capsule 7 to 8 mm. long, subsessile, gray-woolly; style 15 mm. long.

16b. Salix anglorum kophophylla C. Schneid. Habitat of the last, often in the highest, most exposed places. Cited by Schneider only from eastern Que. and Newf.—As the last but the leaves thicker, broadly elliptic to roundish, more strongly nerved, and more densely glaucous beneath.

17. Salix subcoerula Piper. Common on the east slope at all altitudes; along streams, in wet thickets, or on high slopes; scarce on the west slope, apparently, and noted only at Avalanche Lake. Alta. and B. C., south to N. Mex., and Calif.—Shrub 1 to 3 meters high; twigs glabrous, usually covered with a bluish powder; leaves narrowly to broadly lanceolate or oblanceolate, acute at both ends, 3 to 6 or 8 cm. long, 0.8 to 2.5 cm. wide, entire or subcrenulate, green and sparsely pubescent above, densely silvery-pubescent with short appressed shining hairs beneath; catkins sessile or nearly so, the pistillate 2 to 4 cm. long; scales brown or black; capsules 4 to 5 mm. long, subsessile or on pedicels 0.5 to 1 mm. long; style 1 to 1.5 mm. long.

18. Salix drummondiana Barratt. Frequent at low and middle altitudes, and sometimes found above timber line; in thickets or meadows, on moist slopes, or along streams. Rocky and Selkirk Mts. of Alta. and B. C. and northwestern Mont.—Shrub 1 to 3 (?) meters high; young twigs mostly pubescent or woolly, not bluish-powdery; leaves obovate, obovate-oblong, or elliptic-oblanceolate, entire, broadly acute to obtuse at apex, 3 to 6 or 8 cm. long, 1.5 to 3 cm. wide, densely silvery-woolly beneath with a thick mat of tangled hairs, thinly so above; catkins as in No. 17; capsules 5 to 6 mm. long, silvery-woolly; pedicels 0.5 to 1.5 mm. long; style 0.5 to 1 mm. long.

19. Salix scouleriana Barratt. Frequent at low and sometimes at middle altitudes, in moist woods or thickets, along streams, or on rather dry, thinly wooded hillsides; on the west slope frequently a small slender isolated tree; the only species of the park, apparently, which ever attains the dimensions of a tree. Alta. to N. Mex. and west to the coast.—Shrub or small tree, 2 to 4 meters high; twigs glabrate to densely woolly; leaves obovate to broadly oblanceolate, obtuse or mostly abruptly pointed at apex, wedge-shaped at base, entire or shallowly crenulate, dark green and glabrate above, glaucous, net-veined, and often densely tomentose beneath; catkins appearing before the leaves, sessile or nearly so, the pistillate 3 to 5 cm. long; scales obovate or oblanceolate, black, covered with long shining hairs; capsules beaked, 7 to 9 mm. long, gray-woolly; pedicels 1 to 2 mm. long; styles short; stigmas about 1 mm. long.

20. Salix bebbiana Sarg. Common at low altitudes, in swamps, along streams, or on brushy slopes. Across the continent to Alaska, N. Mex., and Calif.—A shrub or small tree, 2 to 5 meters high; leaves broadly oblanceolate to obovate-oval, entire or somewhat crenulate, 2 to 5 cm. long, 1 to 2.5 cm. wide, dull green above, paler to subglaucous and coarsely net-veined beneath, more or less gray-woolly on both sides, especially beneath; catkins appearing before or with the leaves, the staminate subsessile, 1 to 2 cm. long, yellow, the pistillate (on peduncles 0.5 to 2 cm. long) 2 to 5 cm. long, very lax in fruit; scales yellowish, oblong, 2 mm. long; capsules 6 to 10 mm. long, thinly pubescent, on slender pedicels 2 to 5 mm. long.

20a. Salix bebbiana perrostrata (Rydb.) C. Schneid. Occasional at low altitudes, in the same situations as the species. Throughout the Rocky Mts.—Differs in the smaller and thinner, elliptic or oblanceolate leaves, acute at both ends, 2 to 3.5 cm. long, glabrous or glabrate on both sides, and more finely net-veined on the lower surface.

21. Salix geyeriana Anderss. Belton, on a dry brushy slope. Mont. to Colo., west to the coast.—Shrub 1 to 3 meters high; twigs glabrous, leafy, black with a bluish powdery bloom; leaves linear-oblanceolate or narrowly elliptic, very acute at both ends, 2 to 4 or 6 cm. long, entire, dark green above, more or less glaucous beneath, thinly to densely silky-hairy on both sides; catkins on short leafy peduncles, roundish, 1 to 2 cm. long, 1 to 1.3 cm. wide; capsules 5 to 7 mm. long, pubescent, on stoutish pedicels about 2 mm. long.

22. Salix vestita Pursh. Cracker Lake and switchbacks near Swiftcurrent Pass, on rocky slopes. Alta. and B. C. to Mont. and eastern Oreg.; also Lab., Newf., Anticosti, and the Gaspé Peninsula of Que.—Ascending shrub, 0.2 to 1 meter high; leaves broadly elliptic to obovate-oblong or suborbicular, rounded to retuse at the apex, 3 to 5 or 6 cm. long, 2 to 4 cm. wide, thick, deep green and glabrous above, clothed beneath with long white silky hairs, especially on midrib and veins; catkins on short villous peduncles, slender, 2 to 3 or 4 cm. long; capsules ovoid-conic, pointed, 4 to 5 cm. long.

A very handsome shrub because of the striking contrast in the leaves between the bright green, netted upper surface and the silvery-silky under surface.

22a. Salix vestita erecta Anderss. Abundant above timber line, in meadows and on rock slides; one of the most characteristic plants of alpine situations, frequently forming large dense patches.—More erect, with narrower, more pointed leaves, longer catkins, and more ovoid-ellipsoid, blunter capsules.

23. Salix saximontana Rydb. Gunsight Pass, on rock slides and rocky slopes. Alpine summits, Alta. and B. C. to Nev. and N. Mex.—Prostrate, 3 to 6 cm. high; leaves elliptic-oblong to broadly oval, obtuse or acutish at both ends, entire, 1.5 to 3 cm. long, 1 to 2 cm. wide, glabrous on both sides; catkins several to many-flowered, 1 to 1.5 cm. long; capsules ovoid, 3 to 4 mm. long.

24. Salix nivalis Hook. Above timber line, Siyeh Pass and Boundary Peak (B. C.), 2,280 to 2,400 meters elevation, collected by Vernon Bailey, August, 1917. Alpine summits, Alta. and Mont. and westward.—Scarcely 2 cm. high; leaves as the last but only 7 to 12 mm. long and 4 to 8 mm. wide; catkins few-flowered, less than 1 cm. long; capsules 2.5 to 3 mm. long.

25. Salix cascadensis Cockerell. Sexton Glacier, abundant on rocky slope. Alpine summits, Wyo. and Mont. to Wash. (*S. tenera* Anderss.)—Prostrate, creeping, 3 to 5 cm. high; leaves narrowly elliptic to subobovate, mostly acute at both ends, deep green and shining on both sides, glabrous, strongly veined, 8 to 15 mm. long, 4 to 8 mm. wide; catkins subglobose, 5 to 20-flowered, 7 to 20 mm. long; capsules sessile, 4 to 5 mm. long, gray-tomentose.

22. BETULACEAE. Birch Family.

Trees or shrubs; leaves alternate, toothed or somewhat lobed; flowers staminate and pistillate, the staminate ones in slender drooping catkins; pistillate flowers in short catkins, these becoming conelike, inclosing the small nutlike or seedlike fruits.

Conelike pistillate catkins falling apart when mature, their bracts 3-lobed. **1. BETULA.**

Conelike pistillate catkins not falling apart, their bracts not lobed . . . **2. ALNUS.**

1. BETULA L. Birch.

Trees or shrubs; leaves stalked, small or large; fruit narrowly or broadly winged.

Leaves 1 to 2.5 cm. long, rounded at the tip, the teeth rounded . . **1. B. glandulosa.**

Leaves mostly 3 to 10 cm. long, usually sharp-pointed, the teeth sharp.

Bark not separating into layers; twigs densely covered with glands, not hairy; leaves mostly less than 5 cm. long . . . . . **2. B. fontinalis.**

Bark separating into thin layers; twigs hairy and often glandular; leaves mostly 5 to 10 cm. long.

Bark white or yellowish white; twigs usually not glandular . . **3. B. papyrifera.**

Bark reddish brown; twigs glandular . . . . . **4. B. occidentalis.**

1. Betula glandulosa Michx. Scrub birch. Frequent on the east slope at nearly all altitudes, in bogs, along streams, or on alpine slopes. Alaska to Colo., Minn., Me., and Greenl.—Shrub, usually 1 to 2 meters high, with reddish brown, very glandular branchlets; leaves rounded, short-stalked, glabrous; cones 1 to 2 cm. long, the fruit with a narrow wing.

The shrub is abundant in some places, but the stations are scattered and often isolated. Above timber line the plants are sometimes spreading and only 30 to 60 cm. high.

2. Betula fontinalis Sarg. WATER BIRCH. Along creek near St. Mary, and probably elsewhere. Yukon to Utah, N. Mex., and Nebr.—Shrub or small tree with very sticky twigs, the bark reddish brown; leaves broadly ovate, rounded or somewhat cordate at the base, nearly glabrous, coarsely toothed; cones 2 to 3 cm. long, the fruit broadly winged.

Most of the plants of St. Mary are only 1 to 1.5 meters high.

3. Betula papyrifera Marsh. CANOE BIRCH. Common on the west slope at low and middle altitudes, along streams or lake shores, or often on rocky hillsides. Alaska to Colo., N. J., and Lab.—Small or large tree with chalky white or, on young trees, yellowish white bark; leaves broadly ovate, 4 to 10 cm. long, slender-stalked, obtuse to subcordate at base, long or short-pointed, finely hairy beneath or nearly glabrous; cones 2 to 4 cm. long; fruit very broadly winged.

Many of the trees about Lake McDonald are very large; they are often densely covered with lichens. The bark of this species was formerly much used by the Indians for making canoes. The wood is often employed in the manufacture of paper. The canoe birch is a very handsome tree, its white bark contrasting strongly with that of other trees with which it is associated. It is said to grow in a few places on the east slope of the park, but this is doubtful.

4. Betula occidentalis Hook. WESTERN BIRCH. Occasional on the east slope at low altitudes. B. C. and Wash. to Mont.—Small or medium-sized tree with finely hairy twigs; leaves thin, broadly ovate, 4 to 10 cm. long, somewhat hairy beneath, long-pointed; cones 3 to 4 cm. long.

2. ALNUS Hill. ALDER.

Shrubs or small trees with smooth, close, reddish brown bark; leaves slender-stalked; fruit with or without a wing.

Fruit winged; twigs with resin dots, not hairy . . . . . **1. A. sinuata.**
Fruit not winged; twigs not resinous, finely hairy . . . . . **2. A. tenuifolia.**

1. Alnus sinuata (Regel) Rydb. GREEN ALDER. Common at high and middle altitudes, and occasionally, especially on the west slope, at low altitudes; along streams or lake shores, in moist woods, or on open slopes. Alaska to Oreg., Wyo., and Alta.—Shrub, 1 to 2 meters high, or sometimes a small tree; leaves broadly ovate, 4 to 10 cm. long, bright green, acute or obtuse, thin, closely and sharply toothed, scarcely at all lobed, nearly glabrous, but with tufts of hairs beneath in the axils of the veins; cones 1 to 1.5 cm. long.

This species often forms extensive, dense, nearly impenetrable thickets on slopes at middle or high elevations. The stems are usually bent down, probably as a result of the weight of overlying snow. It is only at low altitudes that this alder gets to be a small tree.

2. Alnus tenuifolia Nutt. MOUNTAIN ALDER. Common at low altitudes, along streams or in wet places. Alaska to Calif., N. Mex., and Mont.—Shrub, 1 to 4 meters high; leaves oval or broadly ovate, 4 to 10 cm. long, thick, rather dull green, shallowly lobed and with broad teeth, somewhat hairy beneath; cones 1 to 2 cm. long.

This species nearly always grows at lower altitudes than *A. sinuata*, but sometimes the two are found together. The Blackfoot Indians employed the tough bark for making stirrups, which were covered with rawhide. They also used a hot decoction of the bark as drink for the treatment of scrofula. Their name for the plant is "red mouth bush," in allusion to the fact that when the bark is chewed the saliva is colored red.

23. URTICACEAE. Nettle Family.

1. URTICA L. Nettle.

Perennials, with stinging hairs; leaves opposite, stalked, toothed, with stipules; flowers very small, green, in panicles in the axils of the leaves; sepals 4; petals none; fruit a small green achene.

Stems densely bristly; petioles usually shorter than the breadth of the leaves. **1. U. dioica.**

Stems with few scattered bristles; petioles usually longer than the breadth of the leaves . . . . . **2. U. lyallii.**

1. Urtica dioica L. Open slopes at east entrance and Belton. Native of Eur.; naturalized in N. Amer.—Stems 30 to 80 cm. high, stout; leaves ovate or heart-shaped, 3 to 10 cm. long, coarsely toothed.

2. Urtica lyallii S. Wats. Common at low and middle altitudes, in moist woods or thickets; sometimes found above timber line. Alaska to Wash., Wyo., Conn., and Newf. (*U. cardiophylla* Rydb.; *U. viridis* Rydb.)—Stems slender, 0.5 to 1.5 meters high, nearly glabrous except for the bristles; leaves lance-oblong to ovate or heart-shaped, 5 to 15 cm. long, thin, coarsely toothed.

The hairs sting the skin very painfully, and their effects sometimes last for several days.

24. SANTALACEAE. Sandalwood Family.

1. COMANDRA Nutt.

1. Comandra pallida A. DC. Bastard toadflax. Common on open rocky slopes or on prairie at low and middle altitudes. B. C. to Man., Ariz., and Tex.—Glabrous perennial, 10 to 30 cm. high; leaves small, alternate, sessile, glaucous, entire; flowers small, white, in cymes; calyx 5-lobed; corolla none; fruit drupelike.

25. POLYGONACEAE. Buckwheat Family.

Annual or perennial herbs with alternate leaves (leaves mostly at the base of the stem in some groups); flowers small, with 3 to 6 sepals and no petals; stamens 4 to 8; fruit small, dry, 1-seeded, 3-angled or flattened.

Leaves without stipules; flowers in small clusters, each cluster surrounded by a calyx-like involucre of united bracts; stamens 9 . . . . . **1. ERIOGONUM.**

Leaves with sheathing stipules; flowers not in clusters surrounded by involucres; stamens 4 to 8.

Sepals 5; stigmas not brushlike . . . . . **2. POLYGONUM.**

Sepals 4 or 6; stigmas brushlike.

Sepals 6; fruit 3-angled; leaves not kidney-shaped . . . . . **3. RUMEX.**

Sepals 4; fruit flattened; leaves mostly kidney-shaped . . . . . **4. OXYRIA.**

1. ERIOGONUM Michx.

Perennials; leaves entire, basal, the stem sometimes bearing a whorl of leaves below the flowers; flowers small, surrounded by an involucre of united bracts, the involucres in heads or umbels.

Sepals hairy, at least at the base.

Flowers bright yellow; stems 10 to 30 cm. high; sepals hairy almost all over. **1. E. piperi.**

Flowers yellowish white; stems 2 to 10 cm. high; sepals hairy only at the base. **2. E. androsaceum.**

Sepals not hairy.

Involucres in umbels; leaves green on the upper side . . . . . **3. E. subalpinum.**

Involucres in one head; leaves densely and closely white-woolly on both sides. **4. E. depressum.**

1. Eriogonum piperi Greene. SULPHUR-PLANT. Common at nearly all altitudes on the east slope, on open rocky hillsides; abundant on rock slides above timber line. Wash. to Wyo. and Mont.—Plants usually forming dense clumps; leaves oblanceolate, stalked, obtuse, 3 to 10 cm. long, densely woolly beneath, green and thinly silky on the upper surface; involucres in a large umbel; sepals about 5 mm. long, often becoming deep red in age.

It is doubtful whether this is more than a mere form of *E. flavum* Nutt.

2. Eriogonum androsaceum Benth. On rock slides and exposed summits above timber line, rare in most places; occasionally found in exposed places at low altitudes. B. C., Alta., and Mont.—Often forming dense mats; leaves oblanceolate or spatulate, 1 to 2 cm. long, densely woolly or becoming green on the upper surface; involucres in a small umbel; flowers 4 to 5 mm. long, sometimes tinged with pink.

3. Eriogonum subalpinum Greene. UMBRELLA-PLANT. Common on the east slope at nearly all altitudes, on open hillsides or in meadows. B. C. to Nev., Colo., and Alta.—Plants 15 to 40 cm. high, usually forming loose patches; leaves elliptic, ovate, or obovate, 1.5 to 5 cm. long, green on the upper side and glabrous or nearly so, densely white-woolly beneath; flowers greenish white or tinged with pink, 4 to 5 mm. long.

4. Eriogonum depressum (Blankinship) Rydb. SILVER-PLANT. Common on the east slope at high and middle altitudes, on rock slides or open rocky hillsides. Oreg. to Mont.—Plants 5 to 15 cm. high, usually forming small dense mats; leaves rounded or broadly ovate, 5 to 15 cm. long, white, long-stalked; flowers 3 to 4 mm. long, yellowish white, often tinged with pink.

The name "silver-plant" was applied to this and related species by prospectors because the plant was believed to indicate the presence of silver deposits.

2. POLYGONUM L.

Annuals or perennials, sometimes growing in water; leaves alternate, entire; flowers solitary or clustered in the axils of the leaves or in spikes.

Stems climbing; leaves triangular, with lobes at the base . . . . . **1. P. convolvulus.**
Stems not climbing; leaves never triangular.
  Flowers in dense spikes, not bracted, white or deep pink.
    Flowers deep pink; stems very leafy, often branched and bearing several spikes.
      Leaves acute, with fine appressed hairs . . . . . **2. P. muhlenbergii.**
      Leaves obtuse, glabrous . . . . . **3. P. amphibium.**
    Flowers white; stems with small leaves, not branched.
      Spikes 10 to 15 mm. thick, without bulblets . . . . . **4. P. bistortoides.**
      Spikes 5 to 6 mm. thick, bearing bulblets below . . . . . **5. P. viviparum.**
  Flowers mostly in the axils of the leaves, sometimes in spikes but then with leaflike bracts at the base of the flowers, greenish.
    Flowers bent downward in fruit.
      Lower leaves oval or rounded . . . . . **6. P. austinae.**
      Lower leaves linear or lanceolate.
        Flowers 1.5 to 2 mm. long; leaves all linear . . . . . **7. P. engelmannii.**
        Flowers 3 to 4 mm. long; leaves linear or more often lanceolate. **8. P. douglasii.**
    Flowers erect, never bent downward.
      Flowers crowded near the ends of the stems, the inflorescence spikelike; bracts with broad white margins . . . . . **9. P. polygaloides.**
      Flowers solitary or clustered in the axils of the leaves; bracts without white margins.
        Stems red, slender, wiry, not ridged . . . . . **10. P. minimum.**
        Stems pale green, stout, ridged.
          Stems usually prostrate; sepals with white or pink edges. **11. P. aviculare.**

Stems erect; sepals with yellowish green edges.
Leaves oval or rounded, the upper ones not reduced . **12. P. achoreum.**
Leaves oblong, the upper ones smaller than the lower ones.
13. P. ramosissimum.

1. Polygonum convolvulus L. WILD BUCKWHEAT. Occasional at low altitudes, in waste ground or on open slopes. Native of Eur.; widely naturalized in N. Amer. (*Bilderdykia convolvulus* Dum.)—Slender glabrous annual; leaves 2 to 6 cm. long, slender-stalked, acute; flowers greenish white, in short loose racemes.

2. Polygonum muhlenbergii(Meisn.) S. Wats. WATER SMARTWEED. East entrance, about ponds on prairie. B. C. to Calif., Va., and Me. (*Persicaria muhlenbergii* Small.)—Stout perennial, 30 to 70 cm. high, the stems rooting below; leaves lanceolate, stalked, 5 to 15 cm. long; spikes 3 to 8 cm. long.

3. Polygonum amphibium L. Collected in lake near Belton by Umbach. Alaska to Calif., N. J., and Que. (*Persicaria coccinea* Greene.)—Usually floating in water; leaves oblong, slender-stalked, 3 to 10 cm. long; spikes 1 to 3 cm. long.

4. Polygonum bistortoides Pursh. BISTORT. Common in moist meadows above timber line, rarely found in moist places at lower altitudes. B. C. to Calif., N. Mex., and Mont. (*Bistorta bistortoides* Small.)—Perennial with thick rootstocks, 15 to 40 cm. high, glabrous; basal leaves long-stalked, oblong, 6 to 15 cm. long, pale on the lower surface; spikes 1 to 5 cm. long; stamens projecting beyong the sepals.

The flowers are showy but they do not last long. The plants usually grow among grasses and sedges. The Blackfoot Indians used the roots in soups and stews.

5. Polygonum viviparum L. ALPINE BISTORT. PLATE 49, A. Frequent above timber line, in meadows and on rock slides; occasionally found in moist places at middle altitudes. Alaska to N. Mex., N. H., and Greenl.; also in Eur. and Asia. (*Bistorta vivipara* S. F. Gray.)—Plants glabrous, 10 to 15 cm. high; basal leaves oblong, slender-stalked, 2 to 8 cm. long, obtuse; spikes 2 to 7 cm. long, the lower flowers replaced by small green bulblets.

6. Polygonum austinae Greene. East entrance, in gravel along creek. Alta. to Wyo. and Calif.—Annual, 5 to 15 cm. high, slender, branched from the base; leaves 5 to 15 mm. long, bright green; flowers green, mostly in the axils of the leaves; bracts very small.

7. Polygonum engelmannii Greene. Dry brushy hillside near Sun Camp. B. C. to Colo.—Erect annual, 5 to 30 cm. high, densely branched from the base, very slender; leaves 5 to 20 mm. long, the upper ones very small; sepals green, with whitish edges.

8. Polygonum douglasii Greene. Frequent at low and middle altitudes, in woods or on open or brushy slopes. B. C. to Calif., N. Mex., N. Y., and Vt.—Erect annual, 15 to 40 cm. high, slender; leaves 2 to 5 cm. long; sepals green, with white or pink edges.

9. Polygonum polygaloides Meisn. Frequent on the east slope at low altitudes, on dry open hillsides. Wash. and Oreg. to Wyo. and Mont.—Erect annual, 4 to 12 cm. high, very slender; leaves linear, 1 to 2 cm. long; flowers 2 mm. long, white or pinkish.

10. Polygonum minimum S. Wats. Frequent at middle altitudes and sometimes above timber line, on open slopes or in woods or thickets. B. C. to Calif., Colo., and Mont.—Slender annual, 3 to 15 cm. high, usually branched, very leafy; leaves oval or obovate, 5 to 15 mm. long, bright green; flowers 1.5 to 2 mm. long, the sepals green, with pinkish edges.

11. Polygonum aviculare L. KNOTWEED. Common at low altitudes, on dry slopes or on prairie; often extending well up along the trails. Native of Eur. and Asia; widely naturalized in N. Amer. —Plants bluish green, much branched, usually prostrate but sometimes erect when young or when growing among other plants; leaves oblong or lanceolate, 5 to 25 mm. long, obtuse; flowers 2 to 3 mm. long.

Plants found about dried-up ponds near the east entrance are noteworthy because of their very narrow, appressed leaves.

12. Polygonum achoreum Blake. Occasional about St. Mary and the east entrance, on dry open slopes or along roadsides. Mont. to Que.—Plants 15 to 30 cm. high, branched, glabrous; leaves 1 to 2 cm. long, rounded at the apex; flowers 3 mm. long.

13. Polygonum ramosissimum Michx. TALL KNOTWEED. Along the railroad near Belton; probably introduced. B. C. to Nev., N. Mex., and Ill.—Annual, 20 to 50 cm. high, branched, glabrous, yellowish green; leaves 1 to 3 cm. long; flowers 3 mm. long.

3. RUMEX L. DOCK.

Perennials or annuals, usually with thick roots or with rootstocks; leaves alternate; flowers small, the staminate and pistillate ones sometimes on different plants; sepals 6, the 3 inner ones sometimes with a seedlike tubercle on the back.

Inner sepals deeply toothed or lobed.
- Lower leaves notched at the base, broadly ovate; only one of the inner sepals with a tubercle; stems usually unbranched . . . . . **1. R. obtusifolius.**
- Lower leaves narrowed at the base, lanceolate; all the inner sepals with tubercles; stems much branched . . . . . **2. R. maritimus.**

Inner sepals not toothed or lobed, or very minutely toothed.
- Inner sepals each with a tubercle on the back.
  - Leaves dark green, wavy or ruffled; inner sepals minutely toothed in fruit. **3. R. crispus.**
  - Leaves pale green, flat; inner sepals entire . . . . . **4. R. mexicanus.**
- Inner sepals without tubercles.
  - Sepals in fruit 5 to 6 mm. wide; leaves without acid flavor; flowers all perfect. **5. R. occidentalis.**
  - Sepals 3 mm. wide or less; leaves with acid flavor; staminate and pistillate flowers on separate plants.
    - Leaves narrowed at the base, without lobes or auricles . . . **6. R. paucifolius.**
    - Leaves with auricles or lobes at the base.
      - Sepals not enlarged in fruit, the fruit projecting beyond them. **7. R. acetosella.**
      - Sepals enlarged in fruit, much longer than the fruit . . . . . **8. R. acetosa.**

1. Rumex obtusifolius L. BITTER DOCK. A few plants near the chalets at St. Mary. Native of Eur.; widely naturalized in N. Amer.—Plants 0.5 to 1 meter high, with thick roots; basal leaves 15 to 30 cm. long; sepals green, in fruit 5 mm. long, lobed about half way to the base, one of them with a tubercle.

2. Rumex maritimus L. GOLDEN DOCK. East entrance, about dried-up pools on prairie; scarce. B. C. to Calif., N. C., and N. B.; also in Eur. and Asia.—Annual, 30 to 60 cm. high, finely hairy or nearly glabrous; leaves 3 to 15 cm. long, stalked; sepals green, about 2 mm. long, lobed nearly to the base, with 1 to 3 bristle-like lobes.

3. Rumex crispus L. YELLOW DOCK. Rather rare, in thickets or waste ground at low altitudes, sometimes extending high up along trails. Native of Eur.; widely naturalized in N. Amer.—Perennial, 30 to 60 cm. high, with thick yellow roots; leaves oblong or lanceolate, 15 to 30 cm. long, cordate to acute at base; sepals green, 3 to 5 mm. long.

The leaves are often cooked and eaten as "greens."

4. Rumex mexicanus Meisn. PALE DOCK. Frequent at low altitudes, in wet open ground or thickets. B. C. to Mex., Mo., and Lab.—Glabrous perennial, 30 to 70 cm. high, usually branched and often forming dense clumps; leaves lanceolate, 5 to 15 cm. long, acute at the base; sepals green, about 5 mm. long.

5. **Rumex occidentalis** S. Wats. MOUNTAIN DOCK. Occasional on the east slope at low altitudes, in bogs or wet thickets. Alaska to Calif., N. Mex., N. Dak., and Lab.—Glabrous perennial, 0.5 to 1 meter high, with simple stems; leaves oblong-lanceolate, 10 to 30 cm. long, usually cordate at base; flowers in a narrow dense panicle; sepals reddish or purplish in fruit.

6. **Rumex paucifolius** Nutt. Collected at east entrance by Umbach. B. C. to Calif., Colo., and Alta.—Glabrous perennial, 20 to 50 cm. high, with simple stems; leaves lanceolate or oblanceolate, 3 to 10 cm. long; flowers usually tinged with red.

7. **Rumex acetosella** L. SHEEP SORREL. Common at low altitudes, in open places or in woods; often extending high up along the trails. Native of Eur.; widely naturalized in N. Amer.—Perennial, 10 to 60 cm. high, with creeping rootstocks, often much branched from the base, slender; leaves 3 to 10 cm. long, most of them with 2 spreading lobes at the base; flowers about 1 mm. long, usually deep red or purplish.

In some places very abundant and forming dense patches.

8. **Rumex acetosa** L. SOUR DOCK. Frequent above timber line on rock slides; sometimes in wet meadows at low and middle altitudes. Alaska to Mont.; also in Eur., and naturalized in eastern N. Amer.—Glabrous perennial, 0.2 to 1 meter high, with short rootstocks; leaves oblong or ovate, 3 to 10 cm. long, usually cordate at the base, the stem leaves clasping; sepals tinged with red.

In many books the statement is made that this species is wholly adventive in North America, but it is certainly native in Montana, and doubtless also in Alaska and western Canada.

4. OXYRIA Hill.

1. **Oxyria digyna** (L.) Hill. MOUNTAIN SORREL. Abundant above timber line, on slopes or rock slides; occasionally found at middle elevations, and scattered plants occur about the east entrance. Alaska to Calif., N. Mex., Alta., N. H., and Greenl.; also in Eur. and Asia.—Perennial, 5 to 30 cm. high, often forming dense clumps; leaves mostly at base of stem, long-stalked, kidney-shaped, 1 to 3 cm. broad; flowers panicled, green tinged with red, the 4 sepals 4 to 6 mm. wide.

A characteristic plant of alpine rock slides, conspicuous because of the red coloring of the flowers. The succulent leaves have a pleasant acid flavor; they can be used in salads and sandwiches. Ptarmigan are fond of the flowers, and many of the plants are cropped by animals, presumably sheep and goats.

26. CHENOPODIACEAE. Goosefoot Family.

Annual herbs with succulent leaves; flowers small, greenish, the calyx of 2 to 5 sepals; corolla none; fruit small, 1-seeded.

Leaves, at least the lower ones, opposite; fruit inclosed by 2 green bracts. . . . . **1. ATRIPLEX.**

Leaves all alternate; fruit not inclosed by bracts.

Leaves linear, never white-mealy or toothed.

Leaves with spiny tips; calyx winged in fruit . . . . . **2. SALSOLA.**

Leaves never with spiny tips; calyx not winged . . . . . **3. DONDIA.**

Leaves much broader than linear or, if narrow, white-mealy, often toothed.

Sepal 1 . . . . . **4. MONOLEPIS.**

Sepals 3 to 5 . . . . . **5. CHENOPODIUM.**

1. ATRIPLEX L.

1. **Atriplex hastata** L. A few plants found in low alkaline spots on prairie at the east entrance. Widely distributed in N. Amer., Eur., and Asia.—Annual, 10 to 50 cm. high, with scurfy pubescence; leaves triangular, fleshy, 2 to 6 cm. long, toothed; flowers very small, green, in spikes.

The plants found by the writer were depauperate, and only 5 to 15 cm. high.

2. SALSOLA L.

1. Salsola pestifer A. Nels. RUSSIAN THISTLE. A few plants in waste ground about Belton and the east entrance. Native of Eur.; introduced as a weed in N. Amer.—Annual, 30 to 60 cm. high, usually forming dense bushy clumps; leaves linear, 2 to 5 cm. long, spine-tipped, glabrous; flowers small, green, in the leaf axils; calyx winged in fruit.

In many parts of the West this is an abundant and troublesome weed. In the plains region of Montana it is very common, and east of the park one sees many fields so densely covered with the Russian thistle that they appear to have been deliberately seeded with the plant. In autumn and winter when the plants are dead they are rolled about by the wind as "tumbleweeds," and it is thus that the seeds are scattered so efficiently. The dry plants are often lodged in great masses along wire fences.

3. DONDIA Adans.

1. Dondia depressa (Pursh) Britton. Abundant at east entrance in low alkaline places on prairie. Sask. to Nev., N. Mex., and Kans. (*D. erecta* A. Nels.; *Suaeda depressa* S. Wats.)—Glabrous annual, erect or spreading, very fleshy; leaves linear, alternate, 1 to 2 cm. long; flowers green, borne in the leaf axils.

The plants are usually purplish red, and form dense carpets.

4. MONOLEPIS Schrad.

1. Monolepis nuttalliana (Schult.) Greene. POVERTY-WEED. Occasional on the east slope at low altitudes, on open hillsides or in thickets. Wash. to Calif., Tex., and Minn.—Annual, 10 to 30 cm. high, branched from the base, nearly glabrous; leaves alternate, 1 to 4 cm. long, lobed and often toothed; flowers in small clusters in the leaf axils.

5. CHENOPODIUM L.

Annuals, with mealy or glandular pubescence; leaves alternate, entire, toothed, or lobed; flowers very small, greenish, in spikes or dense clusters; sepals 3 to 5.

Leaves deeply lobed, finely glandular-hairy, sweet-scented . . . . . **1. C. botrys.**
Leaves entire or toothed, neither glandular-hairy nor sweet-scented.
  Seed standing erect inside the calyx.
    Leaves white-mealy beneath; calyx green, not fleshy . . . . . **2. C. salinum.**
    Leaves green, not mealy; calyx becoming red and fleshy.
      Plants low, spreading, very fleshy; flowers in short spikes in the axils of the leaves . . . . . **3. C. humile.**
      Plants tall (30 to 60 cm.), erect, not very fleshy; flowers in rounded clusters in the axils of the leaves . . . . . **4. C. capitatum.**
  Seed lying crosswise in the calyx.
    Pericarp (outer coat of the fruit) easily separating from the shining seed.
      Leaves linear or narrowly lanceolate . . . . . **5. C. leptophyllum.**
      Leaves rhombic-ovate . . . . . **6. C. atrovirens.**
    Pericarp not separating from the seed.
      Clayx closed over the fruit at maturity . . . . . **7. C. album.**
      Calyx open and exposing the fruit . . . . . **8. C. hians.**

1. Chenopodium botrys L. JERUSALEM OAK. Occasional along railroad at Belton. Native of Eur.; adventive in N. Amer.—Plants 10 to 40 cm. high, branched, finely viscid-hairy; leaves 1 to 5 cm. long; flowers in loose axillary clusters.

2. Chenopodium salinum Standl. Frequent about east entrance, on open slopes or about dried-up pools on prairie. Oreg. to N. Mex. and Nebr.—Plants usually prostrate, much branched; leaves oblong to broadly ovate, 1 to 3 cm. long, toothed; flowers in short spikes in the axils of the leaves.

Doubtfully distinct from *C. glaucum* L., of the Old World.

3. Chenopodium humile Hook. ALKALI BLITE. East entrance, in low alkaline places. B. C. to Calif., Colo., and Nebr.—Plants much branched, often conspicuously tinged with red; leaves mostly obovate or spatulate, 1 to 3 cm. long.

4. Chenopodium capitatum (L.) Aschers. STRAWBERRY BLITE. East slope at low altitudes, rare and perhaps introduced. Widely distributed in N. Amer. and in Eur. and Asia. (*Blitum capitatum* L.)—Plants pale green, glabrous, simple or branched; leaves triangular to lanceolate, 3 to 6 cm. long, toothed; flower clusters in fruit fleshy and bright red, suggesting strawberries.

5. Chenopodium leptophyllum Nutt. Open slopes or low places at east entrance. B. C. to Oreg., N. Mex., and Mo.; also on the Atlantic coast.—Plants erect, branched, 30 to 70 cm. high, white-mealy; leaves short-petioled, 1 to 5 cm. long, entire or with a few teeth; flowers in panicled spikes.

6. Chenopodium atrovirens Rydb. East entrance, on dry banks. Mont. to Nev.—Plants erect, green, 20 to 50 cm. high; leaves rhombic-ovate, long-petioled, 1 to 3 cm. long, toothed.

7. Chenopodium album L. LAMB'S-QUARTERS. Frequent at low altitudes, in waste or cultivated ground or on open or brushy slopes; often extending high up along the trails. Native of Eur.; widely naturalized as a weed in N. Amer.—Plants branched, 0.5 to 1 meter high, usually white-mealy, sometimes green; leaves lanceolate to rhombic-ovate, 2 to 6 cm. long, coarsely toothed, slender-petioled.

Some of the specimens are very green and might be referred to *C. paganum* Reichenb., but that is probably only a form of *C. album*.

8. Chenopodium hians Standl. Along trail at head of Lake McDonald. Mont. to N. Mex.—Plants 20 to 60 cm. high, white-mealy; leaves oblong to rhombic-ovate, 1 to 3 cm. long, entire or toothed, short-petioled.

27. AMARANTHACEAE. Pigweed Family.

1. AMARANTHUS L.

Annuals; leaves alternate, entire; flowers very small, green, in panicled spikes or in clusters in the axils of the leaves; sepals 3 to 5; petals none; flowers each with 3 spine-pointed bracts at the base; fruit small, 1-seeded, dry, inclosed in the calyx.

Flowers in long dense spikes at the top of the plant . . . . . **1. A. retroflexus.**
Flowers in small dense clusters in the axils of the leaves.

Plants erect; bracts much longer than the sepals; seeds about 0.8 mm. broad.
2. A. graecizans.

Plants prostrate; bracts only slightly longer than the sepals; seeds about 1.5 mm. broad . . . . . **3. A. blitoides.**

1. Amaranthus retroflexus L. PIGWEED. A few plants along the railroad at Belton; introduced. Widely distributed in the U. S. and southern Can.—Plants erect, 0.3 to 1 meter high or often larger, somewhat hairy; leaves ovate, 3 to 10 cm. long, slender-petioled, obtuse.

2. Amaranthus graecizans L. TUMBLEWEED. Waste or cultivated ground, Belton and east entrance; infrequent. Widely distributed in N. Amer. and Eur.—Plants much branched, 20 to 60 cm. high, the stems pale; leaves mostly spatulate, 1 to 4 cm. long.

3. Amaranthus blitoides S. Wats. Waste or cultivated ground, Belton and east entrance; infrequent. B. C. to Calif., Tex., and Minn.—Stems stout, glabrous or nearly so, much branched, forming circular mats; leaves mostly spatulate, 1 to 3 cm. long.

28. PORTULACACEAE. Purslane Family.

Plants succulent, annual or perennial; leaves entire, opposite or alternate; sepals 2; petals 4 or 5 or sometimes more; stamens as many as the petals; fruit a small capsule.

Stem with 2 small opposite linear bractlike leaves; capsule opening around the base, the top coming off like a cap; petals 6 to 8 . . . . . **1. OREOBROMA.**
Stem with numerous leaves, or with 2 broad leaves; capsule opening at the top by 3 valves; petals 5 . . . . . **2. CLAYTONIA.**

1. OREOBROMA Howell.

1. Oreobroma pygmaea (A. Gray) Howell. BREADROOT. East entrance, on creek bank, *Umbach*. Wash. to Calif., Colo., and Mont.—Stems 2 to 5 cm. high, clustered, from a thick fleshy root, 1-flowered; leaves linear, 2 to 7 cm. long; petals pink or white, 8 to 10 mm. long.

2. CLAYTONIA L. SPRINGBEAUTY.

Glabrous annuals or perennials; leaves opposite or alternate; flowers in racemes.

Stem leaves 2, opposite.
Plants with long thick taproots; basal leaves numerous, obtuse . **1. C. megarrhiza.**
Plants with rounded tuber-like roots; basal leaf 1, acute . . . . . **2. C. lanceolata.**
Stem leaves numerous, alternate.
Leaves spatulate; plants perennial . . . . . **3. C. parvifolia.**
Leaves linear; plants annual . . . . . **4. C. linearis.**

1. Claytonia megarrhiza (A. Gray) Parry. ALPINE SPRINGBEAUTY. Frequent above timber line, on high rock slides and rocky slopes. Wash. to Mont. and N. Mex.—Stems 3 to 10 cm. long, in a dense tuft; basal leaves spatulate or rounded, 1 to 3 cm. long, on very long broad petioles; petals 6 to 8 mm. long, pink or white.

The leaves and stems are usually tinged with red. The roots are very elastic.

2. Claytonia lanceolata Pursh. Frequent in meadows above timber line; also in aspen thickets at east entrance. B. C. to Calif., N. Mex., and Sask.—Stems 5 to 20 cm. high; stem leaves lanceolate or ovate-oblong, 2 to 5 cm. long, sessile; petals white or pink, 6 to 8 mm. long.

The plants bloom only a short time and are not conspicuous. The tuberous roots were dug in the spring by the Blackfoot Indians, boiled, and eaten.

3. Claytonia parvifolia Moc. PINK SPRINGBEAUTY. Frequent at low and middle altitudes, extending up to timber line, in moist woods or thickets or along brooks. Alaska to Calif. and Mont. (*Naiocrene parvifolia* Rydb.)—Stems slender, 10 to 30 cm. long, ascending; leaves 5 to 20 mm. long, the lower ones petioled; petals pink, 8 to 10 mm. long, notched.

The plants produce small green bulblets in the leaf axils.

4. Claytonia linearis Dougl. Occasional on the east slope at low altitudes, in moist thickets or on open hillsides. B. C. to Calif. and Mont. (*Montiastrum lineare* Rydb.)—Stems slender, 5 to 25 cm. high, branched; leaves 1 to 5 mm. long; seeds black and shining.

The flowers are seen only in spring.

29. SILENACEAE. Pink Family.

Annual or perennial herbs with opposite entire leaves; flowers most often in cymes; sepals 4 or 5, distinct or united; petals 4 or 5, sometimes wanting; fruit a capsule, containing few or many seeds.—The name Caryophyllaceae is often used for the family. The cultivated pinks and carnations belong to the group.

Sepals united; petals clawed.
Styles 5; capsule with 10 teeth . . . . . **1. LYCHNIS.**
Styles 3; capsule with 6 teeth . . . . . **2. SILENE.**
Sepals distinct; petals not clawed.
Petals deeply 2-lobed; capsule with twice as many valves or teeth as styles.
Capsule long, cylindric, often curved, opening with 10 teeth at the apex; styles 5. **3. CERASTIUM.**

Capsule short, ovoid or oblong, not curved, usually opening with 6 valves; styles usually 3 . . . . . 4. STELLARIA.

Petals entire or shallowly notched, sometimes none; capsule with as many (entire or 2-cleft) valves as styles.

Styles as many as the sepals and alternate with them; petals shorter than the sepals . . . . . 5. SAGINA.

Styles fewer than the sepals or, if of the same number, opposite them; petals usually much longer than the sepals.

Seeds with a small appendage; flowers mostly in the axils of the leaves; leaves oval or elliptic . . . . . 6. MOEHRINGIA.

Seeds not appendaged; flowers mostly in cymes; leaves usually linear. 7. ARENARIA.

1. LYCHNIS L.

Annuals or perennials, with viscid pubescence; calyx often inflated, 10-nerved, 5-toothed; petals small or large; stamens 10.

Petals much longer than the calyx; plants 0.6 to 1 meter high . . . . . 1. L. alba.

Petals not exserted from the calyx; plants 5 to 20 cm. high . . . . . 2. L. apetala.

1. Lychnis alba Mill. WHITE CAMPION. Scattered plants found in several places. Native of Eur.; naturalized as a weed in N. Amer.—Plants stout, branched, very viscid; leaves ovate to lance-oblong; petals white; calyx becoming very large in fruit.

Several large plants grew in the flower beds at the Glacier Park Hotel in 1919, and they were rather showy. The flowers open in the evening and close in the forenoon; some of them are pistillate and others staminate.

2. Lychnis apetala L. BLADDER CAMPION. Occasional above timber line on the highest rock slides. Alaska to Utah, Colo., Lab., and Greenl.; also in Eur. and Asia. (*Wahlbergella apetala* Fries.)—Perennial, branched, finely hairy and viscid; leaves linear, 2 to 5 cm. long; flowers mostly solitary, long-stalked, nodding; calyx bladder-like, purplish, 12 to 15 mm. long; petals very small.

An uncommon but attractive little plant, whose inflated purple-striped calyces suggest Chinese lanterns.

2. SILENE L.

Perennials; leaves narrow; flowers solitary or in cymes; calyx with short lobes, 10-nerved; petals 5, with an appendage at the upper end of the claw; styles 3.

Plants almost stemless, rarely more than 5 cm. high; petals pink or purple; leaves 5 to 15 mm. long . . . . . 1. S. acaulis.

Plants 15 to 40 cm. high; petals white or nearly so; leaves 30 to 80 mm. long. 2. S. multicaulis.

1. Silene acaulis L. CARPET PINK. Common above timber line, in meadows or on rock slides; rarely found on open slopes at middle altitudes. Alaska to Ariz., N. H., and Greenl.; also in Eur. and Asia.—Plants forming very dense mats 10 to 60 cm. wide; leaves linear; flowers solitary on short erect stems; calyx 5 to 6 mm. long; petals merely notched.

A beautiful plant, the mats densely covered with the bright flowers. The flowers, unfortunately, last only a short time.

2. Silene multicaulis Nutt. CATCHFLY. Common at nearly all altitudes, in woods or meadows or on open slopes or rock slides. B. C. to Oreg., Wyo., and Alta.—Stems tufted, very sticky; leaves linear to oblanceolate; calyx 1.5 cm. long; petals 2 to 2.5 cm. long (including the claw), 2-lobed.

The flowers are rather showy; they open in the evening and close in the forenoon. Sometimes they are tinged with pink.

3. CERASTIUM L. Mouse-ear chickweed.

Perennials, with viscid pubescence; flowers in cymes; petals white; stamens 10; capsule opening by 10 small teeth.

Leaves linear, acute . . . . . **1. C. strictum.**
Leaves oblong to oval, obtuse or acutish.
Petals scarcely if at all longer than the sepals . . . . . **2. C. vulgatum.**
Petals much longer than the sepals.
Sepals 7 to 8 mm. long; petals about 10 mm. long . . . . . **3. C. alpinum.**
Sepals 4 to 5 mm. long; petals 6 to 8 mm. long . . . . . **4. C. beeringianum.**

1. Cerastium strictum L. Common at nearly all altitudes but most abundant above timber line, in moist meadows, woods, or thickets, or on open slopes or rock slides. B. C. and Wash. to Colo. and S. Dak.; also in Eur. and Asia.—Stems tufted, 10 to 30 cm. long, finely hairy; leaves 1 to 2 cm. long; sepals about 5 mm. long; petals about twice as long as the sepals.

Perhaps only a form of *C. arvense* L.

2. Cerastium vulgatum L. Frequent on the west slope at low altitudes, in gardens or waste ground and along trails. Native of Eur. and Asia; adventive in N. Amer.—Stems ascending, 10 to 30 cm. long; leaves 1 to 3 cm. long; sepals 5 mm. long.

3. Cerastium alpinum L. Frequent above timber line, on rocky slopes and rock slides. Alaska to Mont., Que., and Greenl.; also in Eur. and Asia.—Stems ascending, 10 to 20 cm. long; leaves 0.5 to 2 cm. long; cymes 2 or 3-flowered or the flowers often solitary.

4. Cerastium beeringianum Cham. & Schlecht. At nearly all altitudes, but most abundant above timber line, in meadows, on rock slides, or along streams and lakes. Alaska to Ariz., Alta., and Que.—Stems clustered, ascending, 5 to 20 cm. long, very viscid; leaves 0.5 to 2 cm. long.

This species is doubtfully distinct from *C. alpinum*.

4. STELLARIA L. Chickweed.

Annuals or perennials, glabrous or pubescent; leaves broad or narrow; sepals 5; petals 5 or wanting, deeply 2-lobed, white.

Plants with fine gland-tipped hairs . . . . . **1. S. americana.**
Plants without gland-tipped hairs, usually glabrous.
Bracts of the inflorescence, at least the uppermost, scarious, whitish.
Petals as long as the sepals or slightly longer . . . . . **2. S. longipes.**
Petals minute or none.
Leaves oblong-lanceolate; pedicels reflexed in age . . . . . **3. S. umbellata.**
Leaves linear; pedicels ascending . . . . . **4. S. alpestris.**
Bracts all green, never scarious.
Leaves linear or lanceolate, more than 4 times as long as broad.
Petals minute or usually none . . . . . **5. S. borealis.**
Petals as long as the sepals.
Leaves bluish green; plants less than 10 cm. high . . . . . **6. S. laeta.**
Leaves bright green; plants usually more than 10 cm. high. **7. S. crassifolia.**
Leaves lance-ovate to broadly ovate, less than 4 times as long as broad.
Leaves long-petioled . . . . . **8. S. media.**
Leaves sessile or nearly so.
Sepals acute . . . . . **9. S. crispa.**
Sepals obtuse . . . . . **10. S. obtusa.**

1. Stellaria americana (Porter) Standl. Frequent on rock slides and exposed rocky slopes above timber line; occasionally found on rocky slopes at middle altitudes, especially near snow banks. Mont. (*Alsine americana* Rydb.)—Stems very leafy, forming loose prostrate mats; leaves ovate or oval, 1 to 3 cm. long, usually obtuse; petals longer than the sepals.

The plant is extremely viscid when fresh.

2. Stellaria longipes Goldie. Occasional on the east slope at low altitudes, in moist meadows or thickets. Alaska to Colo., Que., and Greenl. (*Alsine longipes* Coville.)—Perennial, with slender, usually erect stems; leaves linear, 1 to 3 cm. long, often shining, acute; flowers on long slender stalks; calyx 4 to 5 mm. long.

3. Stellaria umbellata Turcz. Occasional above timber line, on open rocky slopes; sometimes in woods at middle altitudes. Oreg. to N. Mex. and Mont.; also in Asia. (*Alsine baicalensis* Coville.)—Stems very slender, erect or ascending, 5 to 20 cm. high; leaves 5 to 20 mm. long, acute; sepals 2 to 2.5 mm. long, about half as long as the capsule.

4. Stellaria alpestris Fries. Occasional on the east slope at low altitudes, in bogs. Alta. to Colo. and Ont.; also in Eur. (*Alsine alpestris* Rydb.)—Stems very slender, 20 to 40 cm. high, glabrous, erect or ascending; leaves 2 to 6 cm. long, acute; sepals 3 mm. long.

5. Stellaria borealis Bigel. Frequent at low and rarely at middle altitudes, in damp woods or thickets. Alaska to Calif., Colo., N. J., and Lab. (*Alsine borealis* Britton.)—Stems slender, 15 to 40 cm. long, erect or sometimes procumbent, glabrous; leaves 1 to 4 cm. long; flowers slender-stalked; sepals 3 to 4 mm. long.

6. Stellaria laeta Richards. BLUE CHICKWEED. Open rocky slopes near Piegan Pass. Alaska to Calif. and N. Mex. (*Alsine laeta* Rydb.)—Stems very leafy, tufted; leaves 1 to 2 cm. long, acute; flowers mostly solitary in the leaf axils; petals about 5 mm. long.

The plant is very different from the other species in its pale bluish leaves.

7. Stellaria crassifolia Ehrh. Wet thicket near St. Mary. Alta. to Colo., Pa., and Lab. (*Alsine crassifolia* Britton.)—Stems very slender, 15 to 30 cm. long, glabrous; leaves 5 to 20 mm. long, oblong-lanceolate, acute; petals slightly longer than the acute sepals.

8. Stellaria media (L.) Cyrill. COMMON CHICKWEED. Abundant about Lewis's. Native of Eur.; naturalized as a weed in N. Amer. (*Alsine media* L.)—Annual, with slender prostrate stems; leaves broadly ovate, 5 to 20 mm. long, acute or obtuse, thin; sepals minutely glandular-hairy; petals shorter than the sepals.

9. Stellaria crispa Cham. & Schlecht. Frequent at nearly all altitudes, in moist woods or thickets or on open slopes. Alaska to Calif., Wyo., and Alta. (*Alsine crispa* Holzinger.)—Stems very slender, prostrate, 10 to 30 cm. long; leaves ovate, 5 to 20 mm. long, acute; petals minute or none.

10. Stellaria obtusa Engelm. Frequent at middle altitudes and sometimes above timber line, in woods or on open slopes. B. C. and Wash. to Colo. and Alta. (*Alsine obtusa* Rose.)—Stems slender, 10 to 20 cm. long, prostrate, forming dense mats, glabrous; leaves 4 to 10 mm. long, acute; petals none or minute.

5. SAGINA L.

1. Sagina saginoides (L.) Britton. PEARLWORT. Frequent at all altitudes but most common at middle elevations, on moist banks or slopes or in woods, often along banks of streams and lakes. Alaska to Calif., N. Mex., Que., and Greenl.; also in Eur. and Asia.—Slender perennial, 2 to 8 cm. high, loosely tufted, glabrous or nearly so; leaves filiform, 5 to 12 mm. long; flowers on slender stalks in the leaf axils; sepals 1.5 to 2 mm. long, very obtuse; petals much shorter than the sepals, white.

6. MOEHRINGIA L.

1. Moehringia lateriflora (L.) Fenzl. Frequent at low or sometimes at middle altitudes, in moist woods or thickets. Alaska to Oreg., N. Mex., N. J., and Lab.; also in Eur. and Asia. (*Arenaria lateriflora* L.)—Perennial; stems slender, 10 to 20 cm. long, tufted, minutely hairy; leaves oval to oblong, 1 to 3 cm. long, mostly obtuse; flowers white, axillary or in cymes; sepals obtuse; petals 4 to 5 mm. long, longer than the sepals; seeds black and shining, with a small pale appendage.

7. ARENARIA L. SANDWORT.

Perennials, often tufted or matted; leaves linear or needle-like; flowers in cymes or often solitary; petals 5, white; stamens 10; capsule opening by 3 valves, these often 2-cleft.

Stems glabrous . . . . . **1. A. rossii.**
Stems finely glandular-hairy.
  Sepals acute.
    Sepals 3 mm. long, 3-nerved; petals usually longer than the sepals. **2. A. propinqua.**
    Sepals 4 to 5 mm. long, 1-nerved; petals shorter than the sepals . . **3. A. nuttallii.**
  Sepals obtuse.
    Leaves mostly 2 to 10 cm. long; stems usually with numerous flowers; valves of the capsule 2-lobed . . . . . **4. A. formosa.**
    Leaves 2 to 6 mm. long; stems with 1 to 4 flowers; valves of the capsule entire.
      Sepals glabrous or minutely puberulent; capsule 4 to 6 mm. long. **5. A. sajanensis.**
      Sepals with short but slender gland-tipped hairs; capsule 6 to 8 mm. long. **6. A. laricifolia.**

1. Arenaria rossii (Richards.) R. Br. Common above timber line, especially on rock slides. Alaska to Wash. and Colo. (*Alsinopsis rossii* Rydb.)—Stems 1 to 5 cm. high, tufted; leaves 4 to 8 mm. long, linear; flowers usually solitary; sepals 3 mm. long, acute.

2. Arenaria propinqua Richards. Frequent at nearly all altitudes, especially above timber line, in meadows or moist thickets, along creek beds, or on open slopes or rock slides. B. C. to Calif., N. Mex., and Mack. (*Alsinopsis propinqua* Rydb.)—Stems 3 to 10 cm. high, very slender, loosely branched and tufted; leaves very slender, 5 to 10 mm. long.

3. Arenaria nuttallii Pax. Frequent above timber line, on rock slides or exposed summits or in meadows. B. C. to Calif., Wyo., and Alta. (*Alsinopsis occidentalis* Heller.)—Stems 10 to 15 cm. high, loosely matted; leaves ascending, sharp-pointed, 6 to 12 mm. long, very viscid.

4. Arenaria formosa Fisch. GRASS SANDWORT. Common at nearly all altitudes but most abundant above timber line, in meadows or on open slopes or rock slides. B. C. to Calif., Utah, and Alta.—Stems 10 to 20 cm. high, densely tufted; leaves grasslike, mostly basal; petals 6 to 9 mm. long, much longer than the sepals.

A rather conspicuous plant.

5. Arenaria sajanensis Willd. Frequent above timber line, in meadows or on rock slides. Alaska to Oreg., Ariz., Alta., Que., and Greenl.; also in Asia.—Stems 2 to 5 cm. high, usually forming dense mats; petals equaling or slightly longer than the sepals; seeds not beaked.

6. Arenaria laricifolia L. Frequent at high and middle altitudes, in meadows or on rock slides or open slopes; sometimes found at low altitudes in exposed places Yukon to Oreg. and Wyo.; also in Eur. and Asia. (*Alsinopsis laricifolia* Heller.)—Stems

2 to 10 cm. high, usually forming dense, large or small mats; petals longer than the sepals; seeds with a thick beak.

Some of our material may be referable to *A. obtusiloba* (Rydb.) Fernald, but the differences between the two species are not clearly defined.

30. NYMPHAEACEAE. Waterlily Family.

1. NYMPHAEA L.

1. Nymphaea polysepala (Engelm.) Greene. YELLOW PONDLILY. In small lakes on the west slope. Alaska to Calif., Colo., and S. Dak.—Perennial with very thick rootstocks; leaves long-petioled, floating, oval, 20 to 40 cm long, cordate at base; flowers long-stalked, green and yellow, tinged with red; sepals 6 to 12, the petals very small; fruit a leathery berry, 3 to 8 cm. long, containing numerous brown seeds.

The plants grow in shallow or deep water, and the petioles and peduncles are often very long. The seeds, under the name of "wokas," are much used for food by some of the Indians of the Pacific coast.

31. RANUNCULACEAE. Buttercup Family.

Herbs or climbing shrubs; leaves usually alternate, simple or compound; flowers regular or irregular; sepals 3 to 15, usually green but often colored and petal-like; petals as many as the sepals or wanting; stamens usually numerous, rarely 5; fruit dry or fleshy.

Plants climbing shrubs; leaves opposite . . . . . 1. **CLEMATIS.**
Plants herbs, never climbing; leaves alternate.
Flowers in racemes, blue or white.
Petals white, not spurred; fruit a white or red berry . . . . . 2. **ACTAEA.**
Petals blue, some of them with spurs; fruit of dry pods . . . 3. **DELPHINIUM.**
Flowers not in racemes, of various colors.
Fruit of several pods, each containing several seeds.
Flowers with spurs, yellow or blue; leaves with numerous leaflets.
4. **AQUILEGIA.**
Flowers not spurred, white; leaves with few divisions . . . . . 5. **TROLLIUS.**
Fruit a head of few or many (1-seeded) achenes.
Plants submerged in water; leaves all divided into threadlike lobes.
7. **BATRACHIUM.**
Plants not growing in water or, if so, the leaves not divided into narrow lobes.
Leaves narrowly linear; stems naked . . . . . 6. **MYOSURUS.**
Leaves not linear; stems usually leafy or with bracts.
Petals and sepals present; petals yellow.
Achenes with longitudinal ribs; stems creeping, rooting at the joints; leaves with small rounded teeth . . . . . 8. **HALERPESTES.**
Achenes not ribbed; stems neither creeping nor rooting or, if so, either entire or sharply toothed . . . . . 9. **RANUNCULUS.**
Petals none, but the sepals often resembling petals; sepals never yellow.
Achenes few, not hairy; flower stems not bearing a pair or whorl of leaves below the flowers; sepals greenish . . . 10. **THALICTRUM.**
Achenes many, hairy; flower stems with a pair or whorl of leaves below the flowers; sepals white to blue or purple.
Achenes with long hairy tails in fruit; sepals 2 to 3.5 cm. long.
11. **PULSATILLA.**
Achenes not tailed; sepals less than 2 cm. long . . . 12. **ANEMONE.**

1. CLEMATIS L.

Somewhat woody vines; leaves opposite, composed of 3 to 7 leaflets; flowers solitary or panicled; sepals 4, petal-like; petals very small or usually wanting; fruit a head of achenes, each achene with a long hairy tail.

Sepals white, about 1 cm. long; leaflets 5 or 7, toothed . . . . . **1. C. ligusticifolia.**
Sepals purple, 3 to 5 cm. long; leaflets 3, entire . . . . . **2. C. columbiana.**

1. Clematis ligusticifolia Nutt. WHITE CLEMATIS. At low altitudes on rocky banks or hillsides; scarce. B. C. to Calif., N. Mex., and N. Dak.—Low vine; leaflets 3 to 6 cm. long, with appressed hairs; flowers in loose panicles; tails of the achenes 4 to 5 cm. long.

2. Clematis columbiana (Nutt.) Torr. & Gray. PURPLE CLEMATIS. PLATE 48, A. Frequent at low and middle altitudes, in aspen thickets or moist woods. B. C. and Wash. to Colo. and Alta. (*Atragene columbiana* Nutt.)—Low vine; leaflets 3 to 10 cm. long, thin, sharp-pointed, usually entire; sepals sharp-pointed.

A showy and attractive plant, but it blooms too early in the season to be seen by many visitors to the park. The Blackfoot name for the purple clematis is "ghost's lariat," in allusion to the fact that the slender, tough stems catch people's feet and trip them unexpectedly.

2. ACTAEA L.

1. Actaea rubra (Ait.) Willd. BANEBERRY. Common at low and middle altitudes, usually in moist woods or thickets. Alaska to Calif., N. Mex., N. J., and Newf.—Perennial, with thick rootstocks, 0.5 to 1 meter high, glabrous or nearly so; leaves large, composed of numerous lobed and toothed thin leaflets 5 to 10 cm. long; flowers white, the petals 2 to 3 mm. long; stamens numerous, white, much longer than the petals; fruit berrylike, with several seeds.

The flowers are inconspicuous, but the fruiting plants are very showy and handsome. The fruit is remarkably variable, and because of this fact some authors would divide the Glacier Park material into three species. The typical form has bright red fruit, 10 to 12 mm. long. *A. rubra neglecta* (Gillman) Robinson (*A. eburnea* Rydb.) has white fruit which appears as if made of china. The forms with red and with white fruit are about equally common and grow together; the plants differ in no other respects, and can scarcely be considered distinct species. One plant was noticed by the writer in which the upper fruits of the raceme were bright red, while the lower ones were almost white, with a faint tinge of pink. The fruit varies also in size, and *A. arguta* Nutt. is a form with globose fruit only 5 to 6 mm. long. This form is often found with the large-fruited plants, and does not appear to be of systematic importance. The smaller fruits are most commonly red, but not infrequently white.

According to McClintock, the Blackfoot Indians used the boiled roots as a remedy for coughs and colds.

3. DELPHINIUM L. LARKSPUR.

Erect perennials with simple stems; leaves long-petioled, divided into numerous narrow lobes; flowers large, blue, in racemes; sepals petal-like, one of them produced into a long spur; petals 2 or 4, small; stamens numerous; fruit of 3 or 4 pods.

Roots tuber-like; sepals about 1 cm. long; pods usually about 1 cm. long.
1. D. depauperatum.
Roots thick, clustered, not tuber-like; sepals about 1.5 cm. long; pods 1.5 to 2 cm. long.
2. D. bicolor.

1. Delphinium depauperatum Nutt. Frequent in meadows just above timber line. Wash. to Calif., Wyo., and Mont.—Stems 20 to 40 cm. high, finely hairy above; stem leaves numerous, about 3 cm. long, divided into narrow lobes, glabrous or somewhat hairy; flowers few, dark blue, about 1 cm. long; petals whitish; pods glabrous or finely hairy.

One of the conspicuous plants of alpine meadows, but seldom occurring in great abundance.

2. Delphinium bicolor Nutt. East entrance, on prairie, *Umbach*. Wash. to Utah and Sask.—Stems stout, 20 to 40 cm. high, hairy, at least above; leaves 2 to 4 cm. wide, finely hairy or nearly glabrous; flowers deep blue, 1.5 cm. long; petals yellowish or whitish; pods hairy or glabrous.

4. AQUILEGIA L. COLUMBINE.

Perennials with thick roots; stems often branched, bearing 1 or numerous flowers; leaves with numerous lobed leaflets; sepals 5, petal-like; petals 5, each with a long spur at the base; stamens numerous; fruit of 5 pods.—Red columbine has been reported from the region, but probably does not occur here.

Flowers yellow; stems several-flowered . . . . . **1. A. flavescens.**
Flowers blue; stems usually 1-flowered . . . . . **2. A. jonesii.**

1. Aquilegia flavescens S. Wats. YELLOW COLUMBINE. Common above and near timber line, in meadows, or on rocky slopes or rock slides; occasionally found at middle elevations in woods. B. C. to Oreg., Wyo., and Alta.—Stems 20 to 60 cm. high, usually in clumps; leaflets 1 to 4 cm. long, 3-lobed; sepals usually sulphur-yellow, but sometimes very pale or occasionally salmon-pink; petals pale yellow, 5 to 8 mm. long; spurs 1 to 1.5 cm. long; pods about 2 cm. long.

A very handsome plant. The flowers vary greatly in size, and there are numerous color forms.

2. Aquilegia jonesii Parry. BLUE COLUMBINE. Frequent on the highest rock slides and on exposed rocky alpine slopes. Alta. to Wyo.—Plants 5 to 10 cm. high, finely pubescent; leaves basal, 1 to 5 cm. wide, the leaflets glaucous, small and crowded; flower erect, the sepals 1.5 cm. long; spurs 8 to 10 mm. long; pods 1.5 to 2 cm. long.

A showy plant whose flowers last only a short time.

2a. Aquilegia jonesii elatior Standl., subsp. nov. Similar in general appearance to *A. jonesii*, but the stems taller, 10 to 20 cm. high, usually 1-flowered but occasionally 2-flowered, naked or often leafy-bracted; leaves 7 to 12 cm. high, the leaflets somewhat larger than in the species, not crowded; flowers like those of the species, the petals often white.

Type in the U. S. National Herbarium, no. 1025123, collected on a rock slide above Cracker Lake, Glacier National Park, Montana, altitude 1,920 meters, July 15, 1919, by P. C. Standley (no. 15765). Also collected on rock slide above Iceberg Lake. July 26, 1919 (no. 16407).

This grows with typical *A. jonesii*, and at first glance it appears quite distinct. While in the field it was presumed that two species of blue columbine were represented in Glacier Park, but close examination of the specimens secured does not reveal any constant differences between the two forms. *A. jonesii elatior* is a larger, greener, less pubescent plant than *A. jonesii*, and has larger leaves whose leaflets are not crowded as in that species. It seems best to regard it as only a form of *A. jonesii*, a view confirmed by Mr. Edwin B. Payson, who has examined the material.

5. TROLLIUS L.

1. Trollius albiflorus (A. Gray) Rydb. GLOBEFLOWER. Common above and near timber line, in wet meadows; often about snow banks. B. C. and Wash. to Color and Alta.—Glabrous perennial, 20 to 50 cm. high, with rootstocks; stems leafy, 1 or few-flowered; leaves parted and lobed, 4 to 8 cm. long; sepals 5 to 7, white; petal, linear, 3 to 5 mm. long; fruit of 10 to 20 pods about 1 cm. long.

One of the characteristic plants of alpine meadows, springing up quickly after snow leaves the ground, the stems sometimes even pushing up through thin snow. The flowers are conspicuous, but they are of a dirty white color and not particularly attractive.

6. MYOSURUS L.

1. Myosurus lepturus (A. Gray) Howell. MOUSETAIL. Plains at east entrance, *Umbach*. Annual, 3 to 10 cm. high, glabrous; leaves basal, threadlike, 2 to 4 cm. long; stems 1-flowered; sepals 5, spurred at the top, about 2 mm. long; petals greenish yellow, very small; fruit a slender spike of small beaked achenes.

7. BATRACHIUM S. F. Gray. WATER BUTTERCUP.

Perennials, growing in water; stems branched, very leafy; leaves much divided into threadlike lobes; flowers small, solitary; petals 5, white; fruit a head of small wrinkled achenes.

Petals broadly obovate, 5 to 7 mm. long; stamens numerous . . . . . **1. B. flaccidum.**
Petals oblong-obovate, 3 to 5 mm. long; stamens 5 to 12 . . . . . **2. B. drouetii.**

1. Batrachium flaccidum (Pers.) Rupr. Snyder Lake and Swiftcurrent Creek. Wash. to Calif., N. C., and Lab.—Stems slender, glabrous; leaves 1.5 to 3 cm. long; achenes finely hairy.

2. Batrachium drouetii (Schultz) Nyman. Frequent in ponds and pools. Widely distributed in N. Amer., Eur., and Asia.—Plants slender, glabrous; leaves 1 to 2 cm. long; head of achenes globose, 4 mm. thick.

The species of this genus are not well understood, and the differences between them are imperfectly distinguishable.

8. HALERPESTES Greene.

1. Halerpestes cymbalaria (Pursh) Greene. ALKALI BUTTERCUP. Frequent about east entrance in low places on prairie, sometimes in alkaline spots. Alaska to Calif., N. Mex., N. J., and Lab.; also in Mex. and S. Amer. (*Ranunculus cymbalaria* Pursh.)—Perennial with long slender runners; leaves heart-shaped or kidney-shaped, glabrous, 0.5 to 3 cm. long, with low rounded teeth; flower stems 2 to 10 cm. long, 1 to 7-flowered; petals 3 to 5 mm. long, yellow; fruit heads longer than broad.

9. RANUNCULUS L. BUTTERCUP.

Perennials with fleshy-fibrous roots; leaves entire, toothed, or compound; flowers solitary or in cymes; sepals 5; petals 5, yellow; fruit a head of achenes.

Leaves all entire . . . . . **1. R. reptans.**
Leaves toothed, lobed, or divided.
Plants creeping, the stems rooting at the joints, growing on mud or at the edge of water . . . . . **2. R. purshii.**
Plants not creeping and rooting at the joints.
Lowest leaves compound, divided into 3 or more leaflets.
Stems glabrous . . . . . **3. R. oreganus.**
Stems very hairy . . . . . **4. R. macounii.**
Lowest leaves toothed or lobed but never divided to the base.
Achenes with a hooked beak. Stems with long spreading hairs. **5. R. bongardi.**
Achenes with a straight beak or none.
Achenes finely hairy; lowest leaves with rounded teeth, not lobed. **6. R. inamoenus.**
Achenes glabrous; lowest leaves lobed.
Petals 5 to 6 mm. long . . . . . **7. R. alpeophilus.**
Petals 8 to 12 mm. long.
Head of achenes somewhat oblong, longer than broad . . **8. R. saxicola.**
Head of achenes globose . . . . . **9. R. suksdorfii.**

1. Ranunculus reptans L. CREEPING BUTTERCUP. Frequent at low altitudes, in mud or sand along streams and lakes; also abundant on wet slopes at Swiftcurrent Pass. Alaska to N. Mex., N. J., and Lab.—Stems creeping, slender, glabrous, 5 to 30 cm. long; leaves linear to oblanceolate, 1 to 3 cm. long; petals 2 to 4 mm. long; fruit heads globose.

2. Ranunculus purshii Richards. Occasional on the east slope at low altitudes, about pools or along streams. Alaska to Colo., Ont., and N. S. (*R. limosus* Nutt.)—Stems glabrous or hairy; leaves 1 to 2 cm. wide, deeply lobed, the lobes narrow; petals 4 to 5 mm. long; fruit heads globose, about 5 mm. long.

The typical form is glabrous; the hairy form is *R. limosus* Nutt., but there seem to be no constant differences between the two. Both are found in the park.

3. Ranunculus oreganus (A. Gray) Howell. Wooded swamp below Lake McDermott. Wash. and Oreg. to Mont.—Stems stout, 20 to 50 cm. high; leaflets deeply lobed and toothed; petals 5 to 7 mm. long; achenes glabrous.

4. Ranunculus macounii Britton. Occasional at low and sometimes at middle altitudes, in wet woods or thickets or about pools on prairie. B. C. to N. Mex., Iowa, and Ont.—Stems 20 to 60 cm. long, erect or decumbent, branched; leaflets hairy, lobed and toothed, 3 to 8 cm. long; petals 5 to 7 mm. long; fruit heads globose.

5. Ranunculus bongardi Greene. Frequent at low and sometimes at middle altitudes, in moist woods or thickets. Alaska to Oreg. and Colo.—Stems erect, 30 to 60 cm. high; lower leaves 3 to 10 cm. wide, deeply lobed and toothed; petals slightly longer than the sepals; achenes flattened, sometimes hairy when young.

6. Ranunculus inamoenus Greene. East slope at low altitudes, on open hillsides or along streams; scarce. Idaho and Mont. to N. Mex.—Stems stout, 20 to 30 cm. high; basal leaves rounded or fan-shaped, toothed, or some of them lobed, the upper leaves deeply lobed; petals 5 to 6 mm. long; head of achenes oblong.

7. Ranunculus alpeophilus A. Nels. Frequent above timber line, in meadows or on rocky slopes or rock slides. Idaho and Mont. to Colo.—Stems 10 to 30 cm. high, glabrous, mostly 1-flowered; leaves 1.5 to 4 cm. wide, deeply lobed, the lobes obtuse; head of achenes oblong.

8. Ranunculus saxicola Rydb. Occasional on rocky slopes above timber line. Alta. to Wyo. and Utah. (*R. ramulosus* Jones).—Stems glabrous, 10 to 15 cm. high; lower leaves 2 to 4 cm. wide, lobed, the lobes usually acutish; stem leaves often lobed to the base, the lobes narrow.

9. Ranunculus suksdorfii A. Gray. On moist cliffs at Cracker Lake. Wash. to Alta. and Mont.—Stems glabrous, about 10 cm. high, usually 1-flowered; basal leaves 1.5 to 3 cm. wide, lobed, the lobes acutish; stem leaves 3 or 5-cleft, with narrow lobes.

The last three species are closely related, and it is doubtful whether they are distinct. They are showy plants which are often abundant and conspicuous in alpine localities, frequently flowering up to the very edges of the snow banks.

10. THALICTRUM L. MEADOW-RUE.

Tall perennials with rootstocks and yellow roots, glabrous or nearly so; leaves composed of numerous broad, toothed or lobed, stalked leaflets; petioles with dilated sheathing bases; flowers greenish; sepals 4 or 5; petals none; stamens numerous, long and conspicuous; fruit of several ribbed achenes.

Achenes less than 3 times as long as broad, 2.5 to 3.5 mm. wide . **1. T. megacarpum.**
Achenes about 4 times as long as broad, 2 mm. wide . . . . . **2. T. occidentale.**

1. Thalictrum megacarpum Torr. Common nearly everywhere except on prairie and at the highest altitudes, usually in moist woods or thickets, sometimes in meadows or on open slopes. Idaho and Mont. to Colo.—Stems 30 to 80 cm. high; leaflets thin, 1.5 to 6 cm. wide, pale beneath; achenes 6 to 8 mm. long.

The leaves are graceful and handsome, and in a vague way suggest those of the maidenhair fern, with which the plant is frequently confused in the West; in autumn they turn yellow. The flowers are not conspicuous. Our material is rather variable, and some of it might be referred to *T. columbianum* Rydb.

2. Thalictrum occidentale A. Gray. Avalanche Lake, on brushy slopes. B. C. to Calif., Utah, and Alta.—Stems 50 to 80 cm. high; leaflets 1.5 to 5.5 cm. wide, 3-lobed and with rounded teeth; achenes 6 to 8 mm. long.

11. PULSATILLA Adans.

Perennial herbs; leaves borne at the base of the stem, divided into numerous narrow lobes; stem bearing 3 whorled bracts similar to the leaves; flowers usually 1 to a stem, with 5 to 7 colored sepals and no petals; fruit of numerous achenes, each with a long hairy tail.

Flowers purple or bluish; bracts sessile . . . . . **1. P. ludoviciana.**
Flowers white, sometimes tinged with purple; bracts short-stalked.
2. P. occidentalis.

1. Pulsatilla ludoviciana (Nutt.) Heller. PASQUE-FLOWER. Frequent on the east slope at low altitudes, on prairie or open hillsides. B. C. and Wash. to Tex. and Ill.—Stems 10 to 40 cm. high; leaves very hairy, 5 to 10 cm. long; sepals ovate-oblong, 2.5 to 3.5 cm. long.

The plants bloom in spring.

2. Pulsatilla occidentalis (S. Wats.) Freyn. CHALICE-FLOWER. Frequent in a few places above timber line, in low meadows; also at Grinnell Lake. Alaska to Calif., Mont., and Alta. (*Anemone occidentalis* S. Wats.)—Stems short at flowering time, but becoming 30 to 60 cm. high; leaves 3-parted, the divisions pinnately divided into numerous lobes, green, thinly hairy; sepals 2 to 2.5 cm. long; tails of the fruit silky, bent downward in fruit, the head of fruit broad above and narrow below.

The plants bloom early, but they are very handsome even in fruit. The soft, silky heads are most attractive.

12. ANEMONE L. ANEMONE.

Perennials with rootstocks; leaves basal, deeply lobed or parted; stem bearing 3 leaflike bracts; flowers few or solitary; sepals 4 or more, usually 5, petal-like; petals none; fruit a head of woolly achenes.

Leaves divided into 3 broad wedge-shaped leaflets, these toothed or with few short broad lobes . . . . . **1. A. parviflora.**
Leaves 2 to 4 times divided into numerous narrow lobes.
Leaves nearly glabrous, the lobes obtuse; style 2 to 3 mm. long . **2. A. tetonensis.**
Leaves hairy, the lobes acute; style 1 to 2 mm. long . . . . . **3. A. globosa.**

1. Anemone parviflora Michx. NORTHERN ANEMONE. Frequent above timber line, in meadows or on rocky slopes; also in cold bog below Lake McDermott. Alaska to Colo., Ont., and Lab.; also in Asia.—Stems slender, 5 to 20 cm. high; 1-flowered; leaflets 1 to 2 cm. long, thinly hairy beneath; sepals 8 to 12 mm. long, white or tinged with blue

2. Anemone tetonensis Porter. ALPINE ANEMONE. Frequent above timber line, in meadows and on rock slides. B. C. and Wash. to Wyo. and Alta.—Stems 10 to 20 cm. high, mostly 1-flowered; leaves 1.5 to 3 cm. long; sepals 6 to 12 mm. long, bluish white or pale blue; fruit heads 1 to 1.5 cm. long.

3. Anemone globosa Nutt. COMMON WESTERN ANEMONE. Common above timber line, in meadows or on rock slides; sometimes at low or middle elevations, in meadows or thickets. Alaska to Calif., N. Mex., and S. Dak.—Stems 15 to 40 cm. high, hairy, 1 to 3-flowered; leaves 3 to 5 cm. long; sepals 6 to 12 mm. long, yellowish within, blue or purplish outside; fruit heads about 1 cm. in diameter.

32. BERBERIDACEAE. Barberry Family.

1. BERBERIS L.

The cultivated barberry belongs to this genus.

1. **Berberis repens** Lindl. OREGON GRAPE. Common in woods and thickets at low and middle altitudes. B. C. to Alta., Calif., and N. Mex.—Small shrub, usually about 30 cm. high; leaves pinnate; leaflets 3 to 7, leathery, the teeth with bristly tips; flowers yellow, in racemes; fruit blue, very juicy, sour, containing few large seeds.

The leaves persist throughout the winter; in autumn they are handsomely tinted with red or purple. The flowers appear in spring. The fruit is edible but too sour to be very pleasant; it is often used for making jelly. A closely related species of Oregon grape is the State flower of Oregon. The Blackfoot Indians used a decoction of the roots as a remedy for stomach affections and for hemorrhages.

33. PAPAVERACEAE. Poppy Family.

1. PAPAVER L. POPPY.

The cultivated poppies, one of which furnishes opium, belong to this genus.

1. **Papaver pygmaeum** Rydb. ALPINE POPPY. On high alpine summits and rock slides; abundant at Piegan Pass and Sexton Glacier, and occasional elsewhere. B. C., Alta., and Mont.—Plants small, tufted; leaves forming a dense cluster, deeply lobed; flowers solitary on slender stalks 3 to 6 cm. high; sepals 2; petals 4, scarcely 1 cm. long, orange, with a pale yellow spot at the base.

A very small plant, with little resemblance in general appearance to the common poppies. It is found only in the highest and most exposed situations.

34. FUMARIACEAE. Fumitory Family.

1. CAPNOIDES Adans.

Annuals or biennials, with succulent stems; leaves alternate, bipinnately dissected; flowers in racemes; petals 4, one of the outer ones spurred at the base; fruit a long narrow pod.

Flowers yellow; plants ascending, 30 cm. high or less . . . . . **1. C. aureum.**
Flowers purplish pink; plants erect, usually 30 to 60 cm. high . **2. C. sempervirens.**

1. **Capnoides aureum** (Willd.) Kuntze. YELLOW CORYDALIS. On gravelly, open or brushy hillsides at low altitudes on the east slope; occasional. B. C. to Calif., Pa., and N. S. (*Corydalis aurea* Willd.)—Plants much branched from the base, green; flowers 12 to 15 mm. long, rather showy; pods 2 to 3 cm. long, 2 mm. thick; seeds black and shining.

2. **Capnoides sempervirens** (L.) Borkh. PINK CORYDALIS. In thin woods at low or middle altitudes; rare. Alaska and B. C. to N. C. and N. S. (*Corydalis sempervirens* Pers.)—Plants branched above, pale green; flowers 12 to 15 mm. long; pods 3 to 4 cm. long, 1.5 mm. thick.

35. BRASSICACEAE. Mustard Family.

Herbs, often with pungent juice; leaves alternate; flowers regular, mostly in racemes; sepals 4; petals 4; stamens usually 6; fruit a 2-celled pod.—The name Cruciferae is often used for the family.

Leaves not lobed, entire or toothed.
  Pods conspicuously flattened.
    Pods notched at the upper end, with a wing around the edge . . . **2. THLASPI.**
    Pods neither notched nor winged.
      Pods short, rounded to linear-oblong; flowers white or yellow . . **17. DRABA.**
      Pods long, linear; flowers white, pink, or purple . . . . . **18. ARABIS.**

Pods not flattened.
Pods linear, many times longer than thick.
Plants glabrous; leaves broad, pale, entire . . . . . **12. CONRINGIA.**
Plants with fine appressed hairs; leaves narrow, green, often toothed. **13. CHEIRINIA.**
Pods less than twice as long as thick.
Pods inflated and bladder-like, constricted in the middle . . . **5. PHYSARIA.**
Pods not inflated and bladder-like.
Plants gray with a close covering of fine branched hairs, low, usually less than 15 cm. high . . . . . **6. LESQUERELLA.**
Plants green, with coarse hairs, tall, usually 30 to 60 cm. high. **7. CAMELINA.**
Leaves, at least the lower ones, deeply lobed or divided.
Pods about as broad as long, flattened.
Pods 3-cornered . . . . . **3. BURSA.**
Pods rounded . . . . . **1. LEPIDIUM.**
Pods decidedly longer than broad, or rarely short but then not flattened.
Flowers white.
Plants densely and finely white-hairy; pods lanceolate . . . . **4. SMELOWSKIA.**
Plants green, slightly if at all hairy; pods linear.
Sides of the ripe pods recurving as the pod opens; plants growing in wet soil. **16. CARDAMINE.**
Sides of the pod remaining straight after the opening of the pod; plants mostly growing in dry soil . . . . . **18. ARABIS.**
Flowers yellow.
Pod with a long (5 to 15 mm.) distinct beak; upper leaves usually not lobed. **15. BRASSICA.**
Pods not beaked, or the beak very short (2 to 3 mm.); upper leaves usually lobed.
Pods 4-angled; plants glabrous . . . . . **14. CAMPE.**
Pods not 4-angled; plants glabrous or hairy.
Hairs of the stems branched; leaves twice divided into numerous small narrow lobes . . . . . **11. SOPHIA.**
Hairs of the stem simple; leaves once lobed, the lobes often large and broad.
Pods less than 2 cm. long . . . . . **8. RADICULA.**
Pods 3 to 10 cm. long.
Pods 7 to 10 cm. long; stem with spreading hairs . . . . . **9. NORTA.**
Pods 3 to 4 cm. long; stem with minute appressed hairs. **10. DIPLOTAXIS.**

1. LEPIDIUM L.

1. Lepidium densiflorum Schrad. PEPPERGRASS. Frequent at low altitudes, in waste or cultivated ground or on open slopes; apparently introduced. Yukon to N. Mex., N. Y., and Vt.—Annual, 20 to 50 cm. high, branched above, finely hairy; basal leaves lobed, the stem leaves narrow, toothed; petals minute or wanting; pod flat, rounded, 3 mm. long, notched at the apex.

2. THLASPI L.

1. Thlaspi arvense L. FANWEED. Common at low altitudes, especially on the east slope, in waste or cultivated ground or on prairie. Native of Eur.; introduced as a weed in N. Amer.—Glabrous annual, 10 to 50 cm. high; stem leaves oblong, toothed, clasping; flowers white, in long racemes, long-stalked; petals 4 mm. long; pods flat, rounded, 1 to 2 cm. long, broadly winged, notched at the top.

In cultivated ground this is often very abundant. Soon after flowering the plants turn yellow, and they are then conspicuous, even at a distance. In some parts of

the Northwest the name "Jim Hill weed" is applied to the species, the ranchmen having associated its appearance with the building of the Great Northern Railroad.

3. BURSA Weber.

1. Bursa bursa-pastoris (L.) Weber. SHEPHERD'S-PURSE. Frequent at low altitudes, in cultivated, waste, or dry ground. Native of Eur. and Asia; naturalized as a weed in N. Amer. (*Capsella bursa-pastoris* Medic.)—Annual, the pubescence of fine branched hairs; leaves on the stem and also forming a rosette at the base of the stem, deeply lobed or toothed, the stem leaves clasping; flowers white; petals 2 mm. long; fruit flat, triangular, 6 to 8 mm. long.

4. SMELOWSKIA C. A. Mey.

1. Smelowskia americana Rydb. WILD CANDYTUFT. Common above timber line on rock slides or open slopes; rarely found on open slopes at middle altitudes. Idaho and Mont. to Colo.—Perennial, 10 to 20 cm. high, forming dense tufts, densely covered with fine white branched hairs; leaves divided into narrow lobes; flowers white; pods lanceolate or oblong, 7 to 12 mm. long.

A very handsome plant, which remains in flower only a short time.

5. PHYSARIA A. Gray.

1. Physaria didymocarpa (Hook.) A. Gray. DOUBLE BLADDERPOD. On shale slopes of canyons near east entrance. Alta. and Sask. to Colo.—Perennial, 5 to 15 cm. high, forming small clumps; basal leaves broadly obovate, 2 to 6 cm. long, entire or somewhat toothed, densely covered with fine white branched hairs; petals yellow, 8 to 12 mm. long; pod 7 to 15 mm. broad, constricted at the middle, composed of 2 bladder-like cells.

McClintock states that the Blackfoot Indians used the roots as a remedy for sore throat and for pains in the stomach, and a decoction of the plant to reduce swellings.

6. LESQUERELLA S. Wats.

1. Lesquerella spathulata Rydb. BLADDERPOD. Occasional about the east entrance, on shale slopes or dry hillsides. Man. to Mont. and Utah.—Perennial, 3 to 12 cm. high, densely covered with fine white stellate hairs; basal leaves oblanceolate, 2 to 3 cm. long, entire; petals yellow, 7 to 8 mm. long; pod egg-shaped, 5 mm. long.

7. CAMELINA Crantz.

1. Camelina microcarpa Andrzej. FALSE FLAX. Occasional on the east slope at low altitudes, in waste ground or on open hillsides. Native of Eur.; naturalized in N. Amer.—Annual, 30 to 70 cm. high, the stem finely hairy; leaves lanceolate, clasping; petals 3 to 4 mm. long, yellowish; pod inflated, pear-shaped, 4 to 8 mm. long.

8. RADICULA Hill. YELLOWCRESS.

Annuals or perennials, growing in wet soil; leaves pinnately lobed; petals yellow; pods terete, cylindric or almost globose.

Pods slender-cylindric, 8 to 12 mm. long, about 1 mm. thick, usually somewhat curved. **1. R. curvisiliqua.**

Pods oval or oblong, 5 to 8 mm. long, 1.5 to 2 mm. thick not curved.

Pedicels much shorter than the pods; plants spreading, the stems 10 to 25 cm. long. **2. R. lyrata.**

Pedicels nearly or quite as long as the pods, sometimes longer; plants usually erect and 30 to 60 cm. high . . . . . **3. R. terrestris.**

1. Radicula curvisiliqua (Hook.) Greene. Occasional on the east slope at low altitudes, in moist meadows or about pools. Wash. and Oreg. to Wyo. and Mont.—

Annual or biennial, 10 to 40 cm. high, erect or spreading, glabrous or nearly so; petals 2.5 mm. long.

2. Radicula lyrata (Nutt.) Greene. East entrance, about pools. Wash. to Calif. Colo., and Mont.—Stems glabrous or nearly so; petals about 1 mm. long; pedicels 1 to 3 mm. long.

3. Radicula palustris (L.) Moench. Frequent at low altitudes, in wet thickets or about pools. Alaska to Mex., Ga., and Lab.; also in Eur. and Asia. (*R. terrestris* Woot. & Standl.)—Stems glabrous or nearly so, sometimes 60 to 90 cm. high; petals 2 mm. long.

9. NORTA Adans.

1. Norta altissima (L.) Britton. TUMBLE MUSTARD. Frequent at low altitudes, in waste ground or on open slopes. Native of Eur.; naturalized as a weed in N. Amer. (*Sisymbrium altissimum* L.)—Annual, 0.5 to 1 meter high, much branched, hairy below; leaves deeply lobed, the lobes linear or oblong; petals yellowish white, 6 to 8 mm. long; pods slender, cylindric, 7 to 10 cm. long.

10. DIPLOTAXIS DC.

1. Diplotaxis erucoides (L.) DC. Along railroad at east entrance. Native of Eur.—Annual, 30 to 60 cm. high, branched; leaves deeply lobed, the lobes oblong, toothed or lobed; petals pale yellow, 6 to mm. long; pods short-beaked.

This species is of rare occurrence in the United States, and it is not reported in any of the manuals. It seems to be fairly well established at this locality.

11. SOPHIA Adans. TANSY MUSTARD.

Annuals or biennials, the pubescence of fine branched hairs; leaves 2 or 3 times lobed, with small lobes; petals small, yellow; pods slender, cylindric or club-shaped.

Pedicels erect . . . . . **1. S. hartwegiana.**
Pedicels ascending or spreading.
Pods somewhat club-shaped, 5 to 10 mm. long; seeds in 2 rows . **2. S. intermedia.**
Pods linear, usually 10 to 20 mm. long; seeds in 1 row.
Pods 15 to 20 mm. long . . . . . **3. S. parviflora.**
Pods 10 to 15 mm. long.
Stems densely covered with fine branched hairs, not glandular . **4. S. gracilis.**
Stems with few or no branched hairs but with fine gland-tipped hairs. **5. S. californica.**

1. Sophia hartwegiana (Fourn.) Greene. Occasional on the east slope at low altitudes, in aspen woods or by roadsides. B. C. to Colo. and Minn.—Stems 0.4 to 1 meter high, covered with fine branched hairs; petals 2 to 3 mm. long; pods 6 to 12 mm. long, linear or club-shaped.

2. Sophia intermedia Rydb. Open banks, east entrance. B. C. to Calif., Colo., Tenn., and Mich.—Plants green, glabrate; petals scarcely longer than the sepals.

3. Sophia parviflora (Lam.) Standl. Thin woods about Belton; scarce. Native of Eur.; naturalized in N. Amer. (*S. sophia* Britton; *Sisymbrium sophia* L.; *Sisymbrium parviflorum* Lam.)—Plants 30 to 80 cm. high, grayish; petals yellowish; pods 1 mm. thick.

4. Sophia gracilis Rydb. East entrance, frequent on open slopes. Wash. to Mack. and Colo.—Leaves grayish, divided into very small, narrow lobes; petals 2 mm. long; pods 1 mm. thick.

5. Sophia californica (Torr. & Gray) Rydb. Frequent at middle altitudes and often above timber line, in woods or on open slopes. B. C. to Calif. and Mont.—Plants slender, 30 to 60 cm. high, green; petals bright yellow, 3 mm. long.

12. CONRINGIA Link.

1. **Conringia orientalis** (L.) Dum. HARE'S-EAR MUSTARD. Occasional at low altitudes, chiefly n waste ground. Native of Eur.; occasionally naturalized as a weed in N. Amer.—Glabrous annual, 30 to 60 cm. high; leaves mostly oval, 4 to 10 cm. long, entire, clasping, very pale; petals white, 8 mm. long; pod 4-angled, 8 to 10 cm. long, about 2 mm. thick.

13. CHEIRINIA Link. WILD WALLFLOWER.

Annuals or biennials, with leafy stems; pubescence of small, appressed, gray, 2 or 3-branched hairs; petals yellow; pods linear, somewhat 4-angled.

Petals 4 to 5 mm. long; pods 2 to 3 cm. long; plants green . . **1. C. cheiranthoides.**
Petals 8 to 10 mm. long; pods mostly 3.5 to 5 cm. long; plants grayish.
2. C. inconspicua.

1. **Cheirinia cheiranthoides** (L.) Link. Occasional on the east slope at low altitudes, in meadows or on open hillsides. Alaska to Utah, N. C., and Newf. (*Erysimum cheiranthoides* L.)—Plants branched, 30 to 60 cm. high; leaves linear or lanceolate, 2 to 6 cm. long, entire or shallowly toothed; petals bright yellow.

2. **Cheirinia inconspicua** (S. Wats.) Rydb. Frequent on the east slope at low altitudes, in meadows or on open hillsides. B. C. to Colo. and Minn.—Stems 30 to 60 cm. high, often branched; leaves mostly linear, entire or shallowly toothed; petals pale yellow.

14. CAMPE Dulac.

1. **Campe orthoceras** (Ledeb.) Heller. WINTERCRESS. Occasional at low and middle altitudes, in moist woods or thickets. B. C. to Colo. and Mont.; also in Eur., and naturalized in eastern N. Amer. (*C. americana* Cockerell; *Barbarea americana* Rydb.)—Plants biennial, 30 to 50 cm. high, stout, glabrous; leaves pinnately lobed, with broad rounded lobes; petals yellow, 2 to 4 mm. long; pods 2 to 3 cm. long, 2 mm. thick, somewhat 4-angled.

15. BRASSICA L. MUSTARD.

Annuals with leafy stems; leaves, at least the lower ones, lobed; petals yellow; pods long, cylindric, beaked.

Stems hairy, at least below; beak of the pod usually 10 to 15 mm. long, containing a seed in the lower part . . . . . **1. B. arvensis.**
Stems usually glabrous; beak 4 to 7 mm. long, seedless . . . . . **2. B. juncea.**

1. **Brassica arvensis** (L.) Kuntze. CHARLOCK. Occasional at Belton and east entrance, in waste ground. Native of Eur.; naturalized in N. Amer. (*Sinapis arvensis* L.).—Stems stout, branched, 30 to 70 cm. high; upper leaves ovate or lanceolate, toothed; petals about 8 mm. long; pods 3 to 4 cm. long.

2. **Brassica juncea** (L.) Coss. INDIAN MUSTARD. Occasional on the east slope at low altitudes, in waste ground. Native of Asia; naturalized in N. Amer.—Plants 0.3 to 1 meter high, branched, often glaucous; leaves mostly lobed; petals 8 to 10 mm. long; pods 3 to 5 cm. long.

16. CARDAMINE L. BITTERCRESS.

Perennials, glabrous or nearly so; leaves pinnate; petals white; pods long, narrow, flattened.

Petals usually 5 to 6 mm. long; leaflets usually 3 to 7, some of them rounded.
1. C. breweri.
Petals 2 to 3 mm. long; leaflets 5 to 15, most of them oblong or oblanceolate.
2. C. pennsylvanica.

1. **Cardamine breweri** S. Wats. Frequent at low and middle altitudes, in wet woods or thickets, or marshes, or along streams. B. C. to Calif Wyo., and Mont.—

Stems 20 to 50 cm. high, succulent; leaflets mostly 1 to 4 cm. wide; pods 2 to 3.5 cm. long, 1.5 mm. wide.

2. **Cardamine pennsylvanica** Muhl. Frequent at low altitudes, in wet woods or thickets or along streams or lakes. B. C. to Oreg., Colo., Fla., and Newf.—Stems 15 to 40 cm. high, branched; leaflets mostly less than 1 cm. wide, often lobed or toothed; pods 2 to 3 cm. long, 1 mm. wide.

17. DRABA L. Whitlowgrass.

Annuals or perennials, the pubescence, if any, mostly of branched hairs; leaves entire or toothed, often all basal; petals white or yellow; pods short, linear or oblong, flat.

Plants annuals or winter annuals; style none.
- Pods finely hairy.
  - Pedicels equaling or longer than the pods; stems leafy . . . . . **1. D. nemorosa.**
  - Pedicels shorter than the pods; stems naked or with few small leaves. **2. D. praealta.**
- Pods glabrous.
  - Stems leafy; pods usually 8 to 15 mm. long . . . . . **3. D. nitida.**
  - Stems naked; pods mostly 6 to 8 mm. long . . . . . **4. D. crassifolia.**

Plants perennial; style present except in one species.
- Stems leafy; plants usually 15 to 40 cm. high.
  - Petals white . . . . . **5. D. cana.**
  - Petals yellow . . . . . **6. D. aurea.**
- Stems naked; stems usually less than 10 cm. high.
  - Pods densely hairy.
    - Pods nearly or fully twice as long as wide . . . . . **7. D. densifolia.**
    - Pods nearly as wide as long . . . . . **8. D. andina.**
  - Pods glabrous or with a few hairs near the margins.
    - Pods nearly as wide as long . . . . . **9. D. oligosperma.**
    - Pods twice as long as wide or longer.
      - Style none . . . . . **10. D. fladnizensis.**
      - Style present.
        - Petals yellow . . . . . **11. D. glacialis.**
        - Petals white.
          - Pods twisted; leaves with fine branched hairs . . . **12. D. lonchocarpa.**
          - Pods not twisted; leaves with unbranched hairs on the margins. **13. D. oreibata.**

1. **Draba nemorosa** L. Moist woods below Lake McDermott. B. C. to Oreg., Nev., Colo., and Mich.; also in Eur. and Asia.—Stems slender, 10 to 30 cm. high; leaves ovate or oblong, usually toothed; petals pale yellow, 2 to 3 mm. long; pods 7 to 15 mm. long, 2 mm. wide.

2. **Draba praealta** Greene. Rocky slopes near or above timber line. B. C. and Alta. to Wyo.—Stems slender, 10 to 20 cm. high; basal leaves lanceolate or oblanceolate, with fine branched hairs, 1 to 3 cm. long; petals white, 2 to 3 mm. long; pods 1 cm. long, 2 to 3 mm. wide.

3. **Draba nitida** Greene. Frequent on the east slope at middle altitudes, in moist woods or on open banks. Alta. and B. C. to Calif. and Colo.—Stems slender, 10 to 30 cm. high; basal leaves oblanceolate, 1 to 3 cm. long, hairy beneath; petals yellow, 2 mm. long; pods 2 mm. wide.

4. **Draba crassifolia** Graham. Frequent above timber line, in meadows or on rocky slopes. Alaska to Colo., Lab., and Greenl.—Stems slender, 2 to 12 cm. high; basal leaves oblanceolate, 5 to 15 mm. long; petals 2 mm. long, pale yellow or nearly white; pods 2 mm. wide.

5. Draba cana Rydb. Frequent on the east slope at low and middle altitudes and sometimes above timber line, in woods or on open hillsides. B. C. and Alta. to N. Mex.—Stems stout, branched, at least at the base; finely hairy; leaves mostly lanceolate or ovate; petals 3 mm. long; pods 6 to 8 mm. long, finely hairy, usually twisted.

6. Draba aurea Vahl. Frequent on the east slope at middle altitudes and sometimes above timber line, in woods or on open hillsides. Alaska to Ariz., Lab., and Greenl.; also in Eur.—Stems stout, finely hairy; basal leaves oblanceolate, 1 to 2 cm. long; petals 3 to 5 mm. long; pods 10 to 12 mm. long, 2 to 3 mm. wide, finely hairy, usually twisted.

7. Draba densifolia Nutt. Occasional above timber line, chiefly on rock slides. Alaska to Wyo.—Plants densely tufted; leaves oblanceolate, 5 to 10 mm. long, hairy, crowded and overlapping; stems 1 to 5 cm. high; petals yellow, 4 to 5 mm. long; pods 5 to 8 mm. long, 3 to 4 mm. wide.

8. Draba andina (Nutt.) A. Nels. Occasional above timber line, on rock slides or exposed summits, sometimes about snow banks at middle altitudes. B. C. and Alta. to Wyo. and Utah.—Plants very densely tufted; leaves 5 mm. long, hairy, densely crowded and overlapping; stems 1 to 3 cm. high; petals yellow, 4 to 5 mm. long; pods 3 to 4 mm. long, 2.5 to 3 mm. wide.

9. Draba oligosperma Hook. Hills at east entrance, *Umbach*. Alaska to Calif. and Utah.—Plants densely tufted; leaves linear, 5 to 10 mm. long, crowded; stems 2 to 8 cm. high; petals pale yellow, 4 to 5 mm. long; pods about 4 mm. long and 3 mm. wide.

10. Draba fladnizensis Wulf. Open rocky slope at Gunsight Pass. Alaska to Colo., Que., and Greenl.; also in Eur.—Stems slender, 5 to 12 cm. high; leaves oblanceolate, 1 cm. long or shorter, nearly glabrous; petals white, 3 mm. long; pods 4 to 6 mm. long, 2 mm. wide.

11. Draba glacialis Adams. Occasional above timber line, on cliffs or open rocky slopes. Alaska to Wyo. and Greenl.—Stems 5 to 15 cm. high, densely tufted; leaves mostly linear, 1 to 3 cm. long, finely hairy; petals yellow, 5 mm. long; pods 6 to 10 mm. long, 2 to 3 mm. wide.

12. Draba lonchocarpa Rydb. Occasional above timber line, on moraines and rock slides. B. C., Wash., Mont., and Alta.—Plants slender, tufted, 5 to 10 cm. high; leaves spatulate, 3 to 10 mm. long; petals white, 2 mm. long; pods 8 to 12 mm. long, 1.5 mm. wide.

13. Draba oreibata Macbr. & Payson. Occasional on open rocky slopes about timber line, or in exposed places at lower altitudes. Idaho, Utah, and Mont.—Plants tufted, 3 to 10 cm. high; leaves narrowly oblong, 4 to 10 mm. long; petals white, 2 to 3 mm. long; pods 7 to 10 mm. long, 2 to 3 mm. wide.

18. ARABIS L. Rockcress.

Perennials or biennials, glabrous or hairy, the hairs usually branched; leaves entire or toothed, rarely lobed; petals white, pink, or purple: pods long, linear, flat.

Basal leaves deeply lobed . . . . . **1. A. ambigua.**
Basal leaves entire or toothed.
  Pods spreading or reflexed.
    Pedicels abruptly reflexed.
      Pods nearly 2 mm. wide; petals 6 to 8 mm. long: stem leaves oblong or lanceolate . . . . . **2. A. retrofracta.**
      Pods less than 1.5 mm. wide; petals 5 to 6 mm. long; stem leaves linear. **3. A. lignipes.**

Pedicels spreading or ascending.
Pods 3 to 4 cm. long; plants usually 10 to 20 cm. high . . . . **4. A. lemmonii.**
Pods 4 to 8 cm. long; plants usually 30 to 50 cm. high . . . . . **5. A. bourgovii.**
Pods erect or strongly ascending.
Basal leaves glabrous or nearly so.
Stems 30 to 60 cm. high; pods 5 to 8 cm. long . . . . . **6. A. drummondii.**
Stems usually 10 to 20 cm. high; pods 4 to 5 cm. long . . . . . **7. A. lyallii.**
Basal leaves covered with coarse hairs.
Stem leaves narrowed at the base; plants 10 to 20 cm. high . . **8. A. nuttallii.**
Stem leaves clasping; plants mostly 30 to 60 cm. high.
Pods about 1 mm. wide, flat; leaves green, the stem leaves usually toothed. **9. A. hirsuta.**
Pods 2 mm. wide, somewhat 4-angled; leaves somewhat glaucous, the stem leaves usually entire . . . . . **10. A. glabra.**

1. Arabis ambigua DC. Rock slide above Many Glacier Hotel. Alaska to Wash. and Mont.—Stems tufted, 15 to 30 cm. high, slender, glabrous or nearly so; stem leaves spatulate or oblanceolate, entire or toothed; petals white, 6 mm. long; pods erect, 2 to 3 cm. long.

2. Arabis retrofracta Graham. Thin woods at base of Altyn Peak. B. C. to Calif., Utah, and Nebr.—Stems 20 to 40 cm. high, with branched hairs; stem leaves clasping, entire, glabrous; petals white or pinkish.

3. Arabis lignipes A. Nels. Dry rocky slopes, Altyn Peak. Idaho, Mont., and Wyo.—Stems 30 to 50 cm. high, finely hairy below; stem leaves finely hairy, clasping; petals white or purplish.

4. Arabis lemmonii S. Wats. GRAY ROCKCRESS. Common above timber line, in meadows or on rock slides; sometimes about snow banks at middle elevations; also on exposed slopes at east entrance. B. C. to Calif. and Mont.—Stems slender, usually several; stem leaves lanceolate or oblong, clasping, the basal leaves covered with fine branched gray hairs; petals purple, 5 to 6 mm. long.

5. Arabis bourgovii Rydb. Frequent on the east slope at low and middle altitudes and sometimes near timber line, in meadows or low thickets or on open rocky hillsides. Alaska to Man., Wyo., and Idaho.—Stems slender, often numerous; basal leaves oblanceolate, finely hairy; stem leaves lanceolate, clasping; petals pink, 6 to 8 mm. long; pods 2 mm. wide.

6. Arabis drummondii A. Gray. Frequent at nearly all altitudes, but most common above timber line, in woods or meadows or on rock slides or open slopes. Yukon to Utah and N. Mex.—Stems several or solitary; stem leaves lanceolate, clasping, glabrous, glaucous, entire; petals 6 to 10 mm. long, varying from white to purple; pods 1.5 to 2 mm. wide.

7. Arabis lyallii S. Wats. PURPLE ROCKCRESS. Common above timber line, in meadows and on rock slides. B. C. to Calif. and Mont.—Stems usually clustered, glabrous; stem leaves lanceolate, usually clasping, green, entire, glabrous; petals purple, 7 to 8 mm. long; pods 2 mm. wide.

A showy and handsome plant, which remains in flower only a short time.

8. Arabis nuttallii Robinson. Frequent at nearly all altitudes, but most common above timber line, in meadows or woods or on open slopes or rock slides. Wash. to Utah and Mont.—Stems clustered, slender, hairy below; petals white, 4 to 6 mm. long; pods 1 to 3 cm. long.

9. Arabis hirsuta (L.) Scop. Frequent on the east slope at low or middle altitudes, in woods, thickets, or meadows or on open hillsides. Alaska to Calif., Ga., and N. B.; also in Eur. (*A. ovata* Poir.)—Stems solitary or few, stout, often purplish, hairy;

stem leaves lanceolate or oblong, clasping, 2 to 6 cm. long; petals white, 4 to 5 mm. long; pods 4 to 6 cm. long, erect.

10. Arabis glabra (L.) Bernh. East entrance and Belton, in thickets or on open slopes. Alaska to Calif., Pa., and Que.; also in Eur. (*Turritis glabra* L.)—Stems stout, hairy below; stem leaves lanceolate or ovate, 2 to 12 cm. long, glabrous, clasping; petals white, 3 mm. long; pods erect, 4 to 10 cm. long.

36. CAPPARIDACEAE. Caper Family.

1. CLEOME L.

1. Cleome serrulata Pursh. ROCKY MOUNTAIN BEEPLANT. Along the railroad near the east entrance; apparently introduced; abundant farther east on the plains. Oreg. to Sask., N. Mex., and Ariz. (*Peritoma serrulatum* DC.)—Glabrous annual, 0.5 to 1 meter high; leaves palmate, stalked; leaflets 3, entire, oblanceolate; flowers purple; petals 4, about 1 cm. long; fruit a long slender stalked pod.

The plant has a disagreeable odor; its flowers are showy.

37. DROSERACEAE. Sundew Family.

1. DROSERA L.

Small perennials; leaves in a basal rosette, entire, stalked, covered with slender gland-tipped hairs; flowers small, white, in a raceme; petals usually 5.—The sundews are of great interest because of their carnivorous habits. The glands of the leaves exude a sticky fluid, by which insects are entrapped, to be digested and used as food by the plants.

Leaves rounded, as broad as long . . . . . **1. D. rotundifolia.**
Leaves oblanceolate, several times longer than broad . . . . . **2. D. longifolia.**

1. Drosera rotundifolia L. COMMON SUNDEW. Sphagnum bogs at Johns and Fish lakes, and doubtless in similar places elsewhere. Alaska to Calif., N. J., and Lab.; also in Eur. and Asia.—Leaves 6 to 10 mm. wide; stems 6 to 20 cm. high; petals 4 mm. long; capsules 5 mm. long.

The plants are not at all conspicuous and are half hidden in the sphagnum. The leaves and stems are more or less tinged with red.

2. Drosera longifolia L. NARROWLEAF SUNDEW. Abundant in sphagnum bog about Fish Lake. B. C. to Calif., Ont., and Newf.; also in Eur. and Asia.—Leaves 1.5 to 3 cm. long, 4 to 5 mm. wide; stems 5 to 20 cm. high; petals 5 mm. long.

38. CRASSULACEAE. Stonecrop Family.

1. SEDUM L. STONECROP.

Perennial herbs with leafy stems; leaves narrow, fleshy, entire or toothed; flowers in cymes; sepals 4 or 5; petals 4 or 5; stamens 8 or 10; fruit of 4 or 5 small pods.

Petals dark purple . . . . . **1. S. integrifolium.**
Petals bright yellow.
Leaves terete or nearly so, narrow at the base; plants without bulblets. **2. S. stenopetalum.**
Leaves flattened, broadened at the base; flowers partly replaced by small plants or bulblets . . . . . **3. S. douglasii.**

1. Sedum integrifolium (Raf.) A. Nels. RED ORPINE. Common above or near timber line, on open rocky slopes. Alaska to Calif. and Colo. (*Rhodiola integrifolia* Raf.)—Stems clustered, very stout, about 10 cm. high; leaves obovate or oblong, 1 to 1.5 cm. long, sometimes toothed; petals about 3 mm. long.

A rather showy plant, especially in late summer, when the pods and leaves are usually red or purple.

2. Sedum stenopetalum Pursh. YELLOW STONECROP. At nearly all altitudes, but most common above timber line, on open rocky slopes. Alta. to Calif., N. Mex., and Nebr.—Stems 6 to 15 cm. high, tufted; leaves mostly basal, linear, 6 to 12 mm. long; petals linear-lanceolate, 6 to 7 mm. long; pods 4 mm. long.

A handsome plant, which remains in flower a long time.

3. Sedum douglasii Hook. Frequent at low and middle altitudes, on open rocky slopes. B. C. to Calif. and Mont.—Stems 10 to 20 cm. high; leaves linear-lanceolate, 1 to 2 cm. long; petals 6 to 10 mm. long; pods 3 to 4 mm. long.

Nearly all the flowers are replaced by diminutive plants or bulblets, which fall from the stems if touched, and presumably develop into new plants.

39. PARNASSIACEAE. Parnassia Family.

1. PARNASSIA L.

Glabrous erect perennials; leaves clustered at the base of the plant, the flower stems 1-flowered, naked or with a single bract; flowers white; petals 5, conspicuously veined; stamens 5, with a fascicle of sterile stamens between each pair; fruit a 1-celled capsule.

Petals fringed on the sides toward the base . . . . . **1. P. fimbriata.**
Petals not fringed.
  Petals scarcely as long as the sepals, 3-veined; capsule twice as long as the sepals; bract none or borne near the base of the stem . . . . . **2. P. kotzebuei.**
  Petals longer than the sepals, often much longer, 5 to 9-veined; capsule less than twice as long as the sepals; bract present, borne near the middle of the stem.
    Petals nearly twice as long as the sepals; sterile stamens usually 9 to 15 in each fascicle . . . . . **3. P. palustris.**
    Petals only slightly longer than the sepals; stamens usually 7 to 9 in each fascicle . . . . . **4. P. montanensis.**

1. Parnassia fimbriata Konig. FRINGED PARNASSIA. Common at all altitudes except the very highest, along streams, in bogs, or in wet meadows. Alaska to Calif., N. Mex., and Alta.—Plants usually in dense clumps, 20 to 40 cm. high; leaves kidney-shaped, 2 to 4 cm. wide; petals about 8 mm. long.

The flowers are very showy and graceful. Above timber line the petals are often only 6 mm. long.

2. Parnassia kotzebuei Cham. ALPINE PARNASSIA. Edge of a brook at Grinnell Glacier; high rock slide above Lake McDermott. Alaska to Wyo., Que., and Greenl.—Leaves broadly ovate or somewhat heart-shaped, 1 to 2 cm. long; stems about 10 cm. high; petals about 5 mm. long.

3. Parnassia palustris L. MEADOW PARNASSIA. In a wet thicket at St. Mary. Alaska to Wyo., Que., and Lab.; also in Eur. and Asia.—Leaves heart-shaped, 1 to 3 cm. wide; stems 10 to 30 cm. high; petals 8 to 12 mm. long.

4. Parnassia montanensis Fern. & Rydb. MONTANA PARNASSIA. Edge of creek near east entrance; open bog below Lake McDermott. B. C. to Sask. and Mont.—Leaves heart-shaped or kidney-shaped, 1 to 2 cm. wide; stems 15 to 20 cm. high; petals 8 to 10 mm. long.

40. SAXIFRAGACEAE. Saxifrage Family.

Perennial herbs; leaves usually alternate, often all borne at the base of the stem, simple or compound; sepals 5; petals 5 or none, small; stamens as many or twice as many as the sepals; fruit a capsule or of 2 or more small pods.

Flowers in loose racemes; petals lobed.
  Leaves divided to the base; rootstocks with bulblets . . . **1. LITHOPHRAGMA.**
  Leaves shallowly lobed; rootstocks without bulblets . . . . . **2. MITELLA.**

Flowers not in racemes; petals entire.
Stamens 5.
Lowest leaves divided to the base into 3 lobes . . . . . **3. HEMIEVA.**
Lowest leaves (like the upper ones) shallowly lobed or toothed.
Rootstocks with bulblets; flower stems leafy; flowers in a loose open panicle. **4. SUKSDORFIA.**
Rootstocks without bulblets; flower stems not leafy; flowers in a dense spikelike panicle . . . . . **5. HEUCHERA.**
Stamens 10.
Fruit 1-celled; leaves broadly heart-shaped; flowers white, in a loose panicle. **6. TIARELLA.**
Fruit 2-celled; leaves and flowers various.
Leaves leathery; fruit of 2 distinct pods . . . . . **7. LEPTARRHENA.**
Leaves thin or fleshy, not leathery; fruit of 2 united pods . **8. SAXIFRAGA.**

1. LITHOPHRAGMA Nutt.

1. Lithophragma parviflora (Hook.) Nutt. WOODLAND STAR. East entrance, in woods, *Umbach*. B. C. to Calif., Colo., and S. Dak.—Stems slender, 10 to 30 cm. high, leafy, somewhat hairy; lobes of the leaves again lobed, 1 to 3 cm. long; flowers few, the petals white, 7 to 8 mm. long, 3 or 5-cleft; stamens 10.

2. MITELLA L. MITERWORT.

Perennials with rootstocks; leaves basal, long-petioled, heart-shaped or kidney-shaped, shallowly toothed and lobed; petals 5 or none; stamens 5 or 10.—The capsule opens widely and exposes the black seeds which lie within, like eggs in a nest.

Petals 3-cleft near the apex, white or purplish; stamens 5, opposite the sepals. **1. M. violacea.**
Petals pinnately lobed, greenish or yellowish; stamens 5 or 10.
Stamens 10; rootstocks very slender . . . . . **2. M. nuda.**
Stamens 5; rootstocks short and thick.
Stamens opposite the petals . . . . . **3. M. pentandra.**
Stamens opposite the sepals . . . . . **4. M. breweri.**

1. Mitella violacea Rydb. Occasional on the east slope at all altitudes, on open slopes or cliffs or in moist woods. Mont. (*Ozomelis violacea* Rydb.)—Rootstocks thick; leaves 2 to 4 cm. long, shallowly lobed, hairy; flower stems slender, 10 to 30 cm. high; petals twice as long as the sepals.

2. Mitella nuda L. Mossy banks in swampy woods below Lake McDermott. B. C. and Mont. to Lab.; also in Asia.—Plants producing long runners; leaves 2 to 5 cm. wide, only slightly lobed, hairy; stems 5 to 20 cm. high.

3. Mitella pentandra Hook. Common at middle and high altitudes, on open slopes or in meadows or deep woods. Alaska to Calif., Colo., and Alta. (*Pectianthia pentandra* Rydb.)—Leaves 3 to 8 cm. wide, very shallowly lobed, sparsely short-hairy; stems 10 to 40 cm. high; petals with threadlike lobes.

4. Mitella breweri A. Gray. Common above and near timber line, in woods or on open slopes. B. C. to Calif., Mont., and Alta. (*Pectianthia breweri* Rydb.)—Leaves 4 to 7 cm. wide, shallowly lobed, slightly hairy; stems 10 to 30 cm. high; flowers green.

3. HEMIEVA Raf.

1. Hemieva ranunculifolia (Hook.) Raf. On moist cliffs or damp rocky slopes; Altyn Peak, Grinnell Glacier, Baring Falls. B. C. to Oreg., Mont., and Alta.—Plants with bulblike rootstocks, 10 to 20 cm. high, with scattered gland-tipped hairs; basal leaves stalked, 1 to 2.5 cm. long, divided to the base into 3 broad lobes, these 3 or 4-lobed; upper leaves 3-lobed; flowers in a loose panicle; petals white, short-clawed, persisting in fruit.

4. SUKSDORFIA A. Gray.

1. **Suksdorfia violacea** A. Gray. Wet mossy cliffs at Baring Falls. Wash. and Oreg. to Mont.—Plants 10 to 20 cm. high, with bulblet-bearing rootstocks, somewhat glandular-hairy; lower leaves kidney-shaped, 1 to 3 cm. wide, with rounded teeth; upper leaves 2 to 4-toothed at the tip; flowers few, paniced; petals pink, 5 to 7 mm. long, clawed.

5. HEUCHERA L. ALUMROOT.

Perennials with thick rootstocks; leaves basal, slender-petioled, rounded or kidney-shaped, shallowly or deeply lobed; flowers in spikelike panicles, on naked stalks; petals entire; stamens 5, opposite the sepals; capsule 2-beaked.

Flowers 3 to 4 mm. long; leaves lobed nearly halfway to the base. **1. H. flabellifolia.**

Flowers about 7 mm. long; leaves shallowly lobed . . . . . **2. H. glabella.**

1. **Heuchera flabellifolia** Rydb. Hills at east entrance, and on Mt. Henry, *Umbach.* Alta. to Wyo.—Stems 20 to 30 cm. high, finely glandular-hairy; leaves 1.5 to 3 cm. wide, glandular; flowers greenish.

2. **Heuchera glabella** Torr. & Gray. Common at nearly all altitudes, usually on cliffs or rocks, sometimes on open slopes, in dry woods or alpine meadows, or on prairie. Wash. and Oreg. to Mont. and Alta.—Leaves long-stalked, rounded or heart-shaped, 2 to 5 cm. wide, glabrous or nearly so, with shallow lobes and teeth; flower stalk 20 to 50 cm. high, nearly glabrous; flowers yellowish white.

In dry weather or in late summer the leaves turn bronze or deep red. The flowers are rather handsome. The Blackfoot Indians used the macerated plant as a remedy for sores and swellings.

6. TIARELLA L.

1. **Tiarella unifoliata** Hook. LACEFLOWER. Common or abundant at middle altitudes, in moist woods; sometimes at low altitudes and in meadows above timber line. B. C. to Calif. and Mont.—Perennial with thick rootstocks; stems 15 to 40 cm. high, glabrous or nearly so, with 1 to 4 leaves; basal leaves slender-petioled, broadly heart-shaped, 4 to 10 cm. long, 3 or 5-lobed and toothed, finely hairy; flowers white, in narrow panicles; stamens 10, longer than the petals.

One of the most conspicuous plants of moist woods, forming dense banks all along the trails. The flowers are very delicate and give the effect of a cloud of mist above the masses of deep green leaves; they last almost all summer.

7. LEPTARRHENA R. Br.

1. **Leptarrhena pyrolifolia** (Don) R. Br. LEATHERLEAF SAXIFRAGE. Abundant above timber line, in wet meadows or on rocky slopes, often along brooks. Alaska to Wash. and Mont.—Plants 10 to 20 cm. high, from a short thick leafy base; leaves mostly at base of stem, oblong, 3 to 8 cm. long, thick and leathery, toothed, deep green and shining on the upper surface, pale beneath; flower stalk bearing 1 or 2 leaves, the flowers in a narrow panicle; petals white, 2 to 2.5 mm. long, persisting in fruit.

A handsome plant, often forming great mats. The fruit is tinged with red or purple.

8. SAXIFRAGA L. SAXIFRAGE.

Perennials with naked or leafy stems; leaves entire, toothed, or lobed; flowers mostly in cymes, sometimes solitary; petals entire; stamens 10; fruit 2-celled.

Leaves entire.

Leaves opposite, obtuse; flowers solitary, purple . . . . . **1. S. oppositifolia.**

Leaves alternate, acute; flowers in cymes, white . . . . . **2. S. bronchialis.**

Leaves toothed or lobed.
Stems leafy.
Leaves longer than broad, 3-toothed or with 3 narrow lobes.
Basal leaves entire or 3-toothed . . . . . **3. S. adscendens.**
Basal leaves deeply 3-lobed . . . . . **4. S. caespitosa.**
Leaves as broad as long or broader, with 3 or more broad lobes.
Flowers, except the uppermost one, replaced by bulblets; stems finely and densely viscid-hairy . . . . . **5. S. cernua.**
Flowers not replaced by bulblets; stems nearly glabrous . . . . **6. S. rivularis.**
Stems naked.
Leaves and petioles glabrous.
Leaves as broad as long or broader, somewhat cordate at base . . . **7. S. arguta.**
Leaves mostly longer than broad, narrowed at base . . . . . **8. S. lyallii.**
Leaves and petioles finely or coarsely hairy.
Leaves kidney-shaped, as broad as long, deeply cordate at base. **9. S. mertensiana.**
Leaves oblong, ovate, or spatulate, longer than broad, narrowed at base.
Flowers nearly sessile, in dense clusters, the inflorescence without bulblets. **10. S. rhomboidea.**
Flowers slender-stalked, in loose cymes, often replaced by bulblets. **11. S. brunoniana.**

1. Saxifraga oppositifolia L. PURPLE SAXIFRAGE. On moraine at Grinnell Glacier. Alaska to Wyo., Vt., and Greenl.; also in Eur. and Asia. (*Antiphylla oppositifolia* Fourr.)—Plants with leafy stems, forming dense mats; leaves obovate or spatulate, 3 to 5 mm. long, densely crowded, hairy on the margins; flower stalks 1 to 3 cm. long, 1-flowered; petals 8 to 9 mm. long.

Very showy when in flower.

2. Saxifraga bronchialis L. COMMON SAXIFRAGE. Common at nearly all altitudes, on open slopes or rock slides, sometimes even on prairie. Alaska to N. Mex.; also in Eur. and Asia. (*S. austromontana* Wiegand; *Leptasea austromontana* Small.)—Plants 5 to 15 cm. high, forming dense mats; leaves lanceolate, 5 to 12 mm. long, spine-tipped, hairy on the margins, crowded and overlapping; petals about 5 mm. long, white, with dark red dots.

In dry places the leaves are often purplish; they are disagreeably prickly.

3. Saxifraga adscendens L. Frequent above timber line, on rocky slopes. B. C. and Alta. to Colo.; also in Eur. (*Muscaria adscendens* Small.)—Plants 3 to 10 cm. high, not tufted, very viscid; leaves mostly basal, 4 to 10 mm. long, wedge-shaped; petals 3 mm. long, white.

An inconspicuous plant, easily overlooked.

4. Saxifraga caespitosa L. Frequent above timber line, on rock slides or moist cliffs. Alaska to Colo., Que., and Greenl.; also in Eur. (*Muscaria caespitosa* Haw.)—Plants 2 to 10 cm. high, often matted, finely glandular-hairy; leaves 5 to 15 mm. long; flower stalks 1 to 3-flowered; petals 3 to 5 mm. long, white.

5. Saxifraga cernua L. Occasional on alpine rock slides. Alaska to N. Mex., Lab., and Greenl.; also in Eur. and Asia.—Stems usually solitary, erect, 8 to 15 cm. high; leaves kidney-shaped, 1 to 2 cm. wide, shallowly 5 or 7-lobed; petals white, 6 to 8 mm. long.

6. Saxifraga rivularis L. Occasional above timber line, in meadows or on moist cliffs. Alaska to Wyo., N. H., and Greenl.; also in Eur. and Asia.—Plants 2 to 10 cm. high, very slender, loosely matted; basal leaves long-petioled, kidney-shaped, 4 to 10 mm. broad, with 3 or 5 broad lobes; petals white, 3 to 5 mm. long.

Specimens from Sperry Glacier, reported as *S. debilis* Engelm., a closely related species, are *Romanzoffia sitchensis* Bong.

7. Saxifraga arguta Don. Occasional at low altitudes, on shady mossy banks. B. C. and Mont. to N. Mex. and Calif. (*Micranthes arguta* Small.)—Stems 20 to 40 cm. high, glabrous or nearly so, loosely branched above; leaves long-petioled, rounded or kidney-shaped, 3 to 8 cm. wide, coarsely toothed; petals 3 mm. long, white, with 2 yellow spots below the middle.

8. Saxifraga lyallii Engl. REDSTEM SAXIFRAGE. Common above timber line, in meadows or on rock slides. Alaska to Mont. (*Micranthes lyallii* Small.)—Stems 10 to 25 cm. high, usually purple or red, glabrous; leaves fan-shaped, 2 to 4 cm. long, coarsely toothed; cymes open and loosely flowered; petals 3 to 4 mm. long, white, with 2 yellow spots below the middle.

In wet alpine meadows, especially along brooks, this saxifrage is often abundant and forms dense carpets. The purplish stems and bright green leaves are most attractive.

9. Saxifraga mertensiana Bong. Frequent above or near timber line, on wet cliffs; sometimes on cliffs at middle altitudes. Alaska to Calif. and Mont. (*Heterisia mertensiana* Small.)—Plants 10 to 30 cm. high, brittle, loosely hairy; leaves 2 to 6 cm. wide, shallowly lobed, the lobes 3-toothed; inflorescence loosely branched, often with bulblets; petals white, 3 to 4 mm. long.

10. Saxifraga rhomboidea Greene. Frequent above timber line, in meadows or on rocky slopes; sometimes about snow banks at middle altitudes. Mont. to N. Mex. (*Micranthes rhomboidea* Small.)—Stems 10 to 25 cm. high; leaves in a basal rosette, oblong or ovate, 2 to 6 cm. long, with low obtuse teeth, the petioles short and winged; petals 3 to 4 mm. long, white.

11. Saxifraga brunoniana Bong. Frequent above or near timber line, on cliffs or open slopes; sometimes on cliffs at middle altitudes. Alaska to Oreg. and Colo. (*Spatularia brunoniana* Small; *S. vreelandii* Small.)—Plants 10 to 40 cm. high, very viscid; leaves spatulate, 2 to 8 cm. long, toothed; flowers mostly replaced by green bulblets; petals white, 3.5 to 5 mm. long.

41. GROSSULARIACEAE. Gooseberry Family.

Fruit black, with gland-tipped hairs; pedicels jointed below the flowers . 1. **RIBES.**
Fruit wine-red, glabrous; pedicels not jointed . . . . . 2. **GROSSULARIA.**

1. RIBES L.

Plants spiny or unarmed; leaves alternate, broad; flowers in racemes; sepals and petals each 5; stamens 5; fruit a juicy berry.—The cultivated currants belong to this genus.

Plants without spines or bristles; stems and leaves covered with fine sticky hairs.
1. **R. viscosissimum.**
Plants usually with spines or bristles or both; stems and leaves not viscid-hairy.
2. **R. lacustre.**

1. Ribes viscosissimum Pursh. STICKY CURRANT. Frequent at low and middle altitudes, usually in thin woods. B. C. to Calif., Colo., and Mont.—Shrub, a meter high or less; leaves rounded, kidney-shaped, 5 to 8 cm. wide, shallowly lobed; flowers few, greenish, about 14 mm. long; fruit covered with short gland-tipped hairs.

This shrub is nowhere abundant, and usually only one or two plants are found in a place. The leaves are so sticky that it is unpleasant to handle them, and they catch and hold dust.

2. Ribes lacustre (Pers.) Poir. SPINY CURRANT. PLATE 49, B. Common up to timber line, usually in woods or along cliffs. Alaska to Calif., N. Mex., Pa., and Newf. (*Limnobotrya lacustris* Rydb.; *Ribes lacustre parrulum* A. Gray.)—Shrub, 0.6 to 1.5 meters high, very spiny and prickly; leaves glabrous, 2 to 5 cm. long, with obtuse lobes, often shining; flowers greenish or purplish.

Abundant in many places; a characteristic shrub about alpine meadows. The fruit is sour and somewhat bitter. The flowers last a long time.

2. GROSSULARIA Mill.

1. Grossularia inermis (Rydb.) Coville & Britton. WILD GOOSEBERRY. Common in woods and thickets at low and middle altitudes; often associated with aspens. B. C. and Alta. to N. Mex. and Calif. (*Ribes inerme* Rydb.)—Shrub, a meter high or less, with few or no spines; leaves glabrous, lobed; flowers 5 to 6 mm. long, greenish and inconspicuous; sepals and petals each 5; stamens 5.

The fruit, which is borne in abundance, is of good flavor when ripe. Wild gooseberries are very abundant in the thickets along Swiftcurrent Creek below Lake McDermott.

42. ROSACEAE. Rose Family.

Herbs or shrubs; leaves simple or compound, alternate, usually with stipules; sepals usually 5; petals as many as the sepals; stamens usually many, most commonly 20; fruit dry or fleshy.

Leaves simple, toothed or lobed; plants with woody stems.
- Plants prostrate, forming mats; petals 8 to 10; fruit of achenes with long hairy tails . . . . . **8. DRYAS.**
- Plants erect shrubs; petals 5; fruit not of tailed achenes.
  - Leaves large, 10 to 20 cm. broad; fruit like a raspberry . . . . . **11. RUBUS.**
  - Leaves small, much less than 10 cm. broad; fruit dry.
    - Flowers in pointed panicles; fruit of small achenes . . . **3. SERICOTHECA.**
    - Flowers in flat-topped corymbs; fruit of small pods.
      - Leaves lobed; fruit of 2 pods . . . . . **1. OPULASTER.**
      - Leaves toothed but not lobed; fruit usually of 5 pods . . . . **2. SPIRAEA.**

Leaves compound, composed of 3 or more leaflets.
- Plants shrubby, sometimes armed with prickles or bristles.
  - Plants neither prickly nor bristly; flowers yellow . . . . . **4. POTENTILLA.**
  - Plants prickly or bristly or both; flowers white or pink.
    - Flowers white; fruit like a raspberry or blackberry . . . . . **11. RUBUS.**
    - Flowers pink; fruit red, smooth outside, open at the top, containing numerous seedlike achenes on the inside . . . . . **12. ROSA.**
- Plants herbaceous, unarmed.
  - Leaflets 3 or 5, all attached at the end of the leaf stalk.
    - Plants with runners or long creeping stems; petals white; fruit juicy.
      - Leaflets 3; fruit red and fleshy, bearing the seedlike achenes on the outside . . . . . **6. FRAGARIA.**
      - Leaflets 5; fruit of a few small distinct 1-seeded drupes . . . . **11. RUBUS.**
    - Plants without runners; petals yellow; fruit dry.
      - Stamens 5; petals shorter than the sepals; plants 10 cm. high or smaller. **7. SIBBALDIA.**
      - Stamens usually 20; petals commonly much longer than the sepals; plants usually much more than 10 cm. high . . . . . **4. POTENTILLA.**
  - Leaflets 5 or usually more, some of them attached along the side of the leaf stalk.
    - Achenes tailed or beaked in age.
      - Achenes with hooked beaks . . . . . **9. GEUM.**
      - Achenes with slender hairy tails . . . . . **10. SIEVERSIA.**
    - Achenes neither tailed nor beaked.
      - Style borne near the top of the achene; petals bright yellow or rarely purple; plants not sticky . . . . . **4. POTENTILLA.**
      - Style borne near the base of the achene; petals pale yellow or nearly white; plants with fine sticky hairs . . . . . **5. DRYMOCALLIS.**

1. OPULASTER Medic.

1. Opulaster malvaceus (Greene) Kuntze. NINEBARK. Belton, in woods or on open rocky slopes. B. C. to Oreg., Utah, and Mont. (*Physocarpus malvaceus* Kuntze.)—Shrub, about a meter high, with loose shredded bark; leaves 2 to 6 cm. wide, stalked, rounded, 3 or 5-lobed and with rounded teeth, glabrous or with branched hairs; flowers white, in dense flat-topped clusters; petals about 5 mm. long; fruit of 2 pods about 5 mm. long.

A handsome shrub when in flower.

2. SPIRAEA L.

Shrubs with toothed leaves; flowers in flat-topped panicles, small; fruit of 5 small pods.

Flowers deep reddish pink . . . . . **1. S. densiflora.**
Flowers white . . . . . **2. S. lucida.**

1. Spiraea densiflora Nutt. PINK MEADOWSWEET. Common just above timber line in wet meadows or on open slopes, also in open or brushy places at middle altitudes. B. C. to Oreg., Wyo., and Mont.—Slender shrub, 0.5 to 1.5 meters high, with reddish brown branches; leaves oval or oblong, 1.5 to 3 cm. long, bright green, toothed above the middle, glabrous or nearly so; panicles narrow, dense; petals 1.5 mm. long.

A showy shrub, with very sweet-scented flowers, which last only a short time. Their fragrance is often noticeable before the plants themselves are seen.

2. Spiraea lucida Dougl. WHITE MEADOWSWEET. Common at low and middle altitudes, among aspens, in thin woods, or on open slopes, sometimes extending up to or even above timber line. B. C. to Oreg., Wyo., and Sask.—Low shrub, 30 to 60 cm. high, with creeping rootstocks; leaves oval or obovate, 2 to 6 cm. long, glabrous, rather pale, coarsely toothed; petals 2 mm. long.

The flowers are nearly odorless; they last a long time.

3. SERICOTHECA Raf.

1. Sericotheca discolor (Pursh) Rydb. MOUNTAIN-SPRAY. Frequent at low and middle altitudes, especially on the west slope, in thin woods or on open rocky hillsides; abundant about Sun Camp; rare in the Many Glacier region. B. C. to Calif. and Mont.—Slender shrub, 1 to 2 meters high; leaves ovate or oval, toothed, 4 to 10 cm. long, hairy; flowers creamy white, in dense pointed panicles 10 to 20 cm. long; petals 1.5 to 2 mm. long; fruit of small hairy achenes inclosed in the calyx.

A handsome shrub, which remains in flower nearly all summer. The flowers are slightly fragrant.

4. POTENTILLA L. CINQUEFOIL.

Herbs or shrubs; leaves compound, with 3 or more digitate or pinnate leaflets; flowers in cymes or rarely solitary; petals yellow or sometimes purple; stamens usually 20; fruit of small achenes.

Plants shrubby . . . . . **1. P. fruticosa.**
Plants herbaceous.
  Leaflets 3.
    Cymes very leafy; leaflets green on both sides; plants not tufted.
      2. P. monspeliensis.
    Cymes not leafy; leaflets white-woolly beneath; plants in dense tufts or mats.
      9. P. nivea.
  Leaflets 5 or more.
    Leaves pinnate, some of the leaflets attached along the sides of the petiole.
      Plants with long runners; flowers solitary in the axils of small leaves on the runners . . . . . **16. P. anserina.**

Plants without runners; flowers in cymes.
Petals purple . . . . . 17. **P. palustris.**
Petals yellow.
Leaflets almost equally white-hairy on both surfaces . . . . 3. **P. hippiana.**
Leaflets green on the upper surface.
Leaflets toothed; style longer than the mature achene, slender.
4. P. pulcherrima.
Leaflets deeply lobed; style not longer than the achene, thickened at the base.
Leaflets 7 to 15, grayish beneath . . . . . **5. P. pennsylvanica.**
Leaflets usually 5, white beneath . . . . . **6. P. platyloba.**
Leaves digitate, the leaflets all attached at the end of the petiole.
Leaflets not at all woolly beneath, the pubescence of straight hairs.
Leaflets nearly glabrous . . . . . **7. P. glaucophylla.**
Leaflets densely hairy on one or both surfaces . . . . . **8. P. nuttallii.**
Leaflets with woolly matted hairs on the lower surface.
Leaflets 5, 1 to 2 cm. long; plants 10 to 15 cm. high.
10. P. quinquefolia.
Leaflets more than 5 in most of the leaves, usually more than 3 cm. long; plants commonly 20 to 60 cm. high.
Leaflets divided more than halfway to the margin into narrow lobes.
11. P. blaschkeana.
Leaflets toothed or lobed less than halfway to the margin.
Leaflets shallowly toothed, with rounded or obtuse teeth.
12. P. filipes.
Leaflets deeply toothed, with lanceolate or oblong, often acutish teeth.
Petioles with loosely spreading hairs . . . . . **13. P. gracilis.**
Petioles with appressed or ascending hairs.
Inflorescence dense, leafy; leaflets white beneath . **14. P. dichroa.**
Inflorescence loose and open, not leafy; leaflets grayish green beneath . . . . . **15. P. viridescens.**

1. Potentilla fruticosa L. BUSH CINQUEFOIL. Common at nearly all altitudes, chiefly on open slopes or in meadows; abundant in low places on prairie. Alaska to Calif., N. Mex., N. J., and Lab.; also in Eur. and Asia. (*Dasiphora fruticosa* Rydb.)—Densely branched shrub, 0.3 to 1 meter high, with shredded bark; leaves pinnate, the leaflets 3 to 7, silky-hairy, 1 to 2 cm. long, entire; flowers solitary or in small clusters, 1.5 to 3 cm. broad.

A conspicuous shrub when covered with the bright yellow flowers. Above timber line the plants are sometimes prostrate. One plant was noticed which had creamy white flowers.

2. Potentilla monspeliensis L. Frequent at low and middle altitudes, in meadows, woods, or thickets, or on slopes, sometimes in sphagnum bogs. Widely distributed in N. Amer., Eur., and Asia.—Plants biennial, stout, 20 to 50 cm. high, very leafy, loosely hairy; leaflets 3 to 7 cm. long, toothed; petals slightly shorter than the sepals.

3. Potentilla hippiana Lehm. Frequent on the east slope at low altitudes, on prairie or open hillsides. Alta. and Sask. to N. Mex. and Ariz.—Stems stout, 20 to 50 cm. high; leaflets 7 to 11, 2 to 5 cm. long, coarsely toothed; petals 6 to 8 mm. long.

4. Potentilla pulcherrima Lehm. Occasional on the east slope at middle altitudes or above timber line, on open hillsides. Alta. and Sask. to N. Mex. and Utah.—Stems 25 to 50 cm. high, hairy; leaflets 5 or 7, 1.5 to 6 cm. long, white-woolly beneath, the lower leaflets smaller than the others; petals 5 to 7 mm. long.

5. Potentilla pennsylvanica L. Frequent at low altitudes, on prairie or open slopes. Yukon to B. C., N. Mex., and Kans.—Stems stout, 30 to 60 cm. high; leaflets 1 to 7 cm. long, with linear or oblong lobes; petals about as long as the sepals.

6. Potentilla platyloba Rydb. St. Mary, on rocky flats. Alta. to Colo.—Stems stout, 30 to 50 cm. high; leaflets 2 to 6 cm. long, green above, white beneath; petals about as long as the sepals.

7. Potentilla glaucophylla Lehm. Common above timber line, in meadows or on rocky slopes or rock slides; sometimes at middle altitudes, on moist open slopes. B. C. to Sask., N. Mex., and Utah.—Stems slender, 10 to 50 cm. high, nearly glabrous; leaflets 1 to 5 cm. long, coarsely toothed, green; petals 6 to 10 mm. long.

8. Potentilla nuttallii Lehm. Common on the east slope at low and middle altitudes, in woods or thickets or on open hillsides. B. C. to Oreg., Colo., and Sask.—Stems 30 to 60 cm. high, hairy; leaflets 3 to 10 cm. long, coarsely toothed; petals 6 to 8 mm. long.

9. Potentilla nivea L. Occasional above timber line, on rocky slopes; sometimes about snow banks at middle altitudes. Alaska to Colo., Que., and Greenl.; also in Eur. and Asia.—Plants densely tufted, 10 to 20 cm. high; leaves mostly basal, the leaflets 1 to 2 cm. long, obovate, green above, white beneath, deeply toothed; flowers 1 to 6, 12 to 15 mm. broad.

10. Potentilla quinquefolia Rydb. Exposed summits, Mt. Henry and Sexton Glacier. B. C. to Colo. and Sask.—Plants densely matted; leaflets deeply toothed, green above, white beneath; petals slightly longer than the sepals.

11. Potentilla blaschkeana Turcz. Frequent at low altitudes, in thickets or on prairie or open slopes. B. C. and Alta. to Wyo. and Calif.—Stems 40 to 60 cm. high, silky-hairy; leaflets 4 to 9 cm. long, green above, white beneath; petals 7 to 10 mm. long.

12. Potentilla filipes Rydb. Frequent on the east slope at low altitudes, in thickets or on prairie or open hillsides. Alta. to N. Mex. and Man.—Stems stout, 20 to 50 cm. high, silky-hairy; leaflets 2 to 6 cm. long, green above, white beneath; petals 6 to 8 mm. long.

13. Potentilla gracilis Dougl. Occasional at low or middle altitudes, in woods or on open slopes. B. C. to Oreg. and Mont.—Stems 30 to 70 cm. high, hairy; leaflets 3 to 6 cm. long, green above, whitish beneath; petals nearly 1 cm. long.

14. Potentilla dichroa Rydb. Dry rocky hilltop near foot of Lake McDermott. Oreg. to Utah and Mont.—Stems stout, 20 to 50 cm. high, densely white-hairy; leaflets 2 to 6 cm. long, green above, white beneath; petals 6 to 8 mm. long.

15. Potentilla viridescens Rydb. Frequent on the east slope at low altitudes, in thickets or on prairie. Alta. to Wyo. and Man.—Stems stout, 30 to 60 cm. high, silky-hairy; leaflets 3 to 5 cm. long, coarsely toothed; petals about as long as the sepals.

16. Potentilla anserina L. SILVERWEED. In thickets and about low places on prairie at east entrance. Widely distributed in N. Amer., Eur., and Asia. (*Argentina anserina* Rydb.)—Leaflets 9 to 31, obovate or oval, 1 to 4 cm. long, green on the upper surface, white-silky beneath; petals rounded, 7 to 10 mm. long, yellow.

The Blackfoot Indians employed the root as a remedy for diarrhea. *Potentilla anserina concolor* Seringe (*Argentina argentea* Rydb.) is a form with leaflets densely silvery-silky on both surfaces. It grows with the typical form, and is found about the east entrance.

17. Potentilla palustris (L.) Scop. MARSHLOCKS. Sphagnum bogs on the west slope. Alaska to Calif., Wyo., N. H., and Greenl. (*Comarum palustre* L.)—Perennial,

20 to 40 cm. high, slightly hairy, with long rootstocks; leaflets 5 or 7, oval or elliptic, 5 to 8 cm. long, pale beneath; calyx enlarging in fruit and becoming purplish; petals about half as long as the sepals; fruit of achenes on a receptacle, this becoming large and spongy.

5. DRYMOCALLIS Fourr.

Perennial herbs with viscid pubescence; leaves pinnate, the leaflets broad, deeply toothed; flowers in cymes; petals cream-colored or pale yellow; fruit of numerous small achenes.

Petals about as long as the sepals; plants usually 30 to 60 cm. high . **1. D. glandulosa.**
Petals much longer than the sepals; plants usually 15 to 20 cm. high.
2. D. pseudorupestris.

1. Drymocallis glandulosa (Lindl.) Rydb. Common on the east slope at low and middle altitudes, in woods or thickets or on open hillsides. B. C. to Calif., N. Mex., and S. Dak.—Plants very hairy and viscid; leaflets 7 or 9, green, 1.5 to 4 cm. long, coarsely toothed and often lobed.

2. Drymocallis pseudorupestris Rydb. Frequent at middle and high altitudes, on open rocky slopes or rock slides, sometimes in woods. Alta. to Idaho and Wyo.—Plants hairy and viscid, usually tufted; leaflets 7 or 9, 1 to 3 cm. long; flowers 1.5 to 2 cm. broad.

6. FRAGARIA L. Strawberry.

Perennial, with long runners; leaves basal, the 3 leaflets broad, toothed; petals white, obtuse; fruit of numerous seedlike achenes on a fleshy red receptacle.

Plants green, not glaucous; teeth of the leaflets usually acute . . . . **1. F. bracteata.**
Plants pale and somewhat glaucous; teeth of the leaflets rounded or obtuse.
Hairs of the petioles appressed . . . . . **2. F. glauca.**
Hairs of the petioles spreading . . . . . **3. F. platypetala.**

1. Fragaria bracteata Heller. Frequent, especially on the west slope, at low and middle altitudes, in woods or thickets. B. C. to Calif., N. Mex., and Mont.—Pubescence mostly of spreading hairs; leaflets thin, 2 to 6 cm. long, pale beneath; petals about twice as long as the sepals.

2. Fragaria glauca (S. Wats.) Rydb. Frequent at low and middle altitudes, sometimes near timber line, in woods or thickets or on open slopes. B. C. to N. Mex. and S. Dak.—Leaflets rather thick, 3 to 5 cm. long, coarsely toothed, silky-hairy beneath or nearly glabrous; flowers 1.5 to 2 cm. broad.

3. Fragaria platypetala Rydb. Occasional in woods or thickets at middle altitudes, and sometimes above timber line. Alaska to Calif., Wyo., and Mont.—Leaflets rather thick, 2 to 6 cm. long, silky-hairy beneath; flowers 1.5 to 2 cm. broad.

7. SIBBALDIA L.

1. Sibbaldia procumbens L. Common above timber line, in meadows and on rock slides; occasionally found at lower altitudes, a few plants even at the east entrance. Alaska to Calif., N. Mex., N. H., and Greenl.; also in Eur. and Asia.—Perennial with short rootstocks, 10 cm. high or less, somewhat hairy; leaves slender-stalked, the 3 narrow leaflets 1 to 3 cm. long, 3 to 5-toothed near the end; flowers few, in dense cymes; petals yellow, shorter than the sepals; fruit of small achenes.

The plant often forms dense carpets in alpine meadows.

8. DRYAS L. Dryad.

Low prostrate shrubs, forming dense mats; leaves petioled, with low rounded teeth, thick and leathery, white-woolly beneath; flowers solitary on naked stems; sepals and petals each 8 or 10; fruit of numerous achenes, each with a long hairy tail.

Petals white, spreading; leaves broadly rounded or notched at the base.
1. D. octopetala.
Petals yellow, erect or ascending; leaves narrowed at the base . . **2. D. drummondii.**

1. Dryas octopetala L. WHITE DRYAD. PLATE 48, B. Common above timber line, on rocky slopes and rock slides. Alaska to Wash., Colo., and Greenl.; also in Eur. and Asia.—Leaves oval or oblong, 6 to 20 mm. long, green and nearly glabrous on the upper surface; stems 5 to 15 cm. long; calyx black-hairy; petals 1 to 1.5 cm. long.

A handsome plant, whose flowers soon fade. It appears to be more abundant at Piegan Pass than elsewhere, and in some alpine localities it is rare or absent.

2. Dryas drummondii Richards. YELLOW DRYAD. Occasional above timber line, on rock slides or rocky slopes. B. C. to Oreg., Mont., and Que.—Leaves 1 to 3 cm. long, green on the upper surface; stems 5 to 15 cm. high; calyx black-hairy; petals about 1 cm. long.

This plant, strangely enough, is abundant on rocky flats along the creek at St. Mary, and grows more luxuriantly there than at high altitudes. Evidently the seeds have been carried down by water.

9. GEUM L. AVENS.

Perennial hairy herbs with rootstocks; leaves pinnate, the terminal leaflet much larger than the others; flowers in cymes; fruit of numerous achenes, each with a hooked beak.—The achenes adhere readily to clothing by means of their beaks.

Sepals ascending, deep red; petals pinkish or pale yellow . . . . . **1. G. rivale.**
Sepals reflexed, green; petals bright yellow.
Lower part of the style glandular; petals narrowed at the base.
2. G. macrophyllum.
Lower joint of the style hairy but not glandular; petals rounded at the base.
3. G. strictum.

1. Geum rivale L. PURPLE AVENS. Swampy woods below Lake McDermott. B. C. to N. Mex., N. J., and Lab.; also in Eur. and Asia.—Stems 30 to 80 cm. high, hairy; terminal leaflet 4 to 10 cm. long, often broader than long, lobed and toothed; petals clawed, 7 to 10 mm. long.

2. Geum macrophyllum Willd. YELLOW AVENS. Common at low and middle altitudes, in moist woods or thickets, in bogs, or on brushy slopes. Alaska to Calif., Mont., N. H., and Newf.; also in Asia.—Plants 30 to 80 cm. high, very hairy; leaflets 5 to 15, the terminal one 5 to 10 cm. wide, lobed and toothed; petals 4 to 6 mm. long.

3. Geum strictum Soland. Occasional on the east slope at low altitudes, in meadows or swamps. B. C. to Mex., Pa., and Newf.—Stems 40 to 80 cm. high, hairy; leaflets 5 to 9 or more, toothed and often deeply lobed; stem leaves usually with 3 leaflets; petals 5 to 8 mm. long; fruit heads about 1.5 cm. thick.

10. SIEVERSIA Willd.

Perennial herbs with thick rootstocks; leaves mostly basal, pinnate, the leaflets deeply lobed; flowers solitary or in cymes; fruit of numerous achenes, these sometimes with hairy tails.

Leaflets nearly glabrous; petals yellow; tails of the achenes glabrous.
1. S. turbinata.
Leaflets densely hairy; petals pinkish; tails of the achenes hairy . . . . **2. S. ciliata.**

1. Sieversia turbinata (Rydb.) Greene. Piegan Pass, on open rocky slopes. Mont. to Nev. and N. Mex. (*Acomastylis turbinata* Greene.)—Plants 5 to 20 cm. high, densely tufted; leaflets 11 to 31, deeply lobed, the lobes narrow; petals 6 to 8 mm. long.

2. **Sieversia ciliata** (Pursh) Don. Occasional on the east slope at low altitudes, on prairie or open hillsides. B. C. and Alta. to N. Mex.—Stems 20 to 40 cm. high, few-flowered; leaves 10 to 20 cm. long; leaflets 9 to 19; petals slightly longer than the sepals.

The Blackfoot Indians are said to have used a decoction of the plant as a remedy for sore eyes.

11. RUBUS L.

Shrubs or herbs, often prickly or bristly; leaves compound and pinnate or digitate, or sometimes simple; flowers in corymbs or racemes, rarely solitary; stamens numerous; petals white; fruit of few or many small fleshy drupes, these united or distinct.

Leaves simple, lobed; stems unarmed . . . . . **1. R. parviflorus.**
Leaves compound, with 3 or more leaflets; stems often prickly or bristly.
  Stems herbaceous, unarmed, creeping; leaflets 5, digitate . . . . . **2. R. pedatus.**
  Stems woody, armed with prickles or bristles; leaflets various.
    Stems prostrate, armed with recurved prickles; leaves digitate, and often again pinnate, the leaflets deeply lobed; fruit a blackberry . . . **3. R. laciniatus.**
    Stems erect or nearly so, with straight prickles or bristles; leaves mostly pinnate, the 3 leaflets toothed or shallowly lobed; fruit a raspberry.
      Fruit red; stems bristly and with gland-tipped hairs . . . . . **4. R. strigosus.**
      Fruit purplish black; stems prickly, glabrous . . . . . **5. R. leucodermis.**

1. **Rubus parviflorus** Nutt. THIMBLEBERRY. Common at low and middle altitudes, usually in dense woods, sometimes extending to timber line. Alaska to Calif., N. Mex., and Ont. (*Rubacer parviflorum* Rydb.)—Shrub, 0.5 to 1 meter high, finely hairy; leaves maple-like, 5 to 30 cm. wide, 3 or 5-lobed; flowers panicled; petals rounded or oval, 1.5 to 3 cm. long; fruit like a raspberry, pale red, 1.5 to 2 cm. broad.

This is one of the most abundant plants of deep moist woods, often covering almost solidly many acres of ground. The large flowers are conspicuous. The fruit is soft and collapses when picked; it is rather dry and of poor flavor. It hangs on the bushes a long time and often sours.

2. **Rubus pedatus** Smith. Seen by the writer only on the Avalanche Lake trail, on mossy banks in deep woods. Alaska to Calif., Mont., and Alta.—Stems very slender, creeping; the flowering branches short; leaflets thin, 1 to 5 cm. long, irregularly toothed; flowers solitary; fruit of 1 to 5 loose red drupelets.

In general appearance the plant bears little resemblance to a raspberry or blackberry. The fruit is of good flavor, but it is too small to be edible.

3. **Rubus laciniatus** Willd. CUTLEAF BLACKBERRY. A few plants in thin woods at Lewis's.—Stems long and slender, very prickly; leaflets 5, each one deeply lobed or more often pinnate, with 3 or 5 leaflets, green, nearly glabrous; petals about 1 cm. long; fruit black, globose, 12 to 15 mm. in diameter.

Doubtless escaped from cultivation here. The native region of this species is not definitely known; it is often cultivated and has become naturalized on the Pacific coast.

4. **Rubus strigosus** Michx. RED RASPBERRY. PLATE 50, A. Common at middle altitudes, and sometimes at low altitudes or above timber line. B. C. to Oreg., N. Mex., N. C., and Lab. (*R. melanolasius* Focke.)—Shrub, usually 0.5 to 1 meter high, the stems brown or yellowish, often glaucous, very bristly; leaflets ovate or lanceolate, acute, green above, closely white-woolly beneath; petals 5 to 6 mm. long.

The fruit is of good flavor, but the seeds are very large. On rock slides the plants (as shown in the plate) are often only 10 to 15 cm. high, but such small plants often fruit abundantly.

5. Rubus leucodermis Dougl. BLACK RASPBERRY. Frequent about Lake McDonald, usually in rather thin woods. B. C. to Calif., Utah, and Mont.—Stems about a meter high, glaucous, prickly; leaflets broadly ovate, 4 to 10 cm. long, white beneath; petals shorter than the sepals.

The fruit is of good flavor.

12. ROSA L. ROSE.

Shrubs, usually armed with prickles; leaves pinnate, the leaflets toothed; flowers large, solitary or clustered, the petals pink; stamens numerous; fruit red or orange, consisting of a thickened fleshy wall (hypanthium), with numerous seedlike achenes on the inside.—The Blackfoot Indians used a drink made from the roots as a remedy for diarrhea. Doubtless they, like other American Indians, ate the fruits, at least in times of famine.

Sepals early falling from the fruit . . . . . **1. R. gymnocarpa.**
Sepals remaining upon the top of the fruit.
  Stems without a pair of prickles just below the base of the petiole.
    Fruit pear-shaped, with a distinct neck . . . . . **2. R. acicularis.**
    Fruit globose, almost without a neck . . . . . **3. R. bourgeauiana.**
  Stems usually with a pair of prickles just below the base of each petiole.
    Flowers mostly solitary; fruit usually about 1.5 cm. thick . . . . **4. R. nutkana.**
    Flowers mostly clustered; fruit usually 1 cm. thick or less.
      Fruit pear-shaped, with a distinct neck . . . . . **5. R. pyrifera.**
      Fruit globose, the neck usually none.
        Petioles with fine glands and glandular hairs . . . . . **6. R. fendleri.**
        Petioles without glands.
          Leaflets glabrous beneath or nearly so . . . . . **7. R. woodsii.**
          Leaflets finely pubescent beneath . . . . . **8. R. ultramontana.**

1. Rosa gymnocarpa Nutt. Frequent on the west slope at low and middle altitudes, in thin or deep woods. B. C. to Calif. and Mont.—Slender shrub, usually about 60 cm. high, armed with slender straight prickles; leaflets 5 or 7, 1 to 3 cm. long, thin, glabrous; flowers solitary; petals 1 to 2 cm. long; fruit 8 to 10 mm. long.

A rather handsome shrub when in fruit. The berry-like fruit is different in appearance from that of our other roses.

2. Rosa acicularis Lindl. Occasional on the west slope at low altitudes, on lake shores and brushy hillsides. Alaska to Wyo., Mich., and N. Y.—About 1 meter high; leaflets 3 to 9, 1.5 to 4 cm. long, pale beneath and finely hairy; petals 2 to 2.5 cm. long; fruit 1.5 to 2 cm. long.

3. Rosa bourgeauiana Crép. Common at low and middle altitudes, in woods or thickets or on open slopes. Mont. to Colo. and Ont.—Usually 0.5 to 1 meter high, with very numerous straight prickles; leaflets mostly 5 or 7, 1 to 4 cm. long, pale beneath and finely pubescent; petals 2 to 2.5 cm. long; fruit 1 to 1.5 cm. thick.

The most common rose of the park.

4. Rosa nutkana Presl. Occasional at low altitudes, in wet thickets or along moist cliffs. Alaska to Calif. and Wyo.—Usually 0.5 to 1 meter high, armed with straight prickles; leaflets 5 to 9, 1.5 to 5 cm. long, nearly glabrous; petals 2 to 3 cm. long.

5. Rosa pyrifera Rydb. Low thickets about Lake McDonald. Wash. to Calif., Wyo., and Mont.—Plants 0.5 to 1 meter high, armed with a few straight prickles; leaflets 5 or 7, 2 to 4 cm. long, pale beneath and finely hairy; petals about 2 cm. long; fruit 1.5 to 2 cm. long.

About Belton there is a curious form of this species with wholly unarmed stems.

6. Rosa fendleri Crép. Belton, in thin woods. Mont. to Ariz., N. Mex., and S. Dak.—About a meter high, armed with slender straight prickles; leaflets 5 or 7, 1 to 3 cm. long, glandular beneath; petals about 1.5 cm. long.

7. Rosa woodsii Lindl. East entrance, on shale slopes. B. C. to Colo. and N. Dak.—Slender shrub, about 60 cm. high, armed with slender straight prickles; leaflets 5 or 7, 1 to 2 cm. long; fruit 8 to 10 mm. thick.

8. Rosa ultramontana (S. Wats.) Heller. Frequent on the east slope at low altitudes, in woods or thickets. Oreg. to Calif. and Mont.—Slender shrub, about 60 cm. high, armed with slender straight prickles; leaflets 5 or 7, 1.5 to 4 cm. long; petals about 1.5 cm. long; fruit 8 to 10 mm. thick.

43. MALACEAE. Apple Family.

Shrubs or trees; leaves alternate, with stipules, toothed, lobed, or pinnate; petals 5, white; stamens numerous; fruit fleshy, somewhat resembling a small apple.—The cultivated apples, pears, and quinces belong to this family.

Leaves pinnate, with numerous leaflets . . . . . **1. SORBUS.**
Leaves merely toothed or shallowly lobed.
Branches armed with stout spines; leaves usually somewhat lobed; flowers in corymbs . . . . . **2. CRATAEGUS.**
Branches unarmed; leaves toothed but not at all lobed; flowers in racemes. **3. AMELANCHIER.**

1. SORBUS L. Mountain-ash.

Unarmed shrubs; leaflets toothed; flowers in dense cymes; fruit very sour.
Leaflets very acute, toothed to near the base; fruit red; calyx not glaucous. **1. S. sambucifolia.**
Leaflets mostly rounded or very obtuse at the apex, usually entire near the base; fruit purplish; calyx somewhat glaucous . . . . . **2. S. sitchensis.**

1. Sorbus sambucifolia (Cham. & Schlecht.) Roem. Frequent at low and sometimes at middle altitudes, in woods or on open slopes. Alaska to Oreg., Ariz., and Alta.; also in Siberia. (*S. scopulina* Greene.)—Shrub, 1 to 2 meters high, sometimes forming dense clumps; leaflets 11 to 13, elliptic-oblong, 3 to 6 cm. long, glabrous or nearly so; fruit orange or scarlet, 6 to 8 mm. in diameter.

2. Sorbus sitchensis Roem. Common, usually near and sometimes above timber line, in woods or on open slopes. Alaska to Oreg. and Mont.; also in Japan. (*S. occidentalis* Greene.)—Shrub, 1 to 2.5 meters high, with few or no branches; leaflets usually 9 or 11, oval-oblong, 3 to 5 cm. long, paler beneath, glabrous or nearly so; petals about 5 mm. long; fruit turning orange and finally purple, about 8 mm. long.

The shrub is conspicuous when covered with the large clusters of handsome fruit. The flowers are sweet-scented. The leaves turn yellow in autumn, and even in midsummer they are often discolored with yellow spots, due to the presence of a rust.

2. CRATAEGUS L.

1. Crataegus douglasii Lindl. Black hawthorn. Common on the west slope at low and middle altitudes, on lake shores and along streams; occasional on the east slope at low altitudes, sometimes on open slopes. B. C. to Calif., N. Mex., and Mich.—Shrub or tree, 1 to 5 meters high, armed with short stout spines; leaves stalked, ovate or oval, 2 to 7 cm. long, toothed and lobed, glabrous or nearly so; flowers white, in small clusters; fruit purplish black, juicy.

The plants on the east slope are mostly low and stunted; they are rather abundant along the shore at the foot of St. Mary Lake. The leaves often turn red in late summer. The fruit is edible, but of rather poor quality; it is much more juicy than in the common eastern species.

3. AMELANCHIER Medic.

1. Amelanchier alnifolia Nutt. Serviceberry. Common at low and middle altitudes, in woods or thickets or on open slopes. Yukon to Colo., Nebr., and Mich.—Slender shrub, 0.5 to 2 meters high, nearly glabrous; leaves oval or rounded, 2 to 6

cm. long, toothed; petals about 1 cm. long; fruit 6 to 10 mm. long, purple or nearly black, with a pale bloom.

Known also as juneberry and shadbush. The flowers appear early in the season. The fruit is edible but of rather insipid flavor; in dry places it is small and almost mealy, but in damp situations it is large and very juicy. It was much used by the Indians of the West, who often dried the fruit for use in winter. Among the Blackfoot Indians serviceberries were the most important vegetable food. They were employed, either fresh or dried, in soups or stews. In exposed places the shrubs are sometimes dwarfed and prostrate.

44. AMYGDALACEAE. Almond Family.

1. PRUNUS L.

Shrubs or trees; leaves alternate, petioled, finely toothed; flowers white, in racemes or corymbs; sepals and petals each 5; stamens 15 to 30; fruit juicy, containing a single seedlike stone.—The cultivated plums, prunes, and cherries belong to this genus, and almonds, apricots, and peaches are closely related.

Flowers few, in corymbs; petals about 7 mm. long; leaves with rounded teeth. **1. P. corymbulosa.**

Flowers numerous, in racemes, these leafy at the base; petals about 5 mm. long; leaves with acute teeth . . . . . **2. P. melanocarpa.**

1. Prunus corymbulosa Rydb. PIN CHERRY. Common on the west slope at low or middle altitudes, on open rocky slopes. Mont. and Wyo.—Shrub, 0.5 to 1.5 meters high; leaves ovate or lanceolate, 3 to 8 cm. long, acute, glabrous; flowers 3 to 6 in each cluster; fruit oval, red or red and yellow, nearly 1 cm. long.

In 1919, probably because of the dry season, few bushes bore any fruit. The fruit is extremely bitter.

2. Prunus melanocarpa (A. Nels.) Rydb. CHOKECHERRY. Common at low altitudes and occasional at middle elevations, usually on open slopes but sometimes in woods or along lakes and streams. B. C. to Calif., N. Mex., and N. Dak.—Shrub, 0.5 to 2 meters high or (on the west slope) sometimes a small tree; leaves oval or obovate, 4 to 8 cm. long, obtuse or acute, pale beneath, glabrous or nearly so; fruit 6 to 8 mm. long, red to nearly black.

The fruit is edible, but the flesh is scant and the flavor is somewhat bitter. Among the Blackfoot Indians chokecherries were eaten raw, and they were added to soups, or, pounded up, seeds and all, they were mixed with dried meat (pemmican). The bark was used medicinally.

45. FABACEAE. Bean Family.

Annual or perennial herbs; leaves alternate, compound, with 3 or more leaflets; stipules present; calyx of 5 or 4 more or less united sepals, often 2-lipped; corolla shaped like that of a bean or pea; petals 5, the upper one (standard) broader than the others, the 2 lateral ones (wings) curved upward, the 2 lowest ones (keel) more or less united; stamens usually 10, sometimes 9; fruit a legume (more or less like that of a bean or pea), 1 or 2-celled, usually opening along both edges.—The name Leguminosae is often used for the family.

Leaves with 3 or more leaflets all attached at the end of the leaf stalk.

Leaflets 5 or more . . . . . **1. LUPINUS.**

Leaflets 3.

Leaflets not toothed; flowers yellow; pod long and narrow. **2. THERMOPSIS.**

Leaflets finely toothed; flowers yellow, white, pink, or red-purple; pod very short and small.

Flowers in heads . . . . . **3. TRIFOLIUM.**

Flowers (yellow) in slender racemes . . . . . **4. MELILOTUS.**

Leaves with 5 or more leaflets, some of them attached along the sides of the leaf stalk
Leaves with a tendril at the end.
Flowers purple; leaflets green . . . . . 9. **VICIA.**
Flowers yellowish white; leaflets pale on the under side . . . 10. **LATHYRUS.**
Leaves without tendrils.
Leaflets dotted with glands; fruit covered with hooked prickles.
5. **GLYCYRRHIZA**
Leaflets not gland-dotted; fruit not prickly.
Pods very flat, scalloped along the edges. Flowers pale yellow or purple.
6. **HEDYSARUM.**
Pods not scalloped along the edges.
Keel of the corolla blunt; flower stems usually leafy . . 7. **ASTRAGALUS.**
Keel of the corolla sharp-pointed; flower stems not leafy. 8. **OXYTROPIS.**

1. **LUPINUS** L. LUPINE.

Perennials, usually with silky pubescence; leaves with 5 to 15 narrow entire leaflets attached at the end of the leaf stalk; flowers in racemes, usually blue or purple; pods flattened, hairy.

Plants low, 15 cm. high or less; leaves all basal . . . . . 1. **L. minimus.**
Plants taller, usually 30 to 60 cm. high, with leafy stems.
Leaflets glabrous on the upper surface.
Leaflets flat; keel of the corolla hairy along the edges . . . . . 2. **L. scheuberae.**
Leaflets usually folded; keel glabrous . . . . . 3. **L. tenellus.**
Leaflets hairy on both surfaces.
Hairs of the stem spreading.
Hairs of the stem equal in length, all short . . . . . 4. **L. sericeus.**
Hairs of the stem of 2 kinds, part of them long and part short.
5. **L. leucophyllus.**
Hairs of the stem all appressed.
Plants green, thinly silky . . . . . 6. **L. argenteus.**
Plants gray or whitish, densely silky.
Bracts of the spikes awl-shaped, longer than the flower buds.
7. **L. flexuosus.**
Bracts lanceolate, not longer than the buds . . . . . 8. **L. leucopsis.**

1. Lupinus minimus Dougl. DWARF LUPINE. Open rocky slopes at Piegan Pass; also on exposed rocky hilltop at east entrance. Wash. and Oreg. to Mont. and Alta.—Stems 10 to 15 cm. high, densely tufted; leaflets 5 to 9, oblanceolate, 5 to 15 mm. long, densely silky; racemes short and dense; corolla 1 cm. long.

2. Lupinus scheuberae Rydb. Frequent about east entrance, on open slopes or in aspen thickets. Mont., Wyo., and Utah.—Stems 30 to 70 cm. high; leaflets about 7, oblanceolate, 3 to 7 cm. long, acute or obtuse; corolla about 12 mm. long; pods about 2 cm. long.

3. Lupinus tenellus Dougl. Common on the east slope at low or even middle altitudes, on open rocky hillsides or along streams. Wash. to Calif., Colo., and Mont.—Plants 30 to 60 cm. high, much branched from the base and forming large bushy clumps; leaflets linear or linear-oblanceolate, 1 to 4 cm. long, acute or obtuse; corolla 10 to 12 mm. long, blue or purple; pod 3 to 5-seeded.

One plant found along Appekunny Creek had pinkish white flowers.

4. Lupinus sericeus Pursh. Rocky slopes of Altyn Peak. Oreg. to Wyo. and S. Dak.—Plants 30 to 60 cm. high, much branched, whitish-hairy; leaflets 5 to 10, oblanceolate, 3 to 6 cm. long, acute or obtuse; corolla blue-purple, about 12 mm. long; pods 4 to 6-seeded.

5. Lupinus leucophyllus Dougl. Occasional on the east slope at low or middle altitudes, on open hillsides or in aspen thickets. Wash. to Calif., Utah, and Mont.—

Plants 30 to 60 cm. high, gray-hairy; leaflets 7 to 10, oblanceolate, 3 to 6 cm. long; corolla 10 to 12 mm. long; pod 5 or 6-seeded.

6. Lupinus argenteus Pursh. Frequent about east entrance and Belton, in woods or thickets. Oreg. and Calif. to Colo. and N. Dak.—Plants 40 to 80 cm. high, branched; leaflets 7 or 8, narrowly oblanceolate, flat or folded, 2 to 6 cm. long; corolla violet, 1 cm. long; pods 5 or 6-seeded.

7. Lupinus flexuosus Lindl. Common on the east slope at low and middle altitudes, usually on open hillsides. Wash. to Mont.—Plants 30 to 50 cm. high, forming dense bushy clumps; leaflets 7 to 10, oblanceolate, 2 to 4 cm. long; corolla about 1 cm. long, violet.

Our most common and showy species.

8. Lupinus leucopsis Agardh. Occasional at low altitudes, in thickets or on open slopes. Wash. to Nev., Wyo., and Sask.—Plants 30 to 60 cm. high; leaflets 6 to 12, oblanceolate, 2 to 5 cm. long; corolla blue, about 1 cm. long; pods 2 to 3 cm. long.

2. THERMOPSIS R. Br.

1. Thermopsis rhombifolia (Nutt.) Richards. YELLOW PEA. Open hillsides and prairie about the east entrance. Sask. to Nebr. and Colo.—Perennial, with rootstocks, nearly glabrous, 10 to 30 cm. high; leaves with large stipules, the 3 leaflets obovate, 2 to 3 cm. long, entire; flowers in racemes, yellow, 1.5 to 2 cm. long; pods lender, spreading, 5 to 6 cm. long, with appressed hairs.

3. TRIFOLIUM L. CLOVER.

Annuals or perennials; leaves with 3 leaflets, the leaflets finely toothed; flowers small, in heads; pod very small, inclosed by the withered corolla.

Flowers yellow; plants annual . . . . . **1. T. procumbens.**
Flowers white, pink, or red-purple; plants perennial.
  Heads not stalked; flowers sessile, red-purple . . . . . **2. T. pratense.**
  Heads slender-stalked; flowers short-stalked, white or pinkish.
    Plants with slender runners, these rooting at the joints; leaflets notched at the end . . . . . **3. T. repens.**
    Plants without runners; leaflets usually rounded at the end. **4. T. hybridum.**

1. Trifolium procumbens L. HOP CLOVER. A few plants along the railroad at Belton. Native of Eur.; naturalized in N. Amer.—Plants slender, with nearly prostrate stems; leaflets obovate, 1 to 1.5 cm. long.

2. Trifolium pratense L. RED CLOVER. Common on the west slope at low altitudes, and extending well up along the trails; scarce on the east slope, but occasionally found at low altitudes. Native of Eur.; cultivated and naturalized in N. Amer.—Plants 20 to 50 cm. high, somewhat hairy; leaflets oval or ovate, 2 to 3 cm. long, often with a purplish spot in the middle; flowers about 1.5 cm. long.

Red clover is abundant in some places about Belton.

3. Trifolium repens L. WHITE CLOVER. Common on the west slope at low altitudes, and occasional on the east slope; often found high up along the trails. Native of Eur. and Asia; widely naturalized in N. Amer.—Stems slender, glabrous; leaflets obovate, 5 to 20 mm. long, glabrous; flowers 7 to 8 mm. long.

Very abundant in some places about Belton.

4. Trifolium hybridum L. ALSIKE CLOVER. Common at low altitudes, especially on the west slope, and extending well up along the trails. Native of Eur.; naturalized in N. Amer.—Plants 20 to 50 cm. high, glabrous; leaflets broadly obovate, 1 to 3 cm. long; flowers 7 to 9 mm. long, nearly always pink.

This is abundant in woods and along roads near Belton. On both slopes it is more common than white clover; the two usually grow together.

4. MELILOTUS Hill.

1. **Melilotus officinalis** (L.) Lam. YELLOW SWEETCLOVER. A few plants along the railroad at Belton. Native of Eur.; naturalized in N. Amer.—Perennial, 0.3 to 1 meter high, glabrous or nearly so, loosely branched, sweet-scented; leaflets 3, oblong or obovate, 2 to 4 cm. long, finely toothed; flowers yellow, 5 to 7 mm. long, in loose racemes; pod 2.5 to 3.5 mm. long, 1 or 2-seeded.

5. GLYCYRRHIZA L.

1. **Glycyrrhiza lepidota** Nutt. WILD LICORICE. Occasional about Belton and the east entrance, on dry banks or along streams. Wash. to Calif., Mex., N. Y., and Ont.—Perennial, 0.3 to 1 meter high, glabrous or nearly so, branched; leaflets 11 to 19, oblong, 2 to 3.5 cm. long, entire, gland-dotted; flowers 12 mm. long, yellowish or greenish white, in racemes; pod about 1.5 cm. long, covered with hooked prickles.

The licorice of commerce is obtained from a species of *Glycyrrhiza* which grows in the Mediterranean region.

6. HEDYSARUM L. HEDYSARUM.

Perennials with leafy stems; leaflets numerous, entire; flowers in long racemes; pods flat, scalloped along both edges, not opening.

Leaflets gray, densely silky-hairy; fruit with appressed hairs; teeth of the calyx longer than the tube . . . . . **1. H. cinerascens.**

Leaflets green, with few scattered appressed hairs; fruit glabrous; teeth of calyx shorter than the tube.

Flowers yellowish white . . . . . **2. H. sulphurescens.**

Flowers pink or purple . . . . . **3. H. americanum.**

1. **Hedysarum cinerascens** Rydb. GRAY HEDYSARUM. Hillsides at east entrance, *Umbach*. Alta. to Utah and N. Dak.—Plants 30 to 50 cm. high; leaflets 9 to 15, oval, 1 to 2 cm. long, obtuse; corolla purple, about 1.5 cm. long; pods 6 to 8 mm. long.

2. **Hedysarum sulphurescens** Rydb. YELLOW HEDYSARUM. Common at nearly all altitudes, especially on the east slope, mostly on open hillsides or rock slides or in meadows. B. C. and Alta. to Wyo.—Plants usually 30 to 50 cm. high, nearly glabrous; leaflets 11 to 15, oval or oblong, 1 to 3 cm. long; corolla about 1.5 cm. long; pods 8 to 20 mm. long, 2.5 to 4 mm. wide.

A rather handsome plant when in flower, resembling some species of *Astragalus*. Above timber line the plants are frequently only 10 cm. high.

3. **Hedysarum americanum** (Michx.) Britton. PURPLE HEDYSARUM. Apparently rare; shale slide at east entrance; sandbar along lowest Swiftcurrent Lake. Alaska to Wyo., Vt., and Lab.—Plants 20 to 50 cm. high, in clumps, nearly glabrous; leaflets 11 to 21, oval or oblong, 1 to 3 cm. long, obtuse; corolla 12 to 15 mm. long; pods with 3 to 5 joints.

7. ASTRAGALUS L. MILKVETCH.

Perennials; leaves odd-pinnate, the leaflets entire; flowers white, yellow, or purple, in spikes or racemes; pods very variable, flat or terete, thin or woody, sometimes inflated.

Pods covered with short black hairs.

Pods not flattened from the sides; leaflets usually notched at the apex. **1. A. alpinus.**

Pods strongly flattened from the sides; leaflets not notched.

Corolla white or cream-colored; pods long-stalked in the calyx . . **2. A. macounii.**

Corolla purple; pods nearly sessile . . . . . **3. A. bourgovii.**

Pods glabrous or with white or gray hairs.

Leaflets glabrous on the upper surface; flowers white or pale yellow, sometimes tinged with purple.

Leaflets 1.5 to 4 mm. wide.
Pods flattened from the sides; leaflets obtuse . . . . . **4. A. tenellus.**
Pods not flattened; leaflets notched at the apex . . . . . **5. A. flexuosus.**
Leaflets 5 to 20 mm. wide.
Pods sessile in the calyx, thick and hard, not inflated; flowers nearly sessile. **6. A. carolinianus.**
Pods stalked, thin, inflated; flowers slender-pediceled . . . **7. A. americanus.**
Leaflets finely or coarsely hairy on both surfaces, rarely glabrous on the upper surface, but the flowers then purple.
Pods glabrous or nearly so.
Leaflets with loose spreading hairs . . . . . **8. A. aboriginum.**
Leaflets with appressed silky hairs . . . . . **9. A. forwoodii.**
Pods densely hairy.
Leaves and stems with loose spreading hairs; flowers pale yellow. **10. A. drummondii.**
Leaves and stems with fine appressed hairs; flowers purple or purplish.
Flowers 6 to 8 mm. long; pods about 8 mm. long . . . . **11. A. vexilliflexus.**
Flowers 15 to 20 mm. long; pods 10 to 25 mm. long.
Pod about 1 cm. long, not compressed; leaflets green, thinly silky. **12. A. goniatus.**
Pod 1.5 to 2.5 cm. long, compressed; leaflets gray, densely silky. **13. A. missouriensis.**

1. Astragalus alpinus L. Frequent above timber line, on open rocky slopes or rock slides; also along creek at east entrance. Alaska to N. Mex., Vt., and Lab.; also in Eur. and Asia. (*Tium alpinum* Rydb.)—Stems ascending or spreading, 10 to 25 cm. high, slender; leaflets 13 to 25, oval or rounded, 4 to 10 mm. long, with appressed hairs on one or both surfaces, usually shallowly notched; flowers purplish, 8 to 12 mm. long; calyx black-hairy; pod about 1 cm. long.

2. Astragalus macounii Rydb. Frequent at low and middle altitudes and sometimes above timber line, in moist woods or thickets, along streams, or on open slopes. B. C. and Alta. to Colo. (*Atelophragma macounii* Rydb.)—Stems slender, 30 to 60 cm. high, nearly glabrous; leaflets 9 to 17, oval or oblong, 1.5 to 3 cm. long, glabrous on the upper surface; calyx black-hairy; corolla about 8 mm. long; pods 1.5 to 2 cm. long.

Above timber line the plants are sometimes only 10 cm. high.

3. Astragalus bourgovii A. Gray. Common above and near timber line, in meadows and on rock slides; sometimes in woods or on open slopes at middle altitudes. B. C. and Mont. to S. Dak. (*Homalobus bourgovii* Rydb.)—Stems slender, 10 to 30 cm. long, erect or ascending, densely tufted; leaflets numerous, oblong, 4 to 10 mm. long, with sparse appressed hairs on both surfaces; flowers 8 to 10 mm. long, in a lax raceme, purple or violet; calyx black-hairy; pod 1 to 1.5 cm. long.

A graceful and handsome plant, often abundant in alpine meadows.

4. Astragalus tenellus Pursh. Occasional on the east slope at low altitudes, in creek beds or on open hillsides. Yukon to Utah and Nebr. (*Homalobus tenellus* Britton.)—Stems stout, erect, 20 to 40 cm. high, tufted; leaflets 13 to 21, linear or narrowly oblong, 8 to 12 mm. long, nearly glabrous; flowers about 1 cm. long, in short dense racemes; pods 8 to 12 mm. long, about 3 mm. wide, short-stalked.

5. Astragalus flexuosus Dougl. Hillsides at east entrance, *Umbach*. Alta to Utah, N. Mex., and Minn. (*Homalobus flexuosus* Rydb.)—Stems erect or ascending, 30 to 60 cm. long; leaflets 13 to 21, narrowly oblong, 5 to 15 mm. long, nearly glabrous; flowers about 1 cm. long, in long loose racemes; calyx white-hairy; pods 1.5 to 2 cm. long, 4 mm. thick, with appressed hairs.

6. Astragalus carolinianus L. Belton, in low woods and in thickets along river, B. C. to N. Mex., Fla., and Que. (*A. canadensis* L.)—Stems stout, 30 to 80 cm. high; leaflets 15 to 25, oval to oblong, 2 to 4 cm. long, nearly glabrous; flowers 1.5 cm. long, in dense racemes; pod 1 to 1.5 cm. long, terete or nearly so, thick, glabrous, long-beaked.

7. Astragalus americanus (Hook.) Jones. Frequent on the east slope at low altitudes, in thickets and along streams. Yukon to Wyo. and Que. (*Phaca americana* Rydb.)—Stems stout, erect, clustered, 30 to 80 cm. high; leaflets 7 to 17, oval or oblong, 2 to 4 cm. long, obtuse; flowers yellowish white, 12 mm. long, in dense racemes; pods glabrous, about 2 cm. long.

8. Astragalus aboriginum Richards. Trail to Iceberg Lake, on open bank. Yukon to Nev., Colo., and Sask. (*Atelophragma aboriginum* Rydb.)—Stems tufted, ascending, 20 to 30 cm. long, short-hairy; leaflets 9 to 15, narrowly oblong, 1 to 2 cm. long, acute or obtuse; flowers yellowish white, 1 cm. long, in loose racemes; pod 1.5 to 2 cm. long, slender-stalked, acute.

9. Astragalus forwoodii S. Wats. Occasional on the east slope at low altitudes, on open brushy hillsides. Mont., Wyo., and S. Dak. (*Atelophragma forwoodii* Rydb.)—Stems ascending, tufted, 10 to 30 cm. long; leaflets 9 to 17, oblong, 1 to 1.5 cm. long, acute or obtuse; flowers 7 to 8 mm. long, yellowish white, tipped with purple, in loose racemes; pod 1.5 to 2 cm. long, slender-stalked.

10. Astragalus drummondii Dougl. Occasional on the east slope at low altitudes, on open hillsides. Alta. to N. Mex. and Nebr. (*Tium drummondii* Rydb.)—Stems erect, 30 to 60 cm. high, stout, hairy; leaflets 25 to 31, oblong, obtuse, about 1 cm. long; flowers 1.5 to 2 cm. long, cream-colored; pods 2 to 2.5 cm. long, slender-stalked.

11. Astragalus vexilliflexus Sheld. Common on the east slope at low altitudes, on prairie or open hillsides, or in thickets. B. C. to Wyo. and Sask. (*Homalobus vexilliflexus* Sheld.)—Stems slender, ascending or prostrate, 10 to 30 cm. long, often forming dense mats; leaflets 7 to 11, oblong, 3 to 12 mm. long, densely covered, at least beneath, with appressed hairs; flowers purplish, 8 mm. long, in loose racemes; pod about 3 mm. wide, sessile.

12. Astragalus goniatus Nutt. Occasional on the east slope at low altitudes, on open or brushy hillsides. B. C. to N. Mex. and Sask.—Stems 10 to 20 cm. high, densely tufted, ascending; leaflets 15 to 21, oblong, obtuse, 5 to 12 mm. long; flowers 1.5 cm. long, purple, in dense headlike spikes; calyx usually with black hairs; pod about 1 cm. long, white-hairy.

13. Astragalus missouriensis Nutt. Belton, on dry gravel bank. Mont. to N. Mex. and Kans. (*Xylophacos missouriensis* Rydb.)—Stems 5 to 10 cm. long, densely clustered; leaflets 11 to 21, elliptic or obovate, 5 to 15 mm. long; flowers purple, in a short dense raceme; pod 7 to 8 mm. wide, long-beaked.

8. OXYTROPIS DC. Locoweed.

Perennials; leaves often all basal, with numerous leaflets; flowers usually in dense spikes, purple or yellowish white; pods mostly sessile, often partially 2-celled.—Some, at least, of the species of this genus are poisonous to stock, causing temporary paralysis or sometimes death.

Stems leafy; pods drooping . . . . . **1. O. deflexa.**
Stems naked; pods erect.
  Leaflets whorled . . . . . **2. O. splendens.**
  Leaflets opposite or alternate, not whorled.
    Flowers 1 to 4, on a stalk 4 cm. high or less . . . . . **3. O. parryi.**
    Flowers usually more than 4, often very numerous, on a stalk 5 to 30 cm. high.
      Leaflets and stems with numerous viscid glands; corolla purplish, at least when withered . . . . . **4. O. viscida.**

Leaflets and stems without glands; corolla yellowish white or yellow.
Stems usually 15 to 20 cm. high; calyx without black hairs. 5. **O. gracilis.**
Stems usually less than 15 cm. high; calyx with black hairs.
Corolla about 1.5 cm. long; flowers few, yellowish white. 6. **O. alpicola.**
Corolla about 2 cm. long; flowers numerous, yellow . . . . . 7. **O. spicata.**

1. Oxytropis deflexa (Pall.) DC. Occasional at low altitudes, in woods or thickets. Alaska to N. Mex. and Idaho; also in Asia. (*Aragallus deflexus* Heller.)—Stems ascending, 10 to 40 cm. long, loosely hairy; leaflets 25 to 41, 5 to 15 mm. long, acute, loosely hairy; flowers dirty white, tipped with blue, 6 to 9 mm. long, in loose racemes; pod black-hairy.

2. Oxytropis splendens Dougl. Frequent on the east slope at low altitudes, on open hillsides or flats. Yukon to B. C., N. Mex., and Minn. (*Aragallus splendens* Greene; *A. richardsonii* Greene.)—Plants 10 to 30 cm. high, covered with long loose silky hairs; leaflets very numerous, 8 to 20 mm. long, acute or obtuse; flowers red-purple, 10 to 15 mm. long, in dense spikes; pods 1 to 1.5 cm. long, densely hairy.

3. Oxytropis parryi A. Gray. Above Sexton Glacier, on wind-swept rocky summit. Mont. to N. Mex. (*Aragallus parryi* Greene.)—Plants prostrate or nearly so, tufted; leaflets 11 to 19, 4 to 8 mm. long, silky-hairy; calyx black-hairy; corolla purple, 1.5 cm. long; pods 12 to 20 mm. long.

4. Oxytropis viscida Nutt. Frequent on the east slope at low altitudes, on dry open hillsides. Yukon to Nev. and Wyo. (*Aragallus viscidus* Greene; *A. viscidulus* Rydb.)—Plants 10 to 15 cm. high, forming dense clumps, very viscid and somewhat hairy; leaflets numerous, 5 to 12 mm. long, acute or obtuse; flowers in dense spikes; corolla 12 mm. long; pods 1 to 1.5 cm. long, black-hairy.

5. Oxytropis gracilis (A. Nels.) Jones. Common on the east slope at low altitudes, on prairie or open hillsides. Alta. to Idaho and S. Dak. (*Aragallus gracilis* A. Nels.)—Plants densely tufted, thinly silky-hairy; leaflets 21 to 31, 1 to 2 cm. long, acute; flowers in dense, often long spikes; corolla 1.5 cm. long, yellowish white; pods about 2 cm. long.

6. Oxytropis alpicola (Rydb.) Jones. Common above timber line in meadows or on rock slides. B. C., Alta., and Mont. (*Aragallus alpicola* Rydb.)—Plants often densely tufted; leaflets 9 to 17, 5 to 10 mm. long, obtuse or acute, with appressed silky hairs.

7. Oxytropis spicata (Hook.) Standl. East entrance, on hillsides, *Umbach*. Alta. to Wyo. and S. Dak. (*Aragallus spicatus* Rydb.)—Leaflets oval or oblong, 8 to 20 mm. long, usually obtuse, thinly silky; pods often black-hairy.

9. VICIA L.

1. Vicia americana Muhl. VETCH. Frequent at low altitudes, in woods or thickets. B. C. to Ariz., Va., and N. B.—Slender perennial, 0.3 to 1 meter high, nearly glabrous, climbing by tendrils at the ends of the leaves; leaflets 10 to 14, oval or oblong, 1.5 to 3 cm. long, entire; flowers purple, 1.5 to 2 cm. long, in racemes; pods flat, glabrous, 2 to 3 cm. long.

10. LATHYRUS L.

1. Lathyrus ochroleucus Hook. VETCHLING. Frequent at low altitudes, in moist woods or thickets. B. C. to Wyo., N. J., and Que.—Slender perennial, 0.3 to 1 meter high, glabrous, climbing by tendrils at the ends of the leaves; leaflets 4 or 6, oval, 2 to 5 cm. long, entire, pale beneath; flowers yellowish white, 1.5 cm. long, 5 to 10 in each raceme; pod flat, glabrous, 4 cm. long.

46. GERANIACEAE. Geranium Family.

1. GERANIUM L.

Herbs with opposite, deeply lobed leaves; petals 5; stamens 10; fruit of 5 long-beaked 1-seeded carpels, these separating at maturity, their beaks recoiling.—The cultivated geraniums do not belong to this genus but to a closely related one, *Pelargonium;* they are natives of southern Africa.

Petals about as long as the sepals, pink; plants annual or biennial . . **1. G. bicknellii.**
Petals much longer than the sepals, white or purple; plants perennial.
Petals white; plants slender, not viscid-hairy . . . . . **2. G. richardsonii.**
Petals pinkish purple; plants stout, covered with very sticky hairs.
3. G. viscosissimum.

1. Geranium bicknellii Britton. CRANE'S-BILL. Woods or thickets at low and middle altitudes; scarce. B. C. and Wash. to Utah, N. Y., and N. S.—Plants 20 to 50 cm. high, often much branched, finely hairy; flowers few, small and inconspicuous.

This species has the appearance of being an introduced plant, for it is usually found in waste places or along trails.

2. Geranium richardsonii Fisch. & Trautv. WHITE GERANIUM. Frequent on the east slope at low altitudes, usually in aspen thickets. B. C. to Calif., N. Mex., and S. Dak.—Plants 30 to 60 cm. high, more or less hairy; petals 15 to 20 mm. long.

The flowers are not conspicuous.

3. Geranium viscosissimum Fisch. & Mey. PURPLE GERANIUM. Common on the east slope at low altitudes, chiefly in woods or thickets. B. C. to Calif., Colo., and S. Dak.—Plants 20 to 60 cm. high, very viscid; petals about 2 cm. long.

A handsome plant when in full flower. In late summer the leaves are beautifully colored with red.

47. LINACEAE. Flax Family.

1. LINUM L.

Glabrous erect annuals or perennials; leaves alternate, entire, sessile; flowers large, blue, in racemes or panicles; petals 5; stamens 5; fruit a 5-celled capsule.

Plants annual; inner sepals with short hairs on the margins . . **1. L. usitatissimum.**
Plants perennial; sepals without hairs . . . . . **2. L. lewisii.**

1. Linum usitatissimum L. FLAX. A few plants found along the railroad at the east entrance. Native of Eur.; cultivated and frequently escaping.—Stems 20 to 80 cm. high; leaves lance-linear, 3-nerved; petals 1 to 1.5 cm. long.

2. Linum lewisii Pursh. WILD FLAX. Frequent in open places, usually at low altitudes, but sometimes found above timber line. Alaska to Calif., Mex., and Nebr.—Stems 20 to 60 cm. high, branched from the base, pale green; leaves linear, 1 to 2 cm. long; petals 1.5 to 2 cm. long.

A very showy plant with beautiful blue flowers. The petals usually fall when the flowers are picked. Wild flax belongs properly in the prairie region but, like so many other prairie plants, it is found occasionally above timber line, as at Cracker Lake.

48. EUPHORBIACEAE. Spurge Family.

1. EUPHORBIA L.

1. Euphorbia glyptosperma Engelm. CREEPING SPURGE. Dry soil about Belton; apparently introduced. B. C. to Mex., Mo., and Ont. (*Chamaesyce glyptosperma* Small.)—Prostrate annual, glabrous or nearly so; leaves opposite, oblong, 4 to 12 mm.

long, finely toothed; flowers very small, greenish, surrounded by a small involucre, borne in the leaf axils; fruit a 3-seeded capsule about 2 mm. thick.

An inconspicuous plant with milky juice. Some of the related species have a wide reputation in the Southwest as a remedy for rattlesnake bites.

49. CALLITRICHACEAE. Water Starwort Family.

1. CALLITRICHE L. WATER STARWORT.

Aquatic perennials; leaves opposite, entire; flowers minute, sessile in the leaf axils; calyx and corolla none; stamen 1; fruit small, 4-lobed, leathery.

Upper leaves spatulate, 3-nerved; flower with a pair of bracts at the base. 1. C. palustris.

Upper leaves (like the others) linear, 1-nerved; flowers without bracts. 2. C. autumnalis.

1. Callitriche palustris L. East entrance, in pools. Widely distributed in N. and S. Amer., Eur., and Asia.—Stems usually floating, 3 to 20 cm. long; lower leaves sessile, linear, 1 to 1.5 cm. long, the floating leaves petioled, 5 to 10 mm. long; fruit about 1.5 mm. long.

2. Callitriche autumnalis L. Occasional in pools or sometimes on mud. Oreg. to Colo., N. Y., and Que.; also in Eur.—Stems slender, 3 to 20 cm. long; leaves 5 to 15 mm. long, notched at the apex; fruit 1 to 2 mm. broad.

50. CELASTRACEAE. Bittersweet Family.

1. PACHISTIMA Raf.

1. Pachistima myrsinites (Pursh) Raf. MOUNTAIN LOVER. Abundant on the west slope and in some localities on the east slope, usually in woods. B. C. to Calif. N. Mex., and Alta.—Shrub, 20 to 60 cm. high; leaves opposite, evergreen, oval or obovate, 1 to 3 cm. long, somewhat toothed; flowers small, green, clustered in the leaf axils; petals 4; fruit a small 2-celled capsule.

Rare in the Many Glacier region, but the shrub grows in one place along the trail to Swiftcurrent Pass; plentiful about Sun Camp. It is an inconspicuous and unattractive plant, with erect or sometimes prostrate branches.

51. ACERACEAE. Maple Family.

1. ACER L. MAPLE.

1. Acer douglasii Hook. MOUNTAIN MAPLE. Common at low and middle altitudes, usually in woods or thickets, sometimes on open slopes. B. C. to Oreg., Wyo., and Alta.—Shrub, or a small slender tree with smooth gray bark; leaves opposite, slender-petioled, 3 to 10 cm. long and about as broad, glabrous, 3 or 5-lobed and toothed, on young branches often divided into 3 leaflets; fruit of 2 samaras, these 3 to 4 cm. long.

The plants are very variable in size and in form of the leaves. In exposed places the plants are usually shrubs, about a meter high, forming large clumps, or small trees. In woods they are more often slender trees. The leaves are often covered with showy, bright red galls. It is doubtful whether *A. douglasii* is more than a form of *A. glabrum* Torr.

52. RHAMNACEAE. Buckthorn Family.

Fruit juicy; flowers green, clustered in the axils of the leaves . . . . 1. RHAMNUS.
Fruit dry; flowers white, in panicles . . . . . 2. CEANOTHUS.

1. RHAMNUS L.

1. Rhamnus alnifolia L'Hér. BUCKTHORN. Common at low and middle altitudes, in woods, on open slopes, or in swamps. B. C. to Calif., N. J., and Me.—Shrub, 0.6 to 1.2 meters high; leaves alternate, oval or elliptic, 3 to 8 cm. long, obtuse or acute, toothed, nearly glabrous; flowers very small and inconspicuous; fruit black, 3-seeded, very bitter.

A characteristic shrub, often forming low thickets. The leaves turn yellow in autumn. The name buckthorn is not very appropriate, for the plant has no thorns. A related species, common on the Pacific coast and extending also into Montana (*Rhamnus purshiana*), furnishes the cascara sagrada which is used in medicine.

2. CEANOTHUS L.

Low shrubs with alternate 3-ribbed leaves; flowers small, in dense rounded panicles; petals 5; capsule 3-celled.

Leaves thick, pale and finely velvety-hairy on the under surface; flower panicles on leafy stalks . . . . . **1. C. velutinus.**

Leaves thin, green and nearly glabrous on the under surface; panicles often on naked stalks . . . . . **2. C. sanguineus.**

1. Ceanothus velutinus Dougl. DEERBRUSH. Frequent at low or middle altitudes, usually on open rocky slopes. B. C. to Colo. and S. Dak.—Shrub, 0.6 to 1.5 meters high, with green twigs; leaves 4 to 7 cm. long, finely toothed.

The leaves are bright green on the upper surface and appear as if varnished. The flowers appear early in the season.

2. Ceanothus sanguineus Pursh. SNOWBRUSH. Brushy hillsides about Belton. Mont. to Calif. and B. C.—Slender shrub, about a meter high; older branches red or purple; leaves oval, rounded at the apex, finely toothed.

This shrub is closely related to the New Jersey tea (*Ceanothus americanus*) of the Eastern States, whose leaves were used as a substitute for Chinese tea during the Revolutionary War.

53. MALVACEAE. Mallow Family.

The cultivated althaea, hibiscus, hollyhocks, okra, and cotton belong to the mallow family.

1. SPHAERALCEA St. Hil.

1. Sphaeralcea rivularis Dougl. WILD HOLLYHOCK. Common on the east slope, chiefly at low altitudes, in woods, especially among aspens, or at the edges of streams. B. C. to Colo. and S. Dak.—Coarse perennial herb, 0.6 to 1.5 meters high, covered with branched hairs; leaves alternate, 5 to 12 cm. long, 5 or 7-lobed; flowers clustered in the axils of the upper leaves, delicate pink; petals 5, about 2 cm. long; fruit composed of several cells, these falling apart like the sections of an orange.

The flowers are very handsome, but they last only a short time. The fruit is covered with stiff hairs, which penetrate the skin easily.

54. HYPERICACEAE. St. John's-wort Family.

1. HYPERICUM L.

1. Hypericum scouleri Hook. ST. JOHN'S-WORT. Abundant, chiefly at high and middle altitudes, in moist places; common in alpine meadows. B. C. to Calif., Wyo., and Mont.—Glabrous perennial herb, 10 to 30 cm. high; leaves opposite, entire, sessile, 1 to 2 cm. long, black-dotted; flowers bright yellow, in cymes; petals 5, 8 to 10 mm. long; stamens numerous; fruit a 3-lobed capsule.

The plants often form dense clumps, which are covered with the golden flowers. The buds are tinged with red.

55. VIOLACEAE. Violet Family.

1. VIOLA L. Violet.

Perennial herbs, stemless or with leafy stems; flowers stalked in the leaf axils; petals 5, the lowest one spurred; stamens 5; fruit a small capsule.

Leaves acute at the base; flowers yellow . . . . . **1. V. linguaefolia.**
Leaves cordate or rounded at the base; flowers variously colored.
  Plants stemless, sometimes sending out runners.
    Flowers yellow; leaves broadly rounded at the apex, dark green, usually lying flat on the ground . . . . . **2. V. orbiculata.**
    Flowers white, lilac, or purple; leaves often pointed, not dark green, erect.
      Plants with slender runners; petals white or lilac . . . . . **3. V. palustris.**
      Plants without runners; petals purple . . . . . **4. V. nephrophylla.**
  Plants with short or tall leafy stems.
    Flowers purple; leaves rounded or truncate at base.
      Leaves 1 to 3 cm. long; seeds 1.5 mm. long . . . . . **5. V. adunca.**
      Leaves 3 to 5 cm. long; seeds 2 mm. long . . . . . **6. V. montanensis.**
    Flowers yellow or lavender; leaves cordate at base.
      Petals yellow; leaves usually glabrous beneath . . . . . **7. V. glabella.**
      Petals lavender inside; leaves usually short-hairy beneath on the veins. **8. V. canadensis.**

1. Viola linguaefolia Nutt. East entrance, on canyon slopes, *Umbach*. Wash. to Calif., Colo., and Mont.—Plants with short stems; leaves mostly ovate or elliptic, 4 to 8 cm. long, obtuse or acutish, glabrous or nearly so; upper petals reddish brown.

2. Viola orbiculata Geyer. Evergreen violet. Frequent at low and middle altitudes, rarely found above timber line, usually in deep woods. B. C., Wash., Mont., and Alta.—Rootstocks thick and stout; leaves rounded, 2 to 4 cm. wide, with low rounded teeth, glabrous or nearly so; runners 5 to 10 cm. long, usually flower-bearing.

The leaves are of a darker green than those of most violets; they persist through the winter.

3. Viola palustris L. Marsh violet. Frequent at low and middle altitudes, in swamps or wet thickets; common in sphagnum bogs. Alaska to Colo., S. Dak., N. H., and Lab.; also in Eur. and Asia.—Plants glabrous, with slender rootstocks; leaves heart-shaped or rounded, with low teeth; seeds dark brown.

4. Viola nephrophylla Greene. Purple violet. Occasional in moist woods or on lake shores. B. C. to N. Mex., Wis., Conn., and Que.—Plants with thick rootstocks; leaves heart-shaped or kidney-shaped, 3 to 6 cm. wide; seeds olive-brown, 2 mm. long.

5. Viola adunca J. E. Smith. Rocky summit above Ptarmigan Lake; also collected by Umbach on hills at east entrance. Alaska to Calif., Colo., N. H., and Que.—Stems often very short; leaves ovate, obtuse, finely hairy; spur slender, 5 to 7 mm. long.

6. Viola montanensis Rydb. East entrance, on hillsides, *Umbach*. Mont. to Colo.—Stems 10 to 20 cm. high; leaves broadly ovate, often finely hairy.

Perhaps only a form of *V. adunca*.

7. Viola glabella Nutt. Yellow violet. Common at middle altitudes and sometimes above timber line, in woods or on moist slopes. Alaska to Calif. and Mont.—Plants 10 to 30 cm. high, nearly glabrous; leaves mostly kidney-shaped, crenate, usually short-pointed; seeds nearly black.

This is the only violet which is seen in bloom in any abundance during the summer. The plants often form great beds on banks near snow about timber line.

8. **Viola canadensis** L. CANADA VIOLET. Occasional at low altitudes, in woods or thickets. B. C. to Ariz., S. C., and N. B.—Stems 15 to 30 cm. high, usually finely hairy; leaves kidney-shaped or broadly heart-shaped, 4 to 10 cm. wide, short-pointed; seeds brown.

The Canada violet blooms in spring, but scattered plants blossom in late summer.

56. LOASACEAE. Loasa Family.

1. MENTZELIA L.

1. **Mentzelia dispersa** S. Wats. STICKLEAF. Prairie and dry banks at the east entrance. B. C. to Calif., Colo., and Mex. (*Acrolasia dispersa* Rydb.)—Annual, 25 to 40 cm. high, densely branched; leaves alternate, lanceolate, entire or toothed, very rough with short hairs; petals 5, pale dull yellow, 3 to 4 mm. long.

The leaves adhere tenaciously to clothing.

57. ELAEAGNACEAE. Oleaster Family.

Shrubs; pubescence of scales or of branched hairs; leaves entire; flowers in axillary clusters, small; sepals 4; petals none; fruit drupelike, 1-seeded.

Leaves alternate; stamens 4 . . . . . 1. **ELAEAGNUS.**
Leaves opposite; stamens 8 . . . . . 2. **LEPARGYREA.**

1. ELAEAGNUS L.

1. **Elaeagnus commutata** Bernh. SILVERBERRY. Frequent at low altitudes, on dry rocky hillsides, on shale slopes, or in rocky stream beds. Yukon to Utah, Minn., and Que. (*Elaeagnus argentea* Pursh.)—Slender shrub, 0.6 to 2 meters high, with reddish brown bark; leaves oblong, 2 to 10 cm. long, densely covered with silvery scales; flowers yellowish green, fragrant; fruit 8 to 12 mm. long, covered with silvery scales.

There are extensive thickets of this shrub along the creek at St. Mary. The fruit has thin, nearly dry flesh, and is not edible.

2. LEPARGYREA Raf.

1. **Lepargyrea canadensis** (L.) Greene. CANADA BUFFALOBERRY. PLATE 51, A. Common at low and middle altitudes, in woods or on open slopes. Alaska to Oreg., N. Mex., N. Y., and Newf. (*Shepherdia canadensis* Nutt.)—Shrub, 0.6 to 1.5 meters high, densely branched, often forming broad clumps; leaves oval or ovate, green on the upper surface, beneath silvery-scaly and brown-scurfy; flowers greenish yellow; fruit bright red, very juicy.

When in flower, in spring, the shrub is not conspicuous, but in middle or late summer, when loaded with fruit, it is one of our most showy and attractive plants. The fruit when tasted is at first sour and rather pleasant, but after a moment is intensely bitter. The common buffaloberry, *Lepargyrea argentea* (Nutt.) Greene, grows along streams in the plains region of Montana. Its fruit resembles that of the Canada buffaloberry, but it is edible and not bitter.

58. ONAGRACEAE. Evening-primrose Family.

Annual or perennial herbs; leaves alternate or opposite; flowers borne in the axils of the leaves or arranged in racemes; sepals 4 or rarely 2; petals 4 or 2; fruit a capsule, or nutlike.

Petals and sepals each 2; fruit covered with small hooked hairs . . . 1. **CIRCAEA.**
Petals and sepals each 4; fruit without hooked hairs.
  Plants stemless or nearly so, the leaves forming a rosette.
    Petals about 5 mm. long; stigma not lobed . . . . . 3. **TARAXIA.**

Petals 1.2 to 4 cm. long; stigma with 4 long lobes.
Petals yellow; capsule with narrowly winged angles . . . . . **4. LAVAUXIA.**
Petals white; capsule with 2 low crests along each angle.
5. PACHYLOPHUS.
Plants with leafy stems.
Seeds each with a tuft of silky hairs at one end; leaves opposite or alternate.
2. EPILOBIUM.
Seeds glabrous; leaves alternate.
Petals 1.2 to 3 cm. long, white or yellow.
Petals yellow; stems hairy . . . . . **6. OENOTHERA.**
Petals white; stems glabrous or nearly so . . . . . **7. ANOGRA.**
Petals 1 to 6 mm. long, pink to purplish red, rarely white.
Plants perennial; petals 4 to 6 mm. long; fruit nutlike, not opening.
8. GAURA.
Plants annual; petals 1 to 3 mm. long; fruit opening when ripe.
Calyx with a short tube; capsules sessile . . . . . **9. BOISDUVALIA.**
Calyx without a tube; capsules stalked . . . . . **10. GAYOPHYTUM.**

1. CIRCAEA L. Enchanter's nightshade.

Perennials, glabrous or nearly so; leaves opposite, petioled, broadly ovate, thin; flowers very small, white, in racemes; petals notched, about 1.5 mm. long; fruit obovoid, covered with whitish hooked hairs.—The fruits adhere to clothing readily. The roots bear cylindric watery tubers.

Leaves sharply toothed, usually cordate at base . . . . . **1. C. alpina.**
Leaves entire or with very short sinuate teeth, rounded or truncate at base.
2. C. pacifica.

1. Circaea alpina L. Occasional at low or middle altitudes, in moist woods. Widely distributed in N. Amer., Eur., and Asia.—Stems weak, simple, 5 to 20 cm. high; leaves 2 to 5 cm. long; fruit about 2 mm. long.

2. Circaea pacifica Aschers. & Magn. Frequent, chiefly at middle altitudes, in moist woods or thickets. B. C. to Calif., Colo., and Mont.—Stems 15 to 40 cm. high, weak and succulent; leaves 3 to 6 cm. long, thin; fruit 2 to 3 mm. long.

2. EPILOBIUM L. Cottonweed.

Annual or perennial herbs; leaves alternate or opposite, entire or toothed; flowers in racemes or solitary in the leaf axils; stamens 8; fruit a long slender capsule: seeds with a tuft of white hairs at the upper end.

Petals 10 to 30 mm. long, rounded at the summit.
Leaves bright green on the upper surface, pale beneath; plants usually 0.5 to 1.5 meters high; flowers in long naked racemes . . . . . **1. E. angustifolium.**
Leaves glaucous; plants 10 to 40 cm. high; flowers in short leafy racemes.
2. E. latifolium.
Petals 3 to 7 mm. long, notched.
Plants annual; leaves mostly linear . . . . . **3. E. adenocladon.**
Plants perennial; leaves broader than linear.
Leaves with fine but conspicuous sharp teeth; plants 30 to 60 cm. high, lower only if stunted.
Petals about 7 mm. long . . . . . **4. E. glandulosum.**
Petals 3 to 5 mm. long . . . . . **5. E. adenocaulon.**
Leaves entire or with a few low blunt teeth; plants nearly always less than 30 cm. high.
Stems densely covered to the base with fine gland-tipped hairs; leaves finely hairy . . . . . **6. E. mirabile.**

Stems glabrous below or with minute curled or appressed hairs; leaves mostly glabrous.
Leaves sessile, glaucous . . . . . **7. E. platyphyllum.**
Leaves short-petioled, green.
Petals white . . . . . **8. E. alpinum.**
Petals purple or pink.
Petals 6 to 7 mm. long; plants with scaly underground shoots. **9. E. hornemannii.**
Petals 4 to 5 mm. long; plants with short sterile leafy shoots above ground.
Seeds smooth; capsule long-cylindric . . . . . **10. E. anagallidifolium.**
Seeds finely roughened; capsule somewhat club-shaped. **11. E. clavatum.**

1. Epilobium angustifolium L. FIREWEED. Abundant at low and middle altitudes, chiefly on open slopes, often in woods. Widely distributed in N. Amer., Eur., and Asia. (*Chamaenerion angustifolium* Scop.; *C. spicatum* S. F. Gray.)—Perennial, glabrous or nearly so; stems simple or branched; leaves lanceolate or linear-lanceolate, 5 to 15 cm. long, entire; petals rose-purple, 1 to 2 cm. long; capsules 5 to 8 cm. long, slender.

One of the showiest plants of the park, often occurring in great abundance, and continuing in flower for a long time. There is a particularly fine display along the automobile road on the east slope, and the plant is nearly always abundant in burns. The stems, leaves, and capsules are soon brilliantly tinged with red and purple. The name "fireweed" is due to the fact that the plant is one of the first to spring up in burned-over areas. This, of course, happens because the seeds are easily transported by wind. Fireweed grows in the Eastern States, but there it seldom forms such wonderful displays of color as are found in the West.

2. Epilobium latifolium L. ALPINE FIREWEED. Common above timber line, on rocky slopes and rock slides; often found abundantly along streams at middle or even at low altitudes. Alaska to Wash., Colo., S. Dak., Que., and Greenl.; also in Eur. and Asia. (*Chamaenerion latifolium* Sweet.)—Perennial, 10 to 40 cm. high, often forming dense clumps; leaves ovate or lanceolate, entire, 2 to 5 cm. long, covered with fine hairs; flowers crowded at the ends of the stems; petals rose-purple, 1.5 to 3 cm. long; capsule 5 to 8 mm. long.

A very beautiful plant, but not forming such extensive masses of color as the common fireweed, with which it frequently grows. It reaches its best development along streams at middle elevations, where it often forms great banks of rich color. Plants collected at St. Mary are remarkable for their linear-lanceolate leaves.

3. Epilobium adenocladon (Hausskn.) Rydb. Occasional at low altitudes on open or brushy slopes or sandbars. Mont. to Colo. and S. Dak.—Stems slender, 20 to 60 cm. high, glabrous below, branched; leaves mostly entire, 2 to 4 cm. long; petals pink or purplish, about 5 mm. long; capsule 1.5 to 2.5 cm. long, covered with fine gland-tipped hairs.

4. Epilobium glandulosum Lehm. Occasional at middle altitudes, on brushy slopes or along brooks. Alaska to Wyo. and Sask.—Stems 30 to 60 cm. high, mostly simple, finely pubescent above; leaves lance-ovate, 3 to 6 cm. long, sessile, finely toothed; petals purple; capsules 3 to 6 cm. long, finely pubescent.

5. Epilobium adenocaulon Hausskn. Common at low and middle altitudes, in moist woods or thickets. Yukon to Nev., N. Mex., Pa., and N. B.—Stems 30 to 80 cm. high, simple or branched, finely hairy above; leaves lanceolate or ovate, 2 to 6 cm. long, usually short-petioled, glabrous or nearly so; petals pink or purple; capsules 3 to 5 cm. long, nearly glabrous.

6. Epilobium mirabile Trel. Frequent above timber line, on moist slopes or along brooks; sometimes about snow banks at middle altitudes. Wash. and Mont.—Stems 10 to 25 cm. high, forming dense clumps; leaves ovate, 1 to 2 cm. long, remotely toothed; petals pink, about 5 mm. long; capsule 2 to 4 cm. long.

This species has been known previously only from the original collection, from Mount Rainier, Washington. A specimen collected in Glacier Park by Umbach and listed by Rydberg under *E. palmeri* Rydb. belongs here.

7. Epilobium platyphyllum Rydb. Occasional at low or middle altitudes, on moist slopes or on lake beaches or sandbars. B. C. to Calif., Utah, and Mont.—Stems 10 to 20 cm. high, glabrous, forming dense tufts; leaves ovate, 1.5 to 2.5 cm. long, entire or nearly so, glabrous; petals 4 to 5 mm. long, pink or purple; capsules glabrous, 3 to 5 cm. long.

8. Epilobium alpinum L. Common above timber line, in meadows or on rocky slopes; frequently found at middle altitudes, in wet thickets or on moist cliffs. Alaska to Calif., Colo., S. Dak., N. H., and Greenl.; also in Eur. and Asia.—Stems slender, 10 to 20 cm. high, tufted, usually glabrous; leaves ovate, 1 to 3 cm. long, entire or nearly so; petals 3 to 5 mm. long; capsules 3 to 5 cm. long.

9. Epilobium hornemannii Reichenb. Common above or near timber line, in moist meadows or on slopes; occasional in wet places at middle altitudes. Alaska to Calif., Colo., S. Dak., N. H., and Greenl.; also in Eur. and Asia.—Stems slender, 10 to 30 cm. high, tufted, finely pubescent; leaves oblong to ovate, 1.5 to 4 cm. long, obtuse; capsules 3 to 5 cm. long, slender-stalked.

A handsome plant when in full flower.

10. Epilobium anagallidifolium Lam. Frequent above timber line, in meadows or on rocky slopes or rock slides; sometimes in wet places at middle altitudes. Alaska to Colo., Lab., and Greenl.; also in Eur. and Asia.—Stems slender, 10 to 15 cm. high, minutely pubescent, tufted; leaves oblong to ovate, 1 to 2 cm. long, obtuse, entire or nearly so; capsules 2 to 4 cm. long, slender-stalked.

11. Epilobium clavatum Trel. Occasional above timber line, in meadows or on slopes; sometimes in wet places at middle altitudes. B. C. and Alta. to Colo.—Stems slender, about 10 cm. high, nearly glabrous, tufted; leaves oval or ovate, obtuse, 1 to 2 cm. long, entire or nearly so; capsules 2 to 3 cm. long, slender-stalked.

3. TARAXIA Nutt.

1. Taraxia breviflora Nutt. Low places on prairie near east entrance. B. C. and Alta. to Utah. (*Oenothera breviflora* Torr. & Gray.)—Stemless perennial; leaves spreading upon the ground, 5 to 10 cm. long, lobed, finely hairy; petals yellow, 5 mm. long; capsule roughened, 1.5 cm. long.

4. LAVAUXIA Spach.

1. Lavauxia flava A. Nels. East entrance, on prairie, *Umbach*. Wash. to Calif., N. Mex., and Nebr.—Stemless perennial, nearly glabrous; leaves oblanceolate, 10 to 20 cm. long, lobed, at least near the base; flowers sessile; petals 1.5 to 2 cm. long, yellow, turning pink; capsule 2 to 3 cm. long.

5. PACHYLOPHUS Spach.

1. Pachylophus caespitosus (Nutt.) Raim. PRAIRIE EVENING-PRIMROSE. East entrance, on shale slopes or prairie. Sask. to Utah, N. Mex., and Nebr. (*Oenothera caespitosa* Nutt.)—Perennial, stemless or nearly so, forming dense tufts, glabrous; leaves oblanceolate, 10 to 20 cm. long, toothed; petals 3 to 4 cm. long, white, turning deep pink; capsule about 3 cm. long.

The flowers open in the evening and close in the morning; they are very showy.

6. OENOTHERA L.

1. Oenothera strigosa (Rydb.) Mack. & Bush. EVENING-PRIMROSE. Rare; at low altitudes, on dry slopes; perhaps introduced. B. C. to Utah, Kans., and Minn.—Plants biennial, 0.4 to 1 meter high, hairy; leaves spatulate or lanceolate, 5 to 10 cm. long, with low teeth; flowers sweet-scented, in leafy spikes; petals 12 to 20 mm. long, pale yellow; capsule 2.5 to 3 cm. long, cylindric.

7. ANOGRA Spach.

1. Anogra nuttallii (Sweet) A. Nels. East entrance, on dry bluffs. *Umbach.* B. C. to Colo. and Minn. (*Oenothera albicaulis* Nutt.)—Perennial, 30 to 60 cm. high, branched, with whitish stems; leaves linear or linear-oblong, 3 to 10 cm. long, entire or with distant teeth, finely hairy beneath; flowers sessile in the leaf axils; petals about 2 cm. long, white, turning pink; capsule 2 to 3 cm. long, cylindric.

8. GAURA L.

1. Gaura coccinea L. BUTTERFLY PLANT. Occasional on prairie or dry slopes at east entrance. Mont. to S. Dak. and Mex.—Branched perennial, 10 to 40 cm. high, hairy; leaves oblong or lanceolate, 1 to 3 cm. long, entire or shallowly toothed; flowers in slender spikes; petals 4 to 6 mm. long, pink or red; fruit 4-angled, nutlike, 5 to 7 mm. long.

One of the most characteristic plants of the Great Plains region.

9. BOISDUVALIA Spach.

1. Boisduvalia glabella (Nutt.) Spach. East entrance, abundant about dried-up pools on prairie. B. C. to Calif. and Sask.—Annual, 10 to 30 cm. high, simple or branched, finely hairy or nearly glabrous; leaves sessile, ovate, 7 to 17 cm. long, acute, finely toothed or entire; flowers sessile in the leaf axils; petals 2 mm. long, pink; capsule 5 to 7 mm. long.

10. GAYOPHYTUM Juss.

Slender branched annuals, glabrous or nearly so; leaves linear, entire; flowers very small, in the leaf axils; capsule linear or club-shaped.—In general appearance the plants resemble closely the annual species of *Epilobium*.

Capsule several times as long as its stalk . . . . . **1. G. racemosum.**
Capsule less than 3 times as long as its stalk . . . . . **2. G. intermedium.**

1. Gayophytum racemosum Torr. & Gray. East entrance, on dry hills. *Umbach.* Wash. to Calif., Colo., and S. Dak.—Stems 10 to 30 cm. high; leaves 1 to 2 cm. long; petals white or pink, 1 mm. long; capsules 1 to 1.5 cm. long.

2. Gayophytum intermedium Rydb. Dry slopes, at east entrance and Summit, *Umbach.* Wash. to Calif., Colo., and Mont.—Stems 15 to 40 cm. high; leaves 1 to 4 cm. long; petals 1.5 to 2.5 mm. long, pink, with yellow base; capsules 5 to 10 mm. long.

59. HALORAGIDACEAE. Water Milfoil Family.

Perennial aquatic herbs; leaves whorled; flowers small, green, sessile in the leaf axils; fruit a nutlet.

Leaves mostly divided into threadlike lobes; flowers with 2 to 4 sepals and 2 to 4 small petals . . . . . **1. MYRIOPHYLLUM.**
Leaves entire; sepals and petals none . . . . . **2. HIPPURIS.**

1. MYRIOPHYLLUM L.

1. Myriophyllum spicatum L. WATER MILFOIL. East entrance, in ponds, *Umbach.* Alaska to Calif., N. Mex., Kans., Conn., and Newf.—Stems submerged, branched; leaves in whorls of 4 or 5, 1 to 3 cm. long; floral leaves ovate, entire or toothed, very small.

2. HIPPURIS L.

1. Hippuris vulgaris L. MARE'S-TAIL. About ponds or dried-up pools on prairie about the east entrance. Widely distributed in N. Amer., Eur., and Asia.—Glabrous perennial, 20 to 70 cm. high, with unbranched stems; leaves in whorls of 6 to 12, linear, acute, entire; flowers very small, green, sessile in the leaf axils.

60. ARALIACEAE. Ginseng Family.

Ginseng (*Panax quinquefolium* L.) is one of the best-known plants of this family. It is a native of the eastern United States.

Plants shrubby, armed with prickles . . . . . **1. ECHINOPANAX.**
Plants herbaceous, unarmed . . . . . **2. ARALIA.**

1. ECHINOPANAX Decaisne & Planch.

1. Echinopanax horridum (J. E. Smith) Decaisne & Planch. DEVIL'S-CLUB. Common on the west slope at low altitudes, in moist woods and thickets; reported from the east slope, but certainly rare. Alaska to Oreg., Mont., and Mich. (*Fatsia horrida* Benth. & Hook.)—Shrub, 1 to 2 meters high, the stems and under surfaces of the leaves covered with long prickles; leaves very large, lobed and toothed; flowers small, greenish white, in small umbels arranged in a panicle; fruit bright red, juicy, not edible.

One of the characteristic shrubs of the west slope, often forming extensive and almost impenetrable thickets. The plant has a strong odor. The large leaves remind one of those of some tropical plants. The panicles of fruit are usually large, dense, and very heavy.

2. ARALIA L.

1. Aralia nudicaulis L. WILD SARSAPARILLA. Common at low altitudes on the west slope, in woods or on brushy hillsides. B. C. to Colo., N. C., and Newf.—Plants glabrous, 30 to 60 cm. high; leaf rising directly from the rootstock, composed of several leaflets, these 5 to 10 cm. long, finely toothed; flowers small, greenish, usually arranged in 3 umbels on a naked stalk; fruit purplish black, juicy, not edible.

In autumn the leaves turn pink or deep red. The rootstocks have properties similar to those of sarsaparilla and are employed in medicine. The true sarsaparilla of commerce is obtained from tropical American species of *Smilax*.

61. APIACEAE. Parsley Family.

Annual or perennial herbs, often with a strong odor; stems usually hollow; leaves alternate, commonly compound, the petiole broadened at its base; flowers small, in simple or compound umbels, rarely in heads; sepals 5, usually very small; petals 5; stamens 5; fruit of 2 one-seeded carpels, these at first attached to each other but finally separating.—The names Umbelliferae and Ammiaceae are sometimes used for the group. Cultivated parsley, carrots, caraway, dill, and celery belong to this family. The flowers are usually in small umbels which are arranged in large umbels; at the base of the large umbel there is often an *involucre* of *bracts*, and at the base of the smaller umbels an *involucel* of *bractlets*.

Lowest (or all) leaves simple, entire or toothed.
Leaves all entire, pale green . . . . . **1. BUPLEURUM.**
Leaves not entire, the lowest ones heart-shaped and toothed, the upper ones compound (composed of several leaflets) . . . . . **2. ZIZIA.**
Lowest leaves (like the upper ones) compound, composed of 3 to many leaflets.
Fruit covered with short hooked spines; leaflets 3 or 5, all attached at the end of the leaf stalk . . . . . **3. SANICULA.**
Fruit not spiny; leaflets 3 or more, not all attached at the end of the leaf stalk.
Fruit linear or nearly so, several times as long as broad.
Fruit with appressed bristly hairs on the ribs; flowers white.
4. OSMORRHIZA.
Fruit glabrous; flowers pale yellow . . . . . **5. GLYCOSMA.**

Fruit oblong to rounded, less than 3 times as long as broad.
Ribs of the fruit not winged; flowers white or pink; plants glabrous.
Leaflets, at least those of the upper leaves, linear or threadlike, entire. **6. CARUM.**
Leaflets lanceolate to linear, toothed.
Ribs of the fruit equal and prominent; leaves once pinnate . . **7. SIUM.**
Ribs of the fruit unequal, those on the back of the carpel low and broad, those on the side prominent and thick; leaves twice pinnate or 2 or 3 times ternate . . . . . **8. CICUTA.**
Ribs of the fruit, at least some of them, winged; flowers white or yellow; plants glabrous or hairy.
Leaflets 10 to 30 cm. wide, few; plants very hairy, usually a meter high or taller . . . . . **9. HERACLEUM.**
Leaflets smaller, mostly less than 5 cm. wide, usually numerous; plants glabrous or very finely hairy.
Leaves once pinnate; flowers yellow . . . . . **10. PASTINACA.**
Leaves 2 or more times pinnate or ternate; flowers yellow or white.
Leaflets entire; flowers yellow . . . . . **11. COGSWELLIA.**
Leaflets toothed or lobed; flowers yellow or white.
Plants glabrous; flowers yellow or white . . . . . **12. ANGELICA.**
Plants finely hairy, at least on the leaves; flowers yellow.
Wings at the edges of the carpels thin, not corky; leaves mostly small. . . . . **11. COGSWELLIA.**
Wings thick and corky; leaves broad . . . . . **13. LEPTOTAENIA.**

1. BUPLEURUM L.

1. Bupleurum americanum Coult. & Rose. Frequent on the east slope at low altitudes, on dry open hillsides or on dry or wet prairie. Alaska to Wyo.—Perennial, 10 to 30 cm. high, glabrous and glaucous; leaves entire, oblong or linear-lanceolate, parallel-veined; flowers yellow; involucels of 5 or more ovate bractlets; fruit 5 mm. long, somewhat flattened from the sides, with slender ribs.

2. ZIZIA Koch.

1. Zizia cordata (Walt.) Koch. MEADOW PARSNIP. Low meadows and prairie at St. Mary and east entrance. B. C. to Oreg., Utah, Ga., and Conn.—Glabrous perennial, 20 to 60 cm. high; basal leaves heart-shaped 2 to 8 cm. long, with rounded teeth; stem leaves with 3 ovate or lanceolate, toothed leaflets; flowers yellow; bracts none, the bractlets small; fruit 3 mm. long, somewhat flattened from the sides, with slender ribs.

3. SANICULA L.

1. Sanicula marilandica L. BUR SNAKEROOT. Frequent at low and middle altitudes, especially on the west slope, usually in wet thickets. B. C. and Wash. to Colo., Ga., and Newf.—Glabrous perennial, 30 to 60 cm. high, with rootstocks; basal leaves long-stalked, composed of 3 leaflets, the 2 outer ones deeply 2-lobed; leaflets 5 to 8 cm. long, cut and toothed; flowers greenish yellow, in headlike clusters; fruit 6 to 7 mm. long, covered with hooked bristles.

The fruits cling readily to clothing.

4. OSMORRHIZA Raf. SWEET CICELY.

Perennials with thick strong-scented roots; leaves 3-parted, the leaflets thin, lobed or toothed; flowers few, white, in small umbels; involucre wanting or of 1 or 2 small bracts; fruit linear or club-shaped, bristly.

Pedicels longer than the fruit . . . . . **1. O. divaricata.**
Pedicels shorter than the fruit . . . . . **2. O. brevipes.**

1. Osmorrhiza divaricata Nutt. Common on the east slope at low and middle altitudes, usually in moist woods or thickets. B. C. to Oreg. and S. Dak.; also in Que.—Stems slender, 20 to 60 cm. high, hairy or almost glabrous; leaflets 2 to 6 cm. long, pubescent; fruit 12 to 15 mm. long.

2. Osmorrhiza brevipes (Coult. & Rose) Suksdorf. Frequent at low and middle altitudes, in moist woods.—Plants 30 to 70 cm. high, branched, hairy; leaflets 2 to 6 cm. long, coarsely toothed; fruit about 15 mm. long.

5. GLYCOSMA Nutt.

1. Glycosma occidentalis Nutt. Common on the east slope at low and middle altitudes, in woods or thickets, especially in moist places; often in wet meadows above timber line. B. C. to Calif., Colo., and Alta.—Perennial, 0.5 to 1 meter high, finely hairy; leaves 2 or 3 times divided, the leaflets oblong-lanceolate, 3 to 10 cm. long, toothed; flowers pale yellow or nearly white; fruit narrowly club-shaped, 12 to 20 mm. long, smooth.

The plant, especially the root, has a strong and characteristic odor.

6. CARUM L.

Biennials or perennials, glabrous; leaves divided into linear or threadlike lobes or once pinnate; involucres and involucels of slender bracts and bractlets; fruit glabrous, somewhat flattened from the sides.

Leaves once pinnate; roots tuberous, clustered; fruit about 2 mm. long. **1. C. gairdneri.**

Leaves 3 or 4 times lobed; plants with a taproot; fruit about 4 mm. long. **2. C. carui.**

1. Carum gairdneri (Hook. & Arn.) A. Gray. YAMPA. Occasional on the east slope at low altitudes, in moist meadows or thickets. B. C. to Calif., N. Mex., and Alta. (*Atenia gairdneri* Hook. & Arn.)—Stems slender, 30 to 60 cm. high, usually simple; leaflets 4 to 12 cm. long; flowers white; fruit glabrous.

The Blackfoot Indians used the plant as a remedy for sore throat, and applied it to swellings to reduce the inflammation. They also ate the roots raw, cooked them as a vegetable, and used them for flavoring stews.

2. Carum carui L. CARAWAY. Abundant at the edge of cultivated ground near foot of Sherburne Lake. Native of Eur.; often cultivated and escaping.—Stems 30 to 60 cm. high, branched; lobes of the leaves 5 to 20 mm. long; flowers white or pink; fruit glabrous.

7. SIUM L.

1. Sium cicutaefolium Gmel. WATER PARSNIP. Swamps at low altitudes on the west slope. B. C. to Calif., Va., and Newf.—Glabrous perennial, 0.5 to 1 meter high; leaves pinnate, the 7 to 15 leaflets 3 to 8 cm. long, linear or lanceolate, sharply toothed, the leaves of plants growing in water sometimes 2 or 3 times lobed; flowers white, in broad umbels; bracts and bractlets narrow; fruit 3 mm. long, somewhat flattened from the sides, with conspicuous ribs.

8. CICUTA L.

Glabrous perennials with leafy stems; leaves once or twice pinnate, the leaflets toothed; flowers white; bracts few or none; bractlets narrow; fruit of 2 rounded carpels, with conspicuous ribs.

Leaves without bulblets; leaflets lanceolate . . . . . **1. C. occidentalis.**

Leaves, especially the upper ones, with small bulbs in the axils; leaflets linear. **2. C. bulbifera.**

1. **Cicuta occidentalis** Greene. WATER HEMLOCK. Occasional on the west slope at low altitudes, in swampy thickets. Calif. to Alta., S. Dak., and N. Mex.—Plants about 1 meter high, stout; leaves twice pinnate; leaflets 5 to 10 cm. long, sharply toothed; fruit 3 mm. long.

The roots are poisonous to stock and to human beings.

2. **Cicuta bulbifera** L. Sphagnum bogs on the west slope. B. C. to Oreg., Md., and Me.—Plants slender, 30 to 50 cm. high, often tinged with purple; leaves 2 or 3 times divided, the leaflets 2 to 5 cm. long; fruit 2 mm. long.

9. HERACLEUM L.

1. **Heracleum lanatum** Michx. COW PARSNIP. PLATE 51, B. Common at nearly all altitudes, usually in moist woods or thickets, often in wet meadows, and sometimes even on high rock slides. Alaska to Calif., N. Mex., N. C., and Vt.—Coarse perennial, 1 to 1.5 meters high, very hairy; leaves large, the few leaflets 10 to 30 cm. broad, toothed and lobed, the petioles with dilated sheaths; flowers white, in broad umbels, the bracts and bractlets linear; fruit flat, about 1 cm. long, winged on the edges, finely hairy.

In the park the curious name of "sacred rhubarb" is sometimes applied to this plant, especially by the guides. The same name is found also in ethnological literature, and it is derived from the fact that this is a sacred plant of the Blackfoot Indians and is used in some of their ceremonials, as in the sun dance, in which stalks are placed upon the altar. The plant certainly bears little resemblance to rhubarb. In the spring the Blackfoot Indians eat the succulent young shoots of the cow parsnip after roasting them over hot coals. The plant is an important article of food of many of the northwestern Indians.

10. PASTINACA L.

1. **Pastinaca sativa** L. PARSNIP. Occasional on the east slope at low altitudes, in thickets or cultivated ground. Native of Eur.; cultivated and often naturalized.—Biennial, glabrous or nearly so; leaves pinnate, the leaflets ovate, sessile, 2 to 10 cm. long, lobed and toothed; flowers yellow; involucre none; fruit flat, glabrous, 5 to 7 mm. long, winged along the edges.

11. COGSWELLIA Spreng.

Perennials with thick roots; leaves divided into numerous small or large leaflets; bracts none, but bractlets usually present; fruit strongly flattened, the carpels winged on the edges.

Leaflets 5 to 10 cm. long, linear, entire . . . . . **1. C. triternata.**
Leaflets less than 1 cm. long, toothed or lobed.
Fruit glabrous, about 1 cm. long; flowers white . . . . . **2. C. macrocarpa.**
Fruit puberulent, 4 to 5 mm. long; flowers yellow . . . . . **3. C. sandbergii.**

1. **Cogswellia triternata** (Pursh) Jones. Frequent on the east slope, at low (rarely at middle) altitudes, on dry open hillsides or in aspen thickets. B. C. to Calif., Wyo., and Alta.—Stems 30 to 60 cm. high, minutely puberulent; leaves 2 or 3 times divided, pale green; flowers yellow; fruit glabrous, 6 to 12 mm. long, 3 to 4 mm. wide.

2. **Cogswellia macrocarpa** (Nutt.) Jones. East entrance, on dry open hillsides. B. C. to Calif., Colo., and Sask.—Stems 20 to 50 cm. high, purplish, finely puberulent, branched from the base; leaves divided into numerous small puberulent leaflets; fruit 5 to 7 mm. wide.

3. **Cogswellia sandbergii** (Coult. & Rose) Jones. Occasional above or shortly below timber line, on open slopes or in meadows. B. C., Idaho, Mont., and Alta.—Stems 10 to 15 cm. high, purplish, minutely puberulent; leaves small, soon withering, divided into very small, nearly glabrous leaflets; fruit about 3 mm. wide.

12. ANGELICA L. Angelica.

Tall perennials, glabrous or nearly so; leaves with 3 pinnate divisions, the leaflets large, toothed or lobed; flowers in large umbels; fruit flattened, glabrous, the lateral ribs winged.

Flowers pale greenish yellow; umbel with several large toothed leaflike bracts at the base . . . . . 1. A. dawsoni.
Flowers white; umbel without bracts or with 1 or 2 inconspicuous ones . 2. A. lyallii.

1. **Angelica dawsoni** S. Wats. Yellow angelica. Frequent about timber line, in meadows or moist woods, sometimes in moist places at middle altitudes. B. C., Idaho, Mont., and Alta.—Stems 0.3 to 1 meter high, rather slender; leaflets lance-oblong, thin, bright green, 2 to 6 cm. long, sharply toothed; umbels long-stalked; fruit 5 mm. long.

A rather showy plant when in flower.

2. **Angelica lyallii** S. Wats. White angelica. Common at low and occasionally at middle altitudes, in moist woods or thickets or along streams. B. C. to Oreg., Wyo., and Alta.—Stems very stout, 0.5 to 1.5 meters high; petioles with very broad sheathing bases; leaflets thick, ovate, coarsely toothed, 2 to 7 cm. long; fruit 4 to 6 mm. long.

A very showy plant, which blooms for a long time. In general appearance it is much like *Heracleum lanatum*. The roots have a strong odor.

13. LEPTOTAENIA Nutt.

1. **Leptotaenia multifida** Nutt. Frequent on the east slope at low and middle altitudes and sometimes near timber line, on open rocky slopes or in thickets. B. C. to Calif., Colo., and Alta.—Stout perennial, 30 to 80 cm. high, with glabrous stems; leaves finely puberulent, 10 to 30 cm. wide, divided into numerous leaflets, these with deep linear lobes; flowers yellow; fruit flat, 8 to 12 mm. long, the carpels with a narrow corky wing around the edge.

The plants bloom early in the season, and the leaves soon turn yellow. McClintock gives the following uses of this plant among the Blackfoot Indians: The root was used to prepare a hot drink, taken as a tonic by people in poor health, especially to enable them to put on flesh; the pulverized roots were burned as incense; when horses had the distemper they were made to inhale smoke from the burning plant. the pulverized plant was mixed with brains and employed in tanning.

62. CORNACEAE. Dogwood Family.

1. CORNUS L.

Plants shrubby; flowers in open cymes, not surrounded by an involucre.
1. C. stolonifera.
Plants herbaceous; flowers in a dense head surrounded by an involucre of 4 white petal-like bracts . . . . . 2. C. canadensis.

1. **Cornus stolonifera** Michx. Red-osier dogwood. Common at low and middle altitudes, in woods or swamps or on moist open slopes. Widely distributed in N. Amer. (*Svida instolonea* A. Nels.)—Shrub, 1 to 2 meters high; branches reddish or purplish or sometimes green; leaves oval or ovate, opposite, entire, acute, with fine appressed hairs on the lower surface; flowers small, white, in flat cymes; fruit white or tinged with blue, juicy, not edible.

Very abundant in some places; forming extensive thickets along the Flathead at Belton. The leaves turn red in autumn.

2. **Cornus canadensis** L. Bunchberry. Common at low altitudes on the west slope, in deep or thin woods, on brushy slopes, etc.; rare on the east slope, but found in swampy woods just below Lake McDermott, and probably elsewhere. Alaska to

Calif., Colo., N. J., and Lab. (*Chamaepericlimenum canadense* Aschers. & Graebn.)—Stem 5 to 20 cm. high, unbranched, bearing a whorl of 4 to 6 leaves at the top; leaves ovate or obovate, 3 to 6 cm. long, acute, entire; flowers in a single cluster, small, greenish, the bracts large and conspicuous; fruit a dense head of small, bright red drupes.

A very handsome plant in either flower or fruit. The flower head is likely to be taken for a single flower, but close examination of the center of the "flower" will show that it is composed of numberous small flowers. The flowering dogwood (*Cornus canadensis* L.) of the eastern States is a closely related tree.

63. PYROLACEAE. Pyrola Family.

Perennial herbs with rootstocks; leaves mostly basal, evergreen, entire or toothed; flowers in racemes or corymbs; sepals 5 or 4; petals 5 or 4, waxy; stamens twice as many as the petals; fruit a capsule, containing numerous minute seeds.

Flower one on each stem . . . . . 2. **MONESES.**
Flowers few or numerous.
Flowers mostly in corymbs; leaves oblanceolate, scattered along the stem; filaments hairy. . . . . 1. **CHIMAPHILA.**
Flowers in racemes; leaves broadly ovate to rounded or kidney-shaped, crowded at or near the base of the stem; filaments glabrous . . . . . 3. **PYROLA.**

1. CHIMAPHILA Pursh.

1. Chimaphila umbellata occidentalis (Rydb.) Blake. PIPSISSEWA. Frequent at low and middle altitudes, in deep woods. Alaska to Calif., N. Mex., and Mont. (*C. occidentalis* Rydb.)—Plants loosely branched, 10 to 30 cm. high, glabrous, almost shrubby; leaves nearly sessile, mostly whorled, 4 to 6 cm. long, obtuse or acute, dark green, very thick and leathery, sharply toothed; petals waxy, purplish or pink, 5 to 7 mm. long.

The dried leaves were smoked by the Blackfoot Indians like tobacco. The flowers are attractive, but they are open only a short time. The leaves persist through the winter.

2. MONESES Salisb.

1. Moneses uniflora (L.) A. Gray. WOOD-NYMPH. Occasional at middle altitudes in deep woods on mossy banks. Alaska to Oreg., N. Mex., Pa., and Greenl.; also in Eur. and Asia.—Stems simple, 5 to 12 cm. high; leaves mostly crowded at the base of the stem, opposite or in whorls of 3, short-petioled, rounded, 8 to 15 mm. long, finely toothed; flower nodding, saucer-shaped; petals 8 to 10 mm. long, waxy white; anthers yellow.

A very beautiful little plant, of infrequent occurrence but often forming colonies a meter broad.

3. PYROLA L. PYROLA.

Plants perennial, herbaceous, the leaves mostly basal, evergreen; flowers nodding; fruit a 5-lobed capsule.—The name wintergreen is sometimes applied to these plants, but it is inappropriate, since the plants are not closely related to the true wintergreen.

Style very short, almost wanting . . . . . 1. **P. minor.**
Style long (2 to 5 mm.).
Leaves blotched with white on the upper surface . . . . . 2. **P. picta.**
Leaves not blotched.
Flowers pink or purplish; leaves mostly 3.5 to 6 cm. long.
Leaves minutely toothed by the protruding ends of the veins, often pointed. **3. P. bracteata.**
Leaves merely with low rounded teeth or entire, the ends of the veins not protruding, the leaves rounded at the apex . . . . . 4. **P. asarifolia.**

Flowers white or greenish white; leaves mostly 1.5 to 3 cm. long.
Leaves rounded, dark green; petals about 7 mm. long; racemes not 1-sided. **5. P. chlorantha.**
Leaves oval or ovate, usually acutish, rather pale green; petals about 4 mm. long; racemes 1-sided . . . . . **6. P. secunda.**

1. Pyrola minor L. SMALL PYROLA. Rare; at low, middle, or high altitudes, in swampy woods or on moist banks. Alaska to Calif., Colo., Conn., and Greenl.; also in Eur. and Asia. (*Exlebena minor* Rydb.)—Leaves rounded, 1 to 3 cm. long, petioled, crenulate; petals 4 to 5 mm. long, white or pink.

2. Pyrola picta Smith. SPOTTED PYROLA. Deep moist woods near Sun Camp. B. C. to Calif., Colo., and Mont.—Leaves oval or broadly ovate, often acutish, 2 to 6 cm. long, pale beneath; petals 6 mm. long, greenish or purplish.

3. Pyrola bracteata Hook. Wet woods below Lake McDermott; occasional on the west slope at low and middle altitudes, in deep woods. Alaska to Oreg. and Mont.—Leaves broadly ovate or rounded, 3 to 8 cm. long, dark green, shining; petals 7 to 9 mm. long.

Perhaps only a form of *P. asarifolia.*

4. Pyrola asarifolia Michx. PINK PYROLA. Common at low or rarely at middle altitudes, in bogs or moist woods or thickets. B. C. to Calif., N. Mex., Minn., N. Y., and N. S. (*P. uliginosa* Torr.)—Leaves 3 to 8 cm. long, rounded, often broader than long, green or dark green, usually shining, long-petioled; petals 5 to 7 mm. long, pale or deep pink.

This is very abundant in some localities. The flowers last only a short time.

5. Pyrola chlorantha Swartz. Occasional at almost all altitudes, in deep woods, or under bushes about timber line. B. C. to Calif., Md., and Lab.; also in Eur.—Leaves long-petioled, dull, 1 to 4 cm. wide.

6. Pyrola secunda L. Common at nearly all altitudes, in moist woods or thickets, often on banks or under bushes above timber line. Alaska to Calif., Va., and Lab.; also in Eur. and Asia. (*Ramischia secunda* Garcke.)—Plants 10 to 20 cm. high, often forming dense colonies; leaves 2 to 4 cm. long, finely toothed; flowers usually numerous.

64. MONOTROPACEAE. Indian-pipe Family.

The plants of this family are saprophytes (plants which live on decayed vegetable or animal matter), or parasites upon the roots of other plants; they have no green coloring matter (chlorophyll). The leaves are reduced to scales; the petals are distinct or united at the base; the fruit is a capsule.

Plants glabrous; flower one on each stem . . . . . **1. MONOTROPA.**
Plants hairy; flowers several or many.
Corolla of united petals; plants 20 to 100 cm. high, with hard stems; flowers numerous . . . . . **2. PTEROSPORA.**
Corolla of distinct petals; plants mostly 10 to 20 cm. high, with succulent stems; flowers few. . . . . **3. HYPOPITYS.**

1. MONOTROPA L.

1. Monotropa uniflora L. INDIAN-PIPE. Occasional at low altitudes on the west slope, in deep moist woods; probably also on the east slope. Widely distributed in N. Amer. and in Asia.—Plants 10 to 30 cm. high, usually growing in small clumps, white or pink; flower drooping, 1.5 to 2 cm. long.

A curious plant of striking appearance; sometimes known as ghost-plant or corpse-plant. The simple stem with the recurved flower suggests a pipe, hence the common name. The plants turn black after flowering. Although the flower is curved downward, the seed pod is held erect.

2. PTEROSPORA Nutt.

1. **Pterospora andromedea** Nutt. PINEDROPS. Woods at Sun Camp, and doubtless elsewhere. B. C. to Calif., Mex., Pa., and Que.—Plant unbranched, brownish or purplish, very sticky; flowers whitish, the corolla 6 to 8 mm. long.

Very common in many parts of the West, growing in pine woods.

3. HYPOPITYS Adans.

1. **Hypopitys latisquama** Rydb. PINESAP. Woods about the east entrance, and probably elsewhere. B. C. to Mont. and N. Mex.—Plant pink, finely hairy above; flowers about 1.5 cm. long.

Related species are widely distributed in North America.

65. ERICACEAE. Heath Family.

Shrubs (sometimes very small) with alternate or opposite leaves; corolla of united or distinct petals; fruit a capsule or drupe.

Leaves opposite; corolla saucer-shaped . . . . . **1. KALMIA.**
Leaves alternate; corolla not saucer-shaped.
  Leaves linear . . . . . **2. PHYLLODOCE.**
  Leaves much broader than linear.
    Plants erect shrubs, 0.3 to 2 meters high; fruit a dry capsule.
      Leaves evergreen; corolla of distinct petals . . . . . **3. LEDUM.**
      Leaves deciduous; corolla of united petals, urn-shaped . . **4. MENZIESIA.**
    Plants prostrate or creeping shrubs; fruit a drupe, or a capsule surrounded by a fleshy calyx.
      Leaves rounded; fruit a capsule, surrounded by the fleshy calyx. **5. GAULTHERIA.**
      Leaves wedge-shaped or obovate; fruit a drupe . . **6. ARCTOSTAPHYLOS.**

1. KALMIA L.

1. **Kalmia microphylla** (Hook.) Heller. ROCKY MOUNTAIN LAUREL. Common in alpine meadows; also in sphagnum bog at Johns Lake. Alaska to Calif., Colo., and Alta.—Erect glabrous shrub, 10 to 40 cm. high; leaves evergreen, leathery, oval or oblong, 1 to 2.5 cm. long, green on the upper surface, pale beneath; flowers bluish purple, 10 to 15 mm. broad.

A very beautiful plant when in full flower, but the flowers last only a short time. At Johns Lake the plants are abundant, and they are much larger than those found at high altitudes. The stamens of this plant are of interest; there are 10 of them; at first the anthers are held in little pockets of the outspread corolla, but if the corolla is struck gently the anthers are released and the stamens stand erect. The mountain laurel of the East (*Kalmia latifolia* L.) is a related plant.

2. PHYLLODOCE Salisb.

Small erect shrubs, 10 to 30 cm. high, with densely leafy stems; flowers slender-stalked, clustered at the ends of the branches; stamens 10; fruit a small capsule.

Corolla deep rose, bell-shaped, open; sepals obtuse . . . . . **1. P. empetriformis.**
Corolla yellowish white, urn-shaped, contracted at the mouth; sepals acute. **2. P. glanduliflora.**

1. **Phyllodoce empetriformis** (Smith) Don. RED HEATHER. Frequent and often abundant in meadows above timber line. Alaska to Calif., Colo., and Alta. (*Bryanthus empetriformis* A. Gray.)—Leaves evergreen, 5 to 12 mm. long, sessile, grooved on both sides; corolla 6 to 8 mm. long.

The daintiness and beautiful color of the flowers make this one of the finest plants of the park. Great patches are a conspicuous feature of alpine meadows, and the flowers last for some time. In some meadows the red heather is more abundant, and in others the white heather. The seed capsules are deep red, and they are covered with beautiful golden resin dots. The European heathers (species of *Erica*) are similar in appearance to this plant, and they belong to the same family, but none of the true heathers are natives of North America.

2. **Phyllodoce glanduliflora** (Hook.) Coville. WHITE HEATHER. Common in meadows above timber line. Alaska to Wash., Wyo., and Alta. (*Bryanthus glanduliflorus* A. Gray.)—Leaves 4 to 8 mm. long; corolla about 8 mm. long; flower stalks sticky with fine gland-tipped hairs.

This is a far less handsome plant than the red heather, and the flowers are much less conspicuous. It is abundant at Sexton Glacier and elsewhere, but at Iceberg Lake and in some other similar localities it is rare or absent.

3. LEDUM L.

1. **Ledum glandulosum** Nutt. LABRADOR TEA. Common in woods about Belton. B. C. to Calif., Utah, and Alta.—Shrub, 0.3 to 1 meter high, nearly glabrous; leaves elliptic or oval, 1.5 to 3 cm. long, green on the upper side, paler and resinous beneath; flowers white, in clusters at the ends of the stems, slender-stalked; petals 5, 5 to 7 mm. long; fruit a 5-celled capsule, 4 to 5 mm. long.

4. MENZIESIA Smith.

1. **Menziesia glabella** A. Gray. MENZIESIA. Common in all the wooded portions of the park; usually in woods; a characteristic shrub of timber line, among stunted pines and firs. B. C. to Oreg., Wyo., and Alta.—Slender shrub, 0.6 to 2 meters high, often forming thickets; leaves thin, pale green, elliptic or obovate, 3 to 6 cm. long, entire, nearly glabrous; flowers in clusters at the ends of the old branches; corolla about 8 mm. long, urn-shaped, greenish yellow, tinged with bronze; capsule 4-celled.

The flowers are inconspicuous.

5. GAULTHERIA L.

1. **Gaultheria humifusa** (Graham) Rydb. CREEPING WINTERGREEN. Occasional in meadows above timber line; Iceberg Lake; Granite Park; Sexton Glacier. B. C. to Calif., Colo., and Alta.—Plants small, the slender stems creeping over the ground and forming small mats; leaves 1 to 2 cm. long, finely toothed or entire, dark green; corolla bell-shaped, white, 3 mm. long; fruit small, red.

The wintergreen or checkerberry (*Gaultheria procumbens* L.), from which wintergreen oil is obtained, is a closely related but larger plant of the Eastern States.

6. ARCTOSTAPHYLOS Adans.

1. **Arctostaphylos uva-ursi** (L.) Spreng. BEARBERRY. Abundant at low and middle altitudes, in woods or on open slopes. Alaska to Calif., N. Mex., N. J., and Lab.—Prostrate glabrous shrub; leaves obovate, very thick, 1 to 3 cm. long, nearly sessile, evergreen, entire; flowers white or pink, in small clusters; fruit bright red, 6 to 10 mm. in diameter.

Known also as kinnikinnick. On steep open slopes the plants form great slippery carpets over which it is difficult to climb. The fruit is very handsome; it ripens in late summer. The plants of the west slope seem to bear more abundant and larger fruit than those found on the east side of the park. The branches are used in the West for Christmas greens, and they make excellent camp beds. The fruit is mealy and flavorless. It was gathered for food by the Blackfoot Indians, and was eaten raw, or mashed in fat and fried. The dried leaves were smoked like tobacco.

66. VACCINIACEAE. Blueberry Family.

1. VACCINIUM L.

Slender shrubs; leaves alternate, deciduous, finely toothed or entire; flowers solitary in the leaf axils or in racemes; calyx lobes 4 or 5; corolla urn-shaped or bell-shaped, with 5 or 4 short lobes; stamens 10 or 8, the anthers usually with 2 awns on the back; fruit juicy, with small seeds.—The name huckleberry is often applied to plants of this genus (generally in the Rocky Mountains), but that name is better reserved for species of the genus *Gaylussacia*, none of which are found in the West.

Leaves very hairy, especially beneath; flowers in short racemes; anthers without awns; leaves entire . . . . . **1. V. canadense.**

Leaves glabrous; flowers solitary in the leaf axils; anthers with 2 awns on the back; leaves finely toothed.

Leaves obovate or oblanceolate, obtuse; young branches reddish or brownish, not angled . . . . . **2. V. caespitosum.**

Leaves lanceolate to ovate, rarely obovate but then acute; young branches green, angled.

Leaves mostly 3 to 6 cm. long; plants usually 0.6 to 1 meter high. **3. V. membranaceum.**

Leaves 2.5 cm. long or usually much shorter; plants 15 to 40 cm. high.

Fruit blue or bluish black; leaves broadly ovate or rounded-ovate; plants loosely branched . . . . . **4. V. myrtillus.**

Fruit wine-red; leaves lanceolate or lance-ovate; plants with dense erect branches . . . . . **5. V. scoparium.**

1. Vaccinium canadense Richards. CANADA BLUEBERRY. Rather common in dense flat-woods about Belton. Mont. to Ill., N. J., and Newf. (*Cyanococcus canadensis* Rydb.)—Slender shrub, 30 to 60 cm. high; leaves lanceolate or ovate, 2 to 4 cm. long, acute; corolla white or pinkish, 4 mm. long; fruit about 5 mm. in diameter, black, with a dense pale bloom.

This is apparently the most western station known for the species. The fruit is sweet and rather insipid.

2. Vaccinium caespitosum Michx. Common at low altitudes, rarely found at middle elevations, mostly on dry open slopes or even on prairie or in thin woods, occasionally in deep moist woods. B. C. to Colo., N. H., and Lab.—Densely branched shrub, 10 to 40 cm. high; leaves 2 to 5 cm. long, finely toothed, wedge-shaped at the base; corolla white or pink, 4 to 5 mm. long; fruit at first wine-red, becoming dark blue, with a pale bloom.

The fruit is sweet and insipid; it is too small and not sufficiently abundant to be edible. In 1919 very few of the plants bore fruit. The plants often form dense carpets on open slopes, and they are conspicuous in late summer when the leaves turn red or purplish. Rydberg states that the plant is alpine or subalpine, and while this is true in some regions, it is far from being the case in Glacier Park. Here the plant grows in the Transition and in the lower part of the Canadian Zone.

3. Vaccinium membranaceum Dougl. TALL WHORTLEBERRY. Common and often abundant at middle altitudes and about timber line, in thin or dense woods, sometimes on open slopes. B. C. to Calif., Wyo., and Mich. (*V. globulare* Rydb.)—Much-branched shrub, usually about 60 cm. high; leaves thin, nearly sessile, finely toothed, acute or obtuse; flowers slender-stalked; corolla 5 to 6 mm. long, white or pale pink. fruit commonly 8 to 10 mm. in diameter.

This is the only whortleberry of the region whose fruit is of importance; in many places the plants are abundant and the fruit can be gathered in quantity. The fruit is of excellent quality; indeed it is doubtful if it is surpassed by that of any other species. It is rather tart and very juicy and the seeds are so small as to be negligible.

It makes excellent pies and is still better when eaten fresh with sugar and cream. The fruit varies greatly in size, shape, and color; in moist woods it is larger, juicier, and more tart, while in exposed places it is small, dryer, and sweeter. Usually it is hemispheric, but frequently it is pear-shaped. Commonly the fruit is purplish black, and often it has a bloom, especially in open places. Some plants bear wine-red fruit which seems to be quite ripe. In autumn the leaves turn deep red.

4. Vaccinium myrtillus L. LOW WHORTLEBERRY. Frequent at middle altitudes, and also about Belton; usually in deep woods, but occasionally in rather open places. B. C. to N. Mex. and Alta.; also in Eur. (*V. oreophilum* Rydb.)—Usually about 30 cm. high; leaves mostly 1.5 to 2 cm. long, finely toothed, obtuse or acutish; corolla about 4 mm. long; fruit 5 to 8 mm. in diameter.

The fruit is rather tart and of good flavor, but the plants are so small that it is not easily gathered. The branching in this species is loose and open, and quite unlike the dense broomlike habit of *V. scoparium*

5. Vaccinium scoparium Leiberg. RED WHORTLEBERRY. Usually about timber line, but sometimes at middle altitudes, on open slopes or in thin or dense woods. B. C. to Calif., N. Mex., and Alta.—Plants usually 20 to 30 cm. high, with dense, mostly erect, broomlike branches; leaves acute, usually 1 to 1.5 cm. long, finely toothed, pale green; corolla 3 mm. long, pink; fruit 4 to 5 mm. in diameter.

The fruit is of good flavor, but it is too small to be edible.

67. PRIMULACEAE. Primrose Family.

Annual or perennial herbs; leaves basal, entire or toothed; sepals 4 or 5, partially united; corolla 4 or 5-lobed; stamens as many as the calyx lobes and alternate with them; fruit a 1-celled capsule.

Corolla small (3 to 4 mm. long), white, the lobes erect or spreading; stamens distinct, included . . . . . **1. ANDROSACE.**
Corolla large (about 10 mm. long), rose-purple, the lobes reflexed; stamens united by their anthers, standing above the corolla . . . . . **2. DODECATHEON.**

1. ANDROSACE L.

Small annuals; leaves in a basal rosette, entire or toothed; flowers slender-stalked, in umbels.

Stems glabrous . . . . . **1. A. subumbellata.**
Stems minutely hairy . . . . . **2. A. puberulenta.**

1. Androsace subumbellata (A. Nels.) Small. Occasional above timber line, in meadows or on moist rocky slopes. B. C. to Ariz. and N. Mex.—Plants much branched from the base, 4 to 7 cm. high; leaves oblanceolate, 1 to 2 cm. long, acute; umbels short-stalked or sessile; corolla 3 to 4 mm. long.

2. Androsace puberulenta Rydb. Frequent on the east slope at low altitudes, in low meadows or on dry rocky slopes. Yukon to Ariz. and N. Mex.—Plants 5 to 20 cm. high, with numerous flower stems; leaves oblanceolate, 1 to 3 cm. long; umbels long-stalked; corolla about as long as the calyx.

2. DODECATHEON L.

Perennials; leaves in basal rosettes, entire or nearly so; flowers in long-stalked umbels, nodding; capsule cylindric.

Leaves finely pubescent . . . . . **1. D. cusickii.**
Leaves glabrous . . . . . **2. D. pauciflorum.**

1. Dodecatheon cusickii Greene. East entrance, *Mrs. Otto Thompson.* B. C. and Wash. to Mont. and Alta.—Leaves 3 to 7 cm. long, oblong or oblanceolate, obtuse; flowers few, purple, with yellow throat; capsule 8 mm. long.

2. Dodecatheon pauciflorum (Durand) Greene. SHOOTING-STAR. Frequent at nearly all altitudes, but most common above timber line, in moist woods, bogs, or meadows. B. C. and Wash. to Colo. and Sask.—Glabrous perennial, 10 to 40 cm. high; leaves oblanceolate, 3 to 10 cm. long, pale green, entire, obtuse; flowers few or numerous; corolla lobes about 1 cm. long; anthers 4 to 5 mm. long, purple, the filaments yellow; capsule 10 to 15 mm. long.

A handsome plant, often conspicuous in alpine meadows. The flowers last only a short time.

68. GENTIANACEAE. Gentian Family.

1. GENTIANA L. GENTIAN.

Annual or perennial herbs; leaves opposite, entire, sessile; flowers in the leaf axils or clustered at the ends of the stems; calyx 4 or 5-lobed; corolla usually funnel-shaped, 5-lobed; fruit a 1-celled capsule.

Corolla 2 cm. long or shorter.
- Corolla lobes obtuse . . . . . **1. G. glauca.**
- Corolla lobes acute.
  - Corolla with a fringed crown in the throat . . . . . **2. G. acuta.**
  - Corolla without a crown in the throat . . . . . **3. G. propinqua.**

Corolla 2.5 to 4 cm. long.
- Leaves linear, lanceolate, or oblong; corolla 2.5 to 3 cm. long; calyx lobes linear or linear-lanceolate . . . . . **4. G. affinis.**
- Leaves usually very broadly ovate; corolla commonly 3.5 to 4 cm. long; calyx lobes oval to oblong . . . . . **5. G. calycosa.**

1. Gentiana glauca Pall. Reported from Sperry Glacier by Jones. Alaska, B. C., and Mont.; also in Asia. (*Dasystephana glauca* Rydb.)—Perennial, 2 to 10 cm. high, glabrous, with a rosette of basal leaves; stem leaves 2 or 3 pairs, oval or obovate, 1 cm. long; corolla blue, 12 to 18 mm. long.

2. Gentiana acuta Michx. NORTHERN GENTIAN. Occasional at low altitudes, in wet thickets or woods or in bogs, sometimes on slopes above timber line. Alaska to Calif., N. Mex., Me., and Lab.; also in Eur. and Asia. (*Amarella scopulorum* Greene.)—Annual; stems slender, glabrous, 15 to 30 cm. high, simple, leafy; leaves oblong or lanceolate, 1 to 3 cm. long, acute or obtuse; corolla pale blue or lavender.

3. Gentiana propinqua Richards. Piegan Pass, on open rocky slope. Alaska, B. C., Mont., and Alta.; also in Asia. (*Amarella propinqua* Greene.)—Annual, 3 to 15 cm. high, glabrous, commonly 1-flowered; stem leaves lanceolate or ovate, 5 to 12 mm. long; corolla pale blue, 1 to 1.5 cm. long.

4. Gentiana affinis Griseb. PRAIRIE GENTIAN. Low places on prairie at east entrance. B. C. to Colo. and Sask. (*Dasystephana affinis* Rydb.)—Plants usually tufted, 10 to 30 cm. high, glabrous; leaves 2 to 4 cm. long, acute or obtuse; corolla blue, with a narrow tube.

5. Gentiana calycosa Griseb. BLUE GENTIAN. Common in meadows above timber line; occasionally found in moist places at middle altitudes. Wash. to Calif., Wyo., and Mont. (*Dasystephana calycosa* Rydb.; *D. obtusiloba* Rydb.)—Stems 10 to 30 cm. high, glabrous, often in small clumps; leaves 1 to 3 cm. long, obtuse or acutish at the apex; flowers 1 or few, deep blue.

One of the finest flowers of the park, frequently very abundant in alpine meadows. The flowers last a long time, and the first ones appear in early summer. Dwarfed plants sometimes have corollas only 3 cm. long or even shorter. All our material belongs to *Dasystephana obtusiloba* Rydb., the type of which came from the Sperry Glacier region, but there seem to be no important differences between this form and *Gentiana calycosa*.

69. MENYANTHACEAE. Buckbean Family.

1. MENYANTHES L.

1. Menyanthes trifoliata L. BUCKBEAN. Frequent in sphagnum bogs on the west slope. Alaska to Calif., Colo., Pa., and Lab.—Glabrous perennial with thick rootstocks; leaves basal, long-petioled, with 3 leaflets, these oval or elliptic, 5 to 10 cm. long, entire, fleshy; flower stalk 10 to 30 cm. high, the flowers in racemes; corolla white or pinkish, 1.5 cm. long, 5-lobed, bearded within; fruit a capsule.

The thick fleshy rootstocks sometimes lie upon the surface of the sphagnum.

70. APOCYNACEAE. Dogbane Family.

1. APOCYNUM L. DOGBANE.

Perennial herbs with milky juice and forking stems; leaves opposite, entire, short-petioled; flowers in cymes; sepals 5; corolla bell-shaped, 5-lobed; stamens 5; fruit of 2 long slender pods.—The leaves turn yellow in autumn. The plants are sometimes known as Indian hemp. Their stems contain a tough fiber, from which the Indians made rope, twine, etc. The Blackfoot Indians used a decoction of the root as a laxative; they employed the decoction also as a wash for the hair, to prevent its falling.

Corolla less than twice as long as the calyx, greenish white, the lobes erect. . . . . 1. A. cannabinum.

Corolla more than twice as long as the calyx, white striped with pink, the lobes spreading.

Leaves glabrous . . . . . 2. A. ambigens.

Leaves more or less hairy beneath . . . . . 3. A. pumilum.

1. Apocynum cannabinum L. COMMON DOGBANE. Rocky river banks at Belton, forming large patches. Widely distributed in N. Amer.—Stems purplish, 0.5 to 1 meter high, glabrous; leaves oblong or lance-oblong, 5 to 10 cm. long, glabrous; corolla 3 to 5 mm. long.

2. Apocynum ambigens Greene. PINK DOGBANE. Frequent at low and middle altitudes, on dry open slopes; often on talus slopes. Wash. to N. Mex. and S. Dak.—Plants 20 to 60 cm. high, with pale stems, often much branched; leaves ovate to rounded, 2 to 6 cm. long, green above, pale beneath, acute to rounded at the apex; corolla 5 mm. long, pale pink, with dark pink stripes inside, sweet-scented.

A handsome plant, often loaded with the delicately colored bell-shaped flowers.

3. Apocynum pumilum (A. Gray) Greene. Occasional at low altitudes, on open slopes or in thin woods. Wash. to Calif., Utah, and Mont.—Similar to *A. ambigens*, differing only in the pubescent leaves; pods 8 to 14 cm. long.

This is doubtfully distinct from *A. ambigens*, and it is probable that both are merely forms of *A. androsaemifolium* L.

71. ASCLEPIADACEAE. Milkweed Family.

1. ASCLEPIAS L.

1. Asclepias speciosa Torr. MILKWEED. Prairie and open hillsides about the east entrance. B. C. to Calif., Kans., and Minn.—Coarse perennial, 0.5 to 1 meter high, somewhat woolly, with milky juice; leaves large, oval, sessile, opposite, entire; flowers purplish pink, 1 to 1.5 cm. long, showy, in umbels; fruit a large pod, 7 to 10 cm. long, the numerous seeds each tipped with a tuft of long silky white hairs.

The young sprouts of some of the closely similar species of milkweed in the Eastern States are cooked like asparagus. There is a popular belief that the milky juice will destroy warts.

72. CONVOLVULACEAE. Morning-glory Family.

1. CONVOLVULUS L.

1. **Convolvulus arvensis** L. BINDWEED. Reported from Belton by Jones. Native of Eur.; naturalized as a weed in N. Amer.—Slender prostrate perennial, glabrous or nearly so; leaves oblong, 1 to 5 cm. long, obtuse, entire, but with a lobe on each side at the base; flowers solitary in the leaf axils; corolla 1.5 to 2 cm. long, funnel-shaped, white or pink; fruit a capsule.

73. POLEMONIACEAE. Phlox Family.

Annual or perennial herbs; leaves opposite or alternate, entire, lobed, or pinnate; sepals 5, partly united; corolla 5-lobed; stamens 5, attached to the corolla tube; fruit a 3-celled capsule.

Leaves pinnate or deeply lobed.
  Leaves pinnate, with rounded leaflets; plants perennial; flowers blue. **1. POLEMONIUM.**
  Leaves divided into linear or threadlike lobes; plants annual; flowers white.
    Flowers sessile; lobes of leaves stiff, with spiny tips . . . **2. NAVARRETIA.**
    Flowers slender-stalked; lobes of leaves thin, not spiny-tipped. **6. LINANTHUS.**
Leaves entire.
  Plants perennial, forming dense mats or tufts; corolla white, 1 to 1.5 cm. broad. **3. PHLOX.**
  Plants annual, not tufted; corolla pink or purplish, much less than 1 cm. broad.
    Leaves alternate . . . . . **4. COLLOMIA.**
    Leaves, except the uppermost, opposite . . . . . **5. MICROSTERIS.**

1. POLEMONIUM L.

Perennials, more or less hairy; flowers in loose or dense clusters, blue.

Leaflets opposite, not sticky; corolla 7 to 9 mm. long . . . . . **1. P. parvifolium.**
Leaflets whorled, very sticky; corolla 15 to 20 mm. long. . . . . **2. P. viscosum.**

1. **Polemonium parvifolium** Nutt. JACOB'S-LADDER. Common at nearly all altitudes, at least on the east slope, in woods, thickets, or meadows, or on open slopes. Alta. to Wyo.—Plants 10 to 30 cm. high, usually in dense clumps; leaflets 11 to 25 or more, 2 to 10 mm. long.

2. **Polemonium viscosum** Nutt. SKUNK-PLANT. Common on rock slides above timber line; sometimes found on moist rocky slopes near snow banks at middle altitudes. Alta. to Wyo. and Utah.—Plants 5 to 10 cm. high, forming dense clumps, extremely viscid; leaflets numerous, 1 to 4 mm. long; flowers in a dense sticky cluster.

The plant has a heavy odor, which strongly suggests a skunk; because of its stickiness it is unpleasant to handle. The withered corollas often persist for some time.

2. NAVARRETIA Ruiz & Pav.

1. **Navarretia minima** Nutt. PINCUSHION PLANT. About dried-up pools on prairie at east entrance. Wash. to Calif., Ariz., and Nebr.—Plants annual, 1 to 4 cm. high, each one forming dense rounded mass; leaves divided into numerous slender stiff sharp-pointed lobes; flowers crowded at the ends of the stems; corolla white, 7 mm. long.

An inconspicuous little plant. Upon trying to pull up the plants, one finds the leaf lobes as prickly as pin points.

3. PHLOX L. Phlox.

Low matted perennials; leaves narrow, entire; flowers white or bluish, with a slender tube, mostly solitary and sessile at the ends of the branches.—The various kinds of cultivated phlox belong to this genus.

Leaves awl-shaped, less than 2 mm. wide, with cobwebby hairs; corolla 8 to 10 mm. long . . . . . 1. **P. hoodii.**

Leaves linear or oblong, 2 to 4 mm. wide, without cobwebby hairs except sometimes at the base; corolla 15 to 18 mm. long . . . . . 2. **P. alyssifolia.**

1. **Phlox hoodii** Richards. Dry exposed rocky slopes near the foot of Lake McDermott and on shale slides at east entrance. Yukon to Wyo. and Nebr.—Plants 5 cm. high or less; leaves 4 to 10 mm. long; corolla white, the tube scarcely longer than the calyx.

The plants flower in spring.

2. **Phlox alyssifolia** Greene. Occasional on the east slope at low altitudes, on dry rocky slopes. Mont. to Utah, Colo., and S. Dak.—Plants 3 to 6 cm. high; leaves 5 to 15 mm. long, acute; corolla bluish white, the tube longer than the calyx.

This, too, blooms in spring, but, as in *P. hoodii*, the shriveled corollas often persist in fruit.

4. COLLOMIA Nutt.

1. **Collomia linearis** Nutt. Occasional at low and middle altitudes, on open slopes, in woods, or on gravel beds along streams. B. C. to Calif., N. Mex., and Minn.—Annual, 10 to 30 cm. high, simple or with few branches, finely hairy; leaves linear-lanceolate, 2 to 5 cm. long, the upper ones broader and often pale at the base; flowers in dense leafy clusters at the ends of the stems; corolla trumpet-shaped, about 1 cm. long, pinkish.

The flowers are inconspicuous and unattractive.

5. MICROSTERIS Greene.

1. **Microsteris gracilis** (Dougl.) Greene. Occasional at low or sometimes at middle altitudes, on dry open slopes. B. C. to Calif., Colo., and Mont. (*Gilia gracilis* Hook.)—Branched annual, 10 to 40 cm. high, with fine gland-tipped hairs, at least above; leaves mostly linear, 2 to 6 cm. long; flowers in the leaf axils; corolla 8 to 12 mm. long, purplish, almost tubular.

6. LINANTHUS Benth.

1. **Linanthus harknessii** (Curran) Greene. East entrance, in fields, *Umbach*. B. C. to Calif., Colo., and Mont. (*Gilia harknessii* Curran.)—Very slender glabrous annual, 5 to 25 cm. high, branched; leaves 3 or 5-lobed to the base, the lobes narrowly linear; corolla white, 3 to 4 mm. long.

74. HYDROPHYLLACEAE. Waterleaf Family.

Annual or perennial herbs; leaves alternate or opposite, without stipules; flowers mostly in 1-sided racemes or cymes, sometimes solitary in the axils; calyx of 5 united sepals; corolla 5-lobed; fruit a 1 or 2-celled capsule.

Plants glabrous; leaves kidney-shaped, 1 to 3 cm. broad, with 5 to 9 short rounded lobes . . . . . 1. **ROMANZOFFIA.**

Plants conspicuously hairy; leaves various but never kidney-shaped, pinnately lobed or sometimes entire.

Stamens shorter than the corolla and included in it; plants annual; flowers solitary. 2. **NEMOPHILA.**

Stamens exserted from the corolla; plants perennial; flowers in cymes.
Flowers blue or purple . . . . . 4. **PHACELIA.**
Flowers white.
Leaves, at least most of them, entire, the lowest ones sometimes pinnate. **4. PHACELIA.**
Leaves deeply lobed. . . . . 3. **HYDROPHYLLUM.**

1. ROMANZOFFIA Cham.

1. Romanzoffia sitchensis Bong. MISTMAIDEN. Frequent above timber line, on wet cliffs; occasionally found on wet rocks at lower altitudes. Alaska to Calif. and Mont.—Plants with bulblike bases; leaves basal, slender-petioled, 1 to 3 cm. broad; flower stems slender, 5 to 15 cm. long, often prostrate, few-flowered; corolla white or tinged with pink, 7 to 10 mm. long; capsule longer than the calyx.

A handsome, delicate plant, closely resembling some of the saxifrages.

2. NEMOPHILA Nutt.

1. Nemophila breviflora A. Gray. Collected by Holzinger, somewhere between Lake McDonald and Sperry Glacier. B. C. to Oreg., Colo., and Mont.—Annual, branched, 10 to 30 cm. high; leaves lobed, the lobes oblong-lanceolate, 5 to 15 mm. long, entire; corolla 2 to 3 mm. long, whitish, shorter than the calyx.

3. HYDROPHYLLUM L.

1. Hydrophyllum capitatum Dougl. WATERLEAF. Woods at east entrance *Umbach*. B. C. to Calif., Colo., and Mont.—Stems 10 to 20 cm. high, finely hairy; leaves with 5 or 7 obovate lobes, these 2 to 5 cm. long, lobed; corolla 7 to 8 mm. long.

4. PHACELIA Juss. PHACELIA.

Hairy perennials; flowers in 1-sided racemes or cymes; corolla bell-shaped, the stamens exserted.

Leaves entire; corolla white . . . . . 1. **P. leucophylla.**
Leaves lobed; corolla purplish blue.
Leaves lobed about halfway to the midrib, green, nearly glabrous, the lobes broad . . . . . 2. **P. lyallii.**
Leaves lobed to the midrib, gray-silky, the lobes linear or oblong . . 3. **P. sericea.**

1. Phacelia leucophylla Torr. WHITE PHACELIA. Common at nearly all altitudes, in thin woods or on open slopes, but most abundant above timber line, especially on rock slides. B. C. to Colo. and Nebr.—Stems 10 to 30 cm. high, usually in clumps; leaves oblanceolate or elliptic, 5 to 12 cm. long, acute, with conspicuous veins, covered with stiff grayish hairs; corolla about 6 mm. long, dirty white; calyx covered with stiff bristle-like hairs.

The stiff hairs penetrate the skin easily.

2. Phacelia lyallii (A. Gray) Rydb. BLUE PHACELIA. PLATE 50, B. Common above timber line, especially on rock slides. B. C., Idaho, and Mont.—Plants 10 to 20 cm. high, usually in dense clumps, green; corolla about 5 mm. long.

A very showy plant, which remains in flower a long time; it flowers rather late in the season. One plant found at Sexton Glacier had white flowers.

3. Phacelia sericea (Graham) A. Gray. SILKY PHACELIA. Frequent, at least on the east slope; chiefly at middle altitudes, but sometimes above timber line or at low elevations, on open rocky slopes. B. C. to Nev., Colo., and Alta.—Plants 10 to 30 cm. high, grayish; inflorescence narrow, dense, and spikelike; corolla 5 to 6 mm. long.

This blooms earlier than *P. lyallii*, with which it occasionally grows, and it is only rarely that both are found in flower in the same locality.

75. BORAGINACEAE. Borage Family.

Annual or perennial herbs, the pubescence often of stiff bristle-like hairs; leaves alternate or opposite, entire; flowers regular, in 1-sided racemes or spikes, these variously arranged; calyx of 5 partly united sepals; corolla 5-lobed; stamens 5, attached to the corolla tube; fruit of 4 nutlets, inserted on a receptacle.

Nutlets with hooked prickles, at least on the margins . . . . . **1. LAPPULA.**
Nutlets unarmed, or rarely with straight prickles.
Corolla blue.
Plants glabrous or nearly so; corolla about 1 cm. long . . . . **2. MERTENSIA.**
Plants very hairy; corolla much less than 1 cm. long.
Plants densely tufted, 2 to 8 cm. high, white-hairy; corolla 7 to 9 mm. wide. **3. ERITRICHUM.**
Plants not densely tufted, 10 to 30 cm. high, not white-hairy; corolla 4 to 6 mm. wide . . . . . **4. MYOSOTIS.**
Corolla white or yellow.
Corolla yellow.
Plants covered with stiff sharp bristle-like hairs, biennial, with slender roots, never forming tufts; receptacle conical . . . . . **5. AMSINCKIA.**
Plants with short, mostly appressed hairs, perennial, with thick roots, usually forming dense tufts; receptacle flat . . . . . **6. LITHOSPERMUM.**
Corolla white.
Pedicels in fruit falling off with the closed calyx . . . . **7. CRYPTANTHA.**
Pedicels and calyx not falling in fruit.
Plants perennial, stout, 15 to 30 cm. high; calyx lobes open in fruit; leaves alternate . . . . . **8. OREOCARYA.**
Plants annual, slender, usually less than 15 cm. high; calyx lobes nearly closed in fruit; leaves mostly opposite . . . . . **9. ALLOCARYA.**

1. LAPPULA Moench.

Annuals or perennials; leaves alternate, narrow; flowers blue, in one-sided racemes; corolla with very short tube; nutlets with barbed prickles along the edge and sometimes also on the back.

Racemes with leafy bracts only at the base; plants perennial; corolla 4 to 10 mm. broad.
Corolla 8 to 10 mm. broad; nutlets with a few prickles on the back . . **1. L. diffusa.**
Corolla 4 to 6 mm. broad; nutlets without prickles on the back . . **2. L. floribunda.**
Racemes with small leaflike bracts along the whole length; plants annual; corolla 2 mm. wide or less.
Nutlets with a single row of few prickles along the edge . . . . . **3. L. occidentalis.**
Nutlets with a double row of very numerous prickles along the edge. **4. L. echinata.**

1. Lappula diffusa (Lehm.) Greene. BUR FORGET-ME-NOT. Common at nearly all altitudes, but most abundant near or above timber line, in moist woods or thickets, in meadows, and on open slopes and rock slides. B. C. to Calif., Utah, and Alta.—Plants rough-hairy, 50 to 80 cm. high; lowest leaves oblanceolate, 5 to 20 cm. long, the stem leaves lanceolate or oblong, smaller; fruit 6 to 7 mm. wide, rough on the back and prickly.

A handsome plant with very numerous pale blue flowers which resemble those of the common forget-me-not. It blooms soon after the snow melts, and often forms large dense patches.

2. Lappula floribunda (Lehm.) Greene. Occasional on the east slope at high or low altitudes, on open slopes or in moist woods. B. C. to Calif., N. Mex., and Man.—**Similar to *L. diffusa*,** except for the smaller flowers.

3. Lappula occidentalis (S. Wats.) Greene. STICKSEED. Occasional on the east slope at low altitudes, on flats or open slopes. Wash. to N. Mex., Mo., and Sask.—Plants simple or branched, hairy, 15 to 60 cm. high; leaves spatulate, oblong, or linear, 1 to 4 cm. long; corolla bright blue; fruit 3 mm. wide.

The barbed prickles of this, as well as of the other species, enable the nutlets to adhere readily to clothing.

4. Lappula echinata Gilib. Dry slope near Many Glacier Hotel; along railroad at Belton, frequent. Native of Eur.; naturalized as a weed in N. Amer.—Stems 30 to 60 cm. high, hairy, branched above; leaves mostly linear and sessile, 1 to 3 cm. long; fruit 3 mm. broad.

This species is not listed from the Rocky Mountains by Rydberg, but it is well established at Belton.

2. MERTENSIA Roth.

1. Mertensia lanceolata (Pursh) DC. BLUEBELLS. East entrance, on dry open slopes. B. C. to Colo. and N. Dak.—Perennial; stems clustered, 15 to 40 cm. high, glabrous; leaves alternate, entire, lanceolate or oblong, 3 to 10 cm. long, glabrous or rough-hairy on the upper surface; flowers in small panicles; corolla blue, funnel-shaped, with a thick tube.

3. ERITRICHUM Schrad.

1. Eritrichum howardi (A. Gray) Rydb. ALPINE FORGET-ME-NOT. Reported by Jones from Brown Pass. Wash. to Mont. and Wyo.—Densely tufted perennial, covered with appressed white hairs; leaves linear-oblanceolate, mostly basal; flowers blue, in short racemes; corolla 7 to 9 mm. broad.

4. MYOSOTIS L.

1. Myosotis alpestris Schmidt. FORGET-ME-NOT. Occasional above timber line, in meadows or on rock slides. Alaska to Colo.; also in Eur. and Asia.—Plants perennial, 10 to 30 cm. high, hairy; leaves oblanceolate, 3 to 6 cm. long, flowers in one-sided racemes, intense blue, 4 to 6 mm. wide; nutlets smooth.

A beautiful plant, closely related to the cultivated forget-me-not.

5. AMSINCKIA Lehm.

1. Amsinckia barbata Greene. FIDDLENECK. Dry open slopes at east entrance, perhaps introduced. B. C., Idaho, and Mont.—Annual, 20 to 40 cm. high, branched, covered with bristly yellowish hairs; leaves lanceolate to linear-oblong, 3 to 5 cm. long, alternate; flowers in long one-sided racemes; corolla bright yellow, 5 mm. long.

The hairs are so stiff and sharp that they penetrate the skin easily.

6. LITHOSPERMUM L.

1. Lithospermum ruderale Lehm. PUCCOON. Common on the east slope at low altitudes, on prairie or open hillsides. B. C. to Nev., Colo., and Alta. (*L. lanceolatum* Rydb.)—Perennial, 25 to 50 cm. high, the stems forming dense clumps, hairy; leaves alternate, linear or lanceolate, 3 to 10 cm. long; flowers in leafy spikes; corolla about 1 cm. long, greenish yellow.

The flowers appear early in the season. The nutlets are pale, shining, and very hard.

7. CRYPTANTHA Lehm.

1. Cryptantha affinis (A. Gray) Greene. East entrance, along railroad, *Umbach*. Wash. to Calif., Utah, and Mont.—Annual, 10 to 30 cm. high, hairy, branched; leaves linear, 2 to 3 cm. long; flowers in one-sided racemes; corolla white, about 1.5 mm. wide.

8. OREOCARYA Greene.

1. Oreocarya glomerata (Pursh) Greene. Occasional on the east slope at low altitudes, on prairie or dry open slopes or flats. B. C. to Utah and Nebr.—Perennial, 15 to 30 cm. high, very hairy, grayish, stout; leaves alternate, the basal ones spatulate, 2 to 6 cm. long, obtuse; inflorescence long, narrow, leafy; corolla white, 5 to 8 mm. wide; nutlets narrow, acute, slightly roughened on the back.

The plant is so densely covered with stiff sharp hairs that it is almost as unpleasant to handle as a nettle.

9. ALLOCARYA Greene.

Annuals, much branched; lowest leaves opposite, the others alternate, linear; flowers very small, in one-sided racemes, leafy-bracted; corolla white.

Plants covered with short stiff hairs . . . . . **1. A. californica.**
Plants nearly glabrous, with only a few inconspicuous hairs . . . . **2. A. orthocarpa.**

1. Allocarya californica (Fisch. & Mey.) Greene. East entrance, in wet open ground and about dried-up pools on prairie. Wash. to Calif., N. Mex., and N. Dak. (*A. scopulorum* Greene.)—Plants slender, much branched from the base, spreading; leaves 1.5 to 4 cm. long.

2. Allocarya orthocarpa Greene. Wet ground at east entrance, *Umbach*. Mont. to Utah and Wyo.—Plants green, loosely branched; leaves 2 to 5 cm. long.

The specimens are immature and the determination is not certain.

76. VERBENACEAE. Vervain Family.

1. VERBENA L. Vervain.

The cultivated verbenas belong to this genus.

1. Verbena bracteosa Michx. Carpet vervain. Along the railroad near Belton, probably introduced. B. C. to Calif., Ill., and Fla.—Prostrate hairy plant; leaves opposite, deeply lobed; flowers purplish, small, in dense spikes; corolla 5-lobed; fruit of 4 small nutlets in the bottom of the calyx.

An inconspicuous weed.

77. MENTHACEAE. Mint Family.

Annual or perennial herbs, often with a strong odor; stems 4-angled; leaves opposite, toothed; corolla usually very irregular and 2-lipped; stamens 4 or 2; fruit consisting of 4 small nutlets in the bottom of the calyx.

Flowers in small dense clusters in the axils of the leaves; corolla not 2-lipped, 4 or 5-toothed.
  Anther-bearing stamens 2; plants glabrous or nearly so . . . . . **1. LYCOPUS.**
  Anther-bearing stamens 4; plants finely hairy . . . . . **2. MENTHA.**
Flowers all or mostly in spikes or heads at the ends of the branches; corolla 2-lipped.
  Anther-bearing stamens 2; flowers 2 to 2.5 cm. long, in long-stalked heads. **3. MONARDA.**
  Anther-bearing stamens 4; flowers 1.5 cm. long or less, mostly in spikes.
    Calyx lobes very unequal, 3 of them broad and large and 2 narrow and small; flowers purple . . . . . **4. PRUNELLA.**
    Calyx lobes not very unequal or, if so, one of the teeth longer than the other 4; flowers white, pink, or pale blue.
      Plants glabrous or nearly so; one of the calyx lobes larger than the other 4; corolla pale blue, only slightly longer than the calyx. **5. MOLDAVICA.**

Plants conspicuously hairy; calyx lobes nearly alike in size; corolla white or pink, much longer than the calyx.

Plants pale with a covering of soft whitish matted hairs; leaves with rounded teeth; calyx 15-ribbed . . . . . **6. NEPETA.**

Plants green, covered with spreading hairs; leaves with sharp teeth; calyx 5 to 10-ribbed . . . . . **7. STACHYS.**

1. LYCOPUS L. Water horehound.

Perennials, odorless, glabrous or nearly so; leaves toothed or lobed; flowers small, whitish, scarcely longer than the calyx, clustered in the axils of the leaves.

Calyx teeth mostly obtuse, shorter than the nutlets; leaves toothed.

1. L. uniflorus.

Calyx teeth very acute, longer than the nutlets; leaves lobed, at least near the base.

2. L. americanus.

1. **Lycopus uniflorus** Michx. Frequent at low altitudes on the west slope, in sphagnum bogs or swampy thickets. B. C. to Oreg., Va., and Newf. (*L. communis* Bickn.)—Plants slender, with long slender runners; rootstocks thickened and tuberlike; leaves sharply toothed, 2.5 to 6 cm. long; corolla 2 to 3 mm. long.

2. **Lycopus americanus** Muhl. Swamp at Belton, *Umbach*. B. C. to Calif., Fla., and Newf.—Stems mostly simple, 20 to 40 cm. high, often purplish below; leaves 3 to 8 cm. long, petioled.

2. MENTHA L.

1. **Mentha canadensis** L. American mint. Common at low altitudes, in low meadows or swamps or along streams. Widely distributed in N. Amer.—Plants erect or nearly prostrate, with a strong odor; leaves 2 to 5 cm. long, sharply toothed; flowers small, pink.

The species is a variable one, some of whose forms are often considered to be distinct species. The Blackfoot Indians used the leaves for making a tea and for flavoring dried meat.

3. MONARDA L.

1. **Monarda menthaefolia** Benth. Horsemint. Frequent at low altitudes, on dry open rocky slopes or in thin woods. Idaho to Utah, Tex., and Ill.—Plants 30 to 80 cm. high, finely and closely hairy; leaves ovate, short-stalked, toothed; flowers rose-colored, in large dense heads.

A showy plant, with a strong and distinctive odor.

4. PRUNELLA L.

1. **Prunella vulgaris** L. Heal-all. Common at low and middle altitudes, usually in woods or in wet thickets, along streams, etc.; sometimes in sphagnum bogs. Widely distributed in N. Amer., Eur., and Asia.—Plants 10 to 40 cm. high, usually in small clumps, nearly glabrous; leaves ovate or oblong, 3 to 8 cm. long, stalked, entire or with low rounded teeth.

A handsome plant when in full flower. Known also as self-heal or carpenter-weed.

5. MOLDAVICA Adans.

1. **Moldavica parviflora** (Nutt.) Britton. Dragonhead. At low and middle altitudes, usually along trails or in waste places; rather scarce and perhaps introduced. Alaska to Ariz. and N. Y.—Annual or biennial, 30 to 60 cm. high; leaves lanceolate or oblong, coarsely toothed, the teeth often with spinelike tips.

An inconspicuous weedy plant.

6. NEPETA L.

1. Nepeta cataria L. CATNIP. A few plants found about the head of Lake McDonald. Native of Eur.; introduced in many parts of N. Amer.—Perennial; leaves ovate or heart-shaped, grayish, 2 to 7 cm. long, stalked; flowers white or pale pink.

7. STACHYS L.

1. Stachys scopulorum Greene. HEDGE-NETTLE. About the east entrance, in low moist places. Wash. to N. Mex. and Minn.—Perennial, 30 to 60 cm. high, very hairy; leaves oblong-lanceolate, 5 to 10 cm. long, stalked; flowers pink.

78. SCROPHULARIACEAE. Figwort Family.

Annual or perennial herbs; leaves alternate or opposite, without stipules; flowers irregular; calyx of 5 or 4 more or less united sepals; corolla usually 2-lipped; stamens usually 4 or 2, a fifth sterile one (without an anther) often present, attached to the tube of the corolla; fruit a 2-celled capsule.

Plants stemless, the leaves all rising from the root . . . . . 6. **LIMOSELLA.**
Plants with leafy stems.
Leaves alternate.
Bracts at the base of the flowers tinged with red, pink, or yellow, more conspicuous than the flowers and usually nearly or fully as long. 10. **CASTILLEJA.**
Bracts green, less conspicuous and usually much shorter than the flowers.
Capsule notched at the top; corolla none; leaves with fine rounded teeth. 9. **SYNTHYRIS.**
Capsule not notched; corolla present; leaves entire, lobed, or toothed.
Stamens 5; corolla yellow or white, not 2-lipped . . . . . 1. **VERBASCUM.**
Stamens 4; corolla of various colors, 2-lipped.
Leaves toothed or lobed . . . . . 12. **PEDICULARIS.**
Leaves entire.
Plants perennial, glabrous or nearly so; corolla with a spur at the base. 2. **LINARIA.**
Plants annual, hairy; corolla not spurred . . . 11. **ORTHOCARPUS.**
Leaves opposite.
Leaves deeply lobed . . . . . 12. **PEDICULARIS.**
Leaves entire or toothed.
Calyx 4-lobed.
Flowers white or blue; capsule notched at the top . . . . . 8. **VERONICA.**
Flowers yellow; capsule not notched.
Leaves entire; calyx not large and inflated in fruit. 14. **MELAMPYRUM.**
Leaves toothed; calyx large and inflated in fruit . . 13. **RHINANTHUS.**
Calyx 5-lobed, or of 5 nearly distinct sepals.
Stamens 2; flowers less than 1 cm. long, white or yellowish white; plants of wet soil . . . . . 7. **GRATIOLA.**
Stamens 4 or 5; flowers small or large; plants of wet or dry soil.
Corolla 4 to 6 mm. long (blue); plants annual . . . . . 3. **COLLINSIA.**
Corolla 1 cm. long or larger; plants perennial.
Calyx not angled, the lobes longer than the tube; stamens 5, one of them without an anther . . . . . 4. **PENTSTEMON.**
Calyx angled, the tube longer than the lobes; stamens 4. 5. **MIMULUS.**

1. VERBASCUM L.

Biennials, more or less hairy; leaves alternate; flowers in spikes or racemes; corolla flat, only slightly irregular.

Plants densely woolly; flowers in a long dense spike . . . . . 1. **V. thapsus.**
Plants nearly glabrous; flowers in loose racemes . . . . . 2. **V. blattaria.**

1. **Verbascum thapsus** L. MULLEN. One plant seen on east slope on trail to Iceberg Lake; occasional about Lake McDonald, and up to Sperry Chalets; rather plentiful at Belton. Native of Eur.; naturalized in N. Amer.—Plants 1 to 2 meters high, with a dense covering of pale feltlike hairs; leaves spatulate or oblanceolate, 10 to 40 cm. long; spikes 10 to 50 cm. long; flowers yellow, 1 to 2 cm. wide.

2. **Verbascum blattaria** L. MOTH MULLEN. A few plants at Sun Camp and at Lewis's. Native of Eur.; naturalized in N. Amer.—Plants 30 to 80 cm. high, green; leaves oblong or obovate, 4 to 10 cm. long, coarsely toothed or lobed; flowers white or yellow, about 3 cm. broad.

2. LINARIA L.

1. **Linaria vulgaris** Mill. BUTTER-AND-EGGS. A few plants at Belton, Lewis's, and just below Sperry Chalets. Native of Eur.; naturalized in N. Amer.—Glabrous perennial, pale green, 20 to 50 cm. high; leaves alternate, linear, entire, 2 to 5 cm. long; flowers in racemes; corolla 2-lipped, 2 to 3 cm. long, pale yellow with orange throat, the tube with a spur at base; stamens 4.

The plant has a characteristic odor.

3. COLLINSIA Nutt.

1. **Collinsia parviflora** Dougl. BLUELIPS. Frequent at low and sometimes at middle altitudes, in woods or thickets or on open slopes. B. C. to Calif., Ariz., and Ont.—Branched annual, 10 to 30 cm. high, minutely hairy; leaves opposite, oblong to linear, entire or nearly so; flowers slender-stalked, in the axils of the leaves; corolla pale blue, 2-lipped, 4 to 6 mm. long.

4. PENTSTEMON Schmidel. BEARDTONGUE.

Perennials with leafy stems; leaves opposite, entire or toothed; flowers showy, in racemes or panicles; calyx deeply 5-cleft; corolla somewhat 2-lipped, with 5 lobes; fertile stamens 4, a fifth sterile one also present, this often bearded.

Corolla yellowish white . . . . . 1. **P. confertus.**
Corolla blue or purple.
  Corolla 0.8 to 2 cm. long, blue.
    Corolla 1 cm. long or shorter, with a narrow tube; calyx lobes with long slender tips . . . . . 2. **P. procerus.**
    Corolla about 1.5 cm. long, with a broad tube; calyx lobes acute or short-pointed.
      Leaves, at least most of them, finely toothed, bright green; plants with glands, at least on the calyx . . . . . 3. **P. virens.**
      Leaves all entire, glaucous; plants glabrous . . . . . 4. **P. nitidus.**
  Corolla 2.5 to 4 cm. long, pale or deep purple.
    Anthers glabrous; sterile stamen bearded . . . . . 5. **P. erianthera.**
    Anthers woolly; sterile stamen not bearded.
      Leaves rounded to oblong, 1 to 3 cm. long, most of them petioled; plants usually less than 20 cm. high . . . . . 6. **P. ellipticus.**
      Leaves linear-lanceolate, 4 to 10 cm. long, mostly sessile; plants usually 30 to 50 cm. high.
        Leaves glabrous . . . . . 7. **P. lyallii.**
        Leaves finely hairy . . . . . 8. **P. linearifolius.**

1. Pentstemon confertus Dougl. YELLOW BEARDTONGUE. Common at low altitudes, in moist woods or thickets or on open slopes or prairie; sometimes on slopes or in woods at middle altitudes, and occasionally above timber line. B. C. to Calif., Wyo., and Alta.—Plants glabrous, 15 to 50 cm. high, often forming small clumps; leaves mostly lanceolate, 3 to 10 cm. long, entire; flowers in narrow, long or short panicles; corolla 1 cm. long.

Unlike most species of the genus, this is a rather inconspicuous plant. The corolla is of a much deeper and brighter yellow when dried than when fresh.

2. Pentstemon procerus Dougl. In meadows or on prairie at east entrance. B. C. to Calif., Colo., and Sask.—Plants glabrous or nearly so, 15 to 40 cm. high; leaves 4 to 8 cm. long, oblanceolate or narrowly or broadly lanceolate, entire; flowers in narrow, short or long, dense panicles; corolla deep purplish blue.

3. Pentstemon virens Pennell. BLUE BEARDTONGUE. Frequent at low and middle altitudes, on open slopes or on prairie; occasionally in meadows above timber line. Alta. to Colo. and Nev.—Stems 10 to 30 cm. high, usually tufted; leaves ovate, lanceolate, or oblanceolate, 2 to 5 cm. long, many of them entire; corolla deep blue or purplish blue.

A very handsome plant, which remains in flower only a short time. It occurs mostly in isolated tufts, never in great abundance.

4. Pentstemon nitidus Dougl. Occasional on the east slope at low altitudes, on prairie or open hillsides. Wash. to Wyo. and S. Dak.—Stems 20 to 30 cm. high, often in clumps, stout; leaves ovate, lanceolate, or oblanceolate, 3 to 5 cm. long, thick; panicle narrow, with large rounded-ovate bracts; corolla blue.

The Blackfoot Indians used a decoction of the plant as a remedy for cramps and pains in the stomach.

5. Pentstemon erianthera Pursh. East entrance, on bluffs, *Umbach*. Wash. to Nev., Nebr., and N. Dak.—Stems 10 to 30 cm. high, stout, hairy; leaves oblanceolate or linear, 4 to 10 cm. long, finely hairy, usually toothed.

6. Pentstemon ellipticus Coult. & Fish. ALPINE BEARDTONGUE. Common above timber line, chiefly on rock slides; occasional at middle altitudes, especially near snow banks or on open rocky slopes. Alta., Mont., and Idaho.—Plants 10 to 20 cm. high, often somewhat woody at the base, forming low broad dense clumps; stems minutely hairy, the calyx with gland-tipped hairs; flowers few, purple, 3 to 3.5 cm. long.

One of the most showy plants of alpine rock slides, usually covered with large handsome flowers. The plants bloom for a long time.

7. Pentstemon lyallii A. Gray. Frequent at low and middle altitudes and sometimes near timber line, usually on open rocky slopes. B. C., Idaho, Mont., and Alta.—Stems glabrous or nearly so, usually in dense clumps; leaves finely toothed; corolla 3 to 4 cm. long, pale purple.

A showy plant, with flowers much like those of *P. ellipticus*.

8. Pentstemon linearifolius Coult. & Fish. Occasional on the east slope at low and middle altitudes, on open rocky hillsides or shale slides; sometimes on slopes above timber line. Idaho and Mont.—Stems finely hairy, in dense clumps; leaves finely toothed or entire; corolla purple to purplish pink.

Perhaps only a form of *P. lyallii;* there seems to be no marked difference between the two in size of corolla. One plant collected at Cracker Lake had white flowers.

5. MIMULUS L. MONKEYFLOWER.

Plants usually perennial, somewhat succulent; leaves opposite, shallowly toothed; flowers large or small, borne in the leaf axils or arranged in leafy racemes; calyx 5-lobed, angled; corolla 2-lipped; stamens 4.

Corolla rose-red . . . . . **1. M. lewisii.**
Corolla yellow.
Stems covered with long weak hairs; calyx lobes nearly equal in length.
2. M. moschatus.
Stems glabrous or with minute hairs; calyx lobes very unequal.
Corolla 25 to 30 mm. long . . . . . **3. M. caespitosus.**
Corolla 5 to 15 mm. long.
Calyx lobes obtuse; corolla 8 to 15 mm. long . . . . . **4. M. glabratus.**
Calyx lobes acute; corolla 5 to 8 mm. long . . . . . **5. M. hallii.**

1. Mimulus lewisii Pursh. RED MONKEYFLOWER. Common about timber line and frequently found along streams at middle elevations; in wet ground, especially along streams. B. C. to Calif., Colo., and Minn.—Stems 30 to 60 cm. high, usually tufted, finely hairy and somewhat viscid; leaves oblong or ovate, 4 to 8 cm. long, sharply toothed; corolla 3.5 to 5 cm. long.

A showy plant, often growing in dense masses, especially along brooks.

2. Mimulus moschatus Dougl. MUSKFLOWER. Infrequent; near Sun Camp and along Snyder Creek; in wet thickets or along brooks in deep woods. B. C. to Calif., Colo., and Ont.—Stems slender, prostrate or creeping, very viscid; leaves slender-stalked, ovate, 2 to 5 cm. long, finely toothed.

This species is often cultivated, but it is far from being a showy plant in its wild state.

3. Mimulus caespitosus Greene. YELLOW MONKEYFLOWER. Common above or near timber line, usually along brooks or on wet banks. B. C. to Calif., Colo., and Mont.—Stems 10 to 20 cm. high, usually forming dense clumps; leaves broadly ovate or rounded, 1 to 2 cm. long, sessile or short-stalked; flowers usually 2 or 3 on each stem; corolla bright yellow, the throat spotted with brownish purple.

One of the most handsome plants of the park, frequently occurring in the greatest profusion. In Rydberg's Flora this is united with *M. langsdorfii* Don, but in size and in habit of growth it is very unlike the common forms of that species. The plants of Glacier Park are quite uniform in size and habit.

4. Mimulus glabratus H. B. K. Baring Falls, on wet mossy cliffs. Mont. to Ill., Mex., and S. Amer.—Stems long and weak, glabrous, prostrate or nearly so; leaves rounded, 1 to 4 cm. long, sparsely toothed, short-stalked; flowers few, in the leaf axils.

5. Mimulus hallii Greene. Baring Falls, on mossy cliff in the spray of the falls. Mont. to Colo.—Stems slender, 5 to 15 cm. long, glabrous; leaves rounded or broadly ovate, 0.5 to 1.5 cm. long, entire or slightly toothed.

The Glacier Park plants are only 3 to 5 cm. high and are, therefore, much smaller than is usual in the species. The specimens were determined by Mrs. A. L. Grant as a depauperate form of *M. hallii*.

6. LIMOSELLA L.

1. Limosella aquatica L. MUDWORT. East entrance, about pools, *Umbach*. B. C. to Calif., N. Mex., and Lab.; also in Eur. and Asia.—Annual, with slender runners; leaves oval to oblanceolate, 0.5 to 3 cm. long, entire, obtuse, on very long slender petioles; flowers solitary on slender stalks; corolla white, 2 mm. long, 5-lobed.

7. GRATIOLA L.

1. Gratiola ebracteata Benth. Wet open places at east entrance. B. C. to Calif. and Mont.—Annual, 3 to 15 cm. high, branched, nearly glabrous, with stout succulent stems; leaves linear or lanceolate, 1 to 3 cm. long, sessile, entire or finely toothed; flowers in the axils of the leaves, stalked; corolla yellowish white, 6 to 8 mm. long.

8. VERONICA L. Speedwell.

Annuals or perennials; leaves opposite, entire or toothed; flowers small, in racemes or spikes or solitary in the axils of the leaves; corolla flat, almost regularly 4-lobed; stamens 2; capsule flat, usually notched at the apex.

Flowers solitary in the axils of the leaves; plants annual . **1. V. peregrina xalapensis.**
Flowers in spikes or racemes; plants perennial.
Racemes in the axils of the leaves.
Leaves short-petioled, ovate to oblong . . . . . **2. V. americana.**
Leaves sessile, linear or nearly so . . . . . **3. V. scutellata.**
Racemes terminal (at the ends of the stems).
Racemes loosely hairy, the flowers crowded; leaves all sessile; stems erect.
4. V. wormskjoldii.
Racemes minutely hairy, loosely flowered; lower leaves petioled; stems creeping.
5. V. serpyllifolia.

1. Veronica peregrina xalapensis (H. B. K.) Pennell. Purslane speedwell. Frequent at low altitudes, in moist woods or thickets, on open slopes, or about ponds on prairie. B. C. to Mex. and Tex. (*V. xalapensis* H. B. K.)—Plants 10 to 30 cm. high, usually branched, finely glandular-hairy; leaves linear to spatulate, finely toothed, the lowest ones short-petioled; corolla white, 2 to 3 mm. broad.

The typical form of the species is a native of Europe, and is naturalized in eastern North America.

2. Veronica americana Schwein. American brooklime. Common at low and sometimes at middle altitudes, in wet woods or thickets or along streams and lakes, sometimes growing in water. Alaska to Calif., N. Mex., Va., and Newf.—Plants usually branched and nearly prostrate, glabrous; leaves mostly toothed; flowers long-stalked; corolla blue or bluish white, 4 to 5 mm. broad.

3. Veronica scutellata L. Marsh speedwell. Frequent at low altitudes, in wet thickets or about ponds. B. C. to Calif., Colo., N. Y., and Newf.; also in Eur. and Asia.—Plants slender, often prostrate, glabrous or nearly so; leaves finely toothed or entire; corolla 6 to 8 mm. broad, blue; capsule notched at both ends.

4. Veronica wormskjoldii Roem. & Schult. Alpine speedwell. Frequent in meadows above timber line, sometimes found in wet places at middle altitudes. Alaska to N. Mex., S. Dak., N. H., and Greenl.—Stems simple, 10 to 25 cm. high, hairy above; leaves oval or ovate, 1 to 3 cm. long, entire or with low rounded teeth; corolla deep blue, 4 to 5 mm. broad.

The flowers are rather attractive, but the plants are usually half hidden by grasses and sedges. At Sexton Glacier many plants with pink flowers are found.

5. Veronica serpyllifolia L. Thyme-leaf speedwell. Frequent at low and middle altitudes, in moist woods or thickets or along streams. Alaska to Calif., N. Mex., Ga., and Lab.; also in Eur. and Asia.—Plants 5 to 15 cm. high, with creeping stems; leaves oblong to rounded, 5 to 15 mm. long, entire or with low rounded teeth; corolla whitish or pale blue, 3 to 4 mm. broad.

9. SYNTHYRIS Benth.

1. Synthyris wyomingensis (A. Nels.) Heller. Kittentails. Occasional on the east slope at low altitudes, on dry rocky slopes or prairie. Idaho to Colo. and S. Dak. (*Besseya wyomingensis* Rydb.)—Perennial, 15 to 30 cm. high, with woolly pubescence; leaves mostly basal, long-petioled, ovate or oblong, 3 to 5 cm. long, with low rounded teeth; flowers in dense spikes; corolla none; stamens 2.

The flowers open early in the season.

10. CASTILLEJA Mutis. INDIAN PAINTBRUSH.

Perennials, often parasitic upon the roots of other plants; stems simple or with a few branches above; leaves sessile, entire or lobed, those among the flowers (bracts) colored with red or yellow; flowers in dense spikes; corolla 2-lipped, the upper lip (galea) long and narrow, the lower lip 3-lobed.—The species are poorly understood, and whether all those listed below are valid is doubtful. The bracts exhibit great variation in color in each species. It seems probable to the writer that the species hybridize freely. The plants, especially those with red bracts, are very showy, and they are among the most conspicuous and abundant flowers of the park. In many places they are extremely abundant and offer an almost solid field of color.

Galea less than 3 times as long as the lip, half as long as the corolla tube or shorter; bracts tinged with yellow.
- Leaves, at lease most of them, lobed . . . . . **1. C. lutea.**
- Leaves entire, or only the uppermost lobed.
  - Stems 25 to 50 cm. high; spikes only slightly hairy, mostly with short hairs; corolla about 2.5 cm. long . . . . . **2. C. sulphurea.**
  - Stems usually less than 20 cm. high; spikes very hairy, with long whitish hairs; corolla about 1.8 cm. long . . . . . **3. C. occidentalis.**

Galea several times longer than the very short lip, usually at least two-thirds as long as the corolla tube; bracts tinged with red or pink, except in occasional abnormal plants.
- Leaves, at least most of them, conspicuously lobed.
  - Corolla 2 to 2.5 cm. long, only slightly if at all longer than the bracts. **4. C. bradburyi.**
  - Corolla about 3 cm. long, much longer than the bracts . . . . . **5. C. ampliflora.**
- Leaves entire, or only the uppermost sometimes lobed.
  - Bracts entire, obtuse, broad, sometimes 3-lobed, but then with a broad obtuse middle lobe.
    - Corolla about 3 cm. long . . . . . **6. C. rhexifolia.**
    - Corolla 2 to 2.5 cm. long . . . . . **7. C. lauta.**
  - Bracts lobed, with narrow acute lobes, occasionally entire but then acute.
    - Corolla 3.5 to 4 cm. long . . . . . **8. C. vreelandii.**
    - Corolla 3 cm. long or shorter.
      - Corolla about 2 cm. long . . . . . **9. C. miniata.**
      - Corolla about 3 cm. long . . . . . **10. C. lancifolia.**

1. Castilleja lutea Heller. Occasional at low altitudes, on prairie or open slopes. Wash. to Mont.—Stems simple, 20 to 30 cm. high, hairy; leaves 2 to 5 cm. long, 3 or 5-ribbed; corolla about 2.5 cm. long; bracts pale sulphur-yellow.

2. Castilleja sulphurea Rydb. Occasional on the east slope at low altitudes, on prairie or open hillsides. Mont. to Utah, N. Mex., and S. Dak.—Stems finely hairy, often branched; leaves lanceolate, 3 to 5 cm. long, 3-ribbed.

3. Castilleja occidentalis Torr. Common above timber line, in meadows or on rock slides. B. C. and Alta. to Colo.—Stems 10 to 20 cm. high, simple, usually tufted, finely hairy below; leaves linear or linear-lanceolate, 1.5 to 4 cm. long; bracts pale yellow-green or sometimes dirty pink.

4. Castilleja bradburyi (Nutt.) Don. Occasional on the east slope at low and middle altitudes, in thin woods or on open hillsides. B. C. to Oreg., Wyo., and Mont.—Stems 20 to 40 cm. high, sometimes branched, usually in clumps; leaves 3-ribbed, 3 to 5 cm. long, with few linear lobes; bracts scarlet or sometimes orange or bright yellow.

The plants are scattered and it is unusual to find many in a place. This is the only species of the park which has distinctly scarlet bracts.

5. Castilleja ampliflora Rydb. Occasional in woods or thickets at low altitudes; the type was collected between McDonald and Camas lakes. Mont.—Stems 30 to 40 cm. high, hairy; leaves 2 to 5 cm. long, hairy; bracts crimson.

6. Castilleja rhexifolia Rydb. Frequent at low, middle, and high altitudes, usually in moist meadows. Alaska to Colo. and Sask.—Stems 30 to 50 cm. high, simple, usually glabrous below, hairy above; leaves lanceolate or ovate, 3 to 5 cm. long, 3 or 5-nerved; bracts magenta or pale crimson.

7. Castilleja lauta A. Nels. Common above timber line, in meadows; occasionally found in moist meadows at middle altitudes. Oreg. to Colo. and Mont.—Stems 20 to 40 cm. high, usually glabrous below and hairy above, often clustered; leaves lanceolate or linear-lanceolate, 2 to 5 cm. long; bracts pale or deep crimson-pink, sometimes pinkish white or yellow-green tinged with pink.

8. Castilleja vreelandii Rydb. Occasional on the west slope at low or middle altitudes; the type was collected between McDonald and Camas lakes. Wash. to Wyo. and Mont.—Stems 40 to 70 cm. high, glabrous or nearly so; leaves lanceolate or linear-lanceolate, 4 to 9 cm. long, 3 or 5-ribbed.

9. Castilleja miniata Benth. Frequent at nearly all altitudes, in meadows, woods, or thickets or on open slopes. Wash. to Mont. and Sask.—Stems 40 to 60 cm. high, sometimes branched above, hairy or nearly glabrous; leaves lanceolate or linear, 3 to 7 cm. long; bracts crimson-pink or rarely pale pink or nearly scarlet.

10. Castilleja lancifolia Rydb. Frequent at low, middle, or high altitudes, in meadows or thickets or on open slopes. Alaska to Oreg., Colo., and Alta.—Stems usually solitary, 30 to 70 cm. high, sparsely hairy or glabrous, often branched above; leaves lanceolate, 3-nerved, 3 to 6 cm. long; bracts crimson or pink, or sometimes almost scarlet.

This and the five preceding species are alike in general appearance, and it is hard to distinguish them in the field. They grow together and seem to be about equally abundant.

11. ORTHOCARPUS Nutt.

1. Orthocarpus luteus Nutt. OWL-CLOVER. Low prairie at east entrance. B. C. to Ariz. and Nebr.—Annual, 10 to 30 cm. high, simple or branched, hairy; leaves alternate, linear or linear-lanceolate, 1.5 to 4 cm. long, usually entire; flowers in dense leafy spikes; corolla yellow, 10 to 15 mm. long, 2-lipped.

This was used by the Blackfoot Indians for dyeing gopher skins red. The plant was macerated and pressed firmly upon the skin.

12. PEDICULARIS L.

Erect perennials, glabrous or nearly so; leaves opposite or alternate, toothed or lobed; flowers in spikes; calyx 2 to 5-lobed; corolla strongly 2-lipped, the upper lip often with a short or long beak, the lower lip 3-lobed; stamens 4.

Leaves merely toothed, not lobed . . . . . **1. P. racemosa.**
Leaves deeply lobed.
Upper lip of corolla with a long slender upcurved beak . . . . . **2. P. groenlandica.**
Upper lip with an incurved beak or with none.
Upper lip with an incurved beak; corolla white or nearly so . . . **3. P. contorta.**
Upper lip not beaked; corolla greenish yellow or reddish green . . **4. P. bracteosa.**

1. Pedicularis racemosa Dougl. At middle altitudes or near timber line, rather scarce; on rock slides or in woods or thickets. B. C. to Calif., N. Mex., and Alta.—Stems 30 to 40 cm. high, in clumps; leaves lanceolate, 3 to 6 cm. long; corolla creamy white, 12 to 15 mm. long, the upper lip with an incurved beak.

2. Pedicularis groenlandica Retz. ELEPHANTHEAD. Common above timber line, in wet meadows, and often abundant in bogs or wet meadows at low and middle

altitudes. Alaska to Calif., N. Mex., Lab., and Greenl. (*Elephantella groenlandica* Rydb.)—Stems 10 to 40 cm. high, often in clumps; leaves 5 to 15 cm. long, divided into numerous linear or lanceolate lobes; spikes dense, many-flowered; corolla reddish purple, about 1 cm. long.

A rather conspicuous plant, but soon out of flower. The flowers bear a striking resemblance to an elephant's head, the long beak suggesting the trunk and two of the lower lobes the ears.

3. **Pedicularis contorta** Benth. ALPINE LOUSEWORT. Frequent above timber line, especially on rock slides, and occasionally at middle altitudes on moist rocky slopes. B. C. to Calif. and Mont.—Stems 15 to 30 cm. high, in clumps; leaves 6 to 12 cm. long, divided into numerous toothed linear lobes; flowers yellowish white, in dense spikes, about 1 cm. long.

4. **Pedicularis bracteosa** Benth. INDIAN WARRIOR. Common at nearly all altitudes, in moist woods or thickets, in alpine meadows, or on open slopes. B. C. to Calif., Colo., and Alta. (*P. montanensis* Rydb.)—Stems mostly solitary, 30 to 80 cm. high; leaves 10 to 30 cm. long, divided into numerous toothed lanceolate lobes; flowers 1.5 to 2 cm. long, in long spikes.

Plants with green corollas and others with dull red ones are often found together. The latter form is *P. montanensis*, but it appears to be only a color form rather than a distinct species.

13. RHINANTHUS L.

1. **Rhinanthus crista-galli** L. YELLOW RATTLE. Occasional on the east slope at low altitudes, in marshes or low thickets. Wash. to Colo., Md., and N. S.—Erect annual, 15 to 50 cm. high, nearly glabrous, simple or with few branches above; leaves opposite, lanceolate to linear, toothed, sessile; flowers in leafy spikes; corolla yellow, 8 mm. long; calyx enlarging in fruit, about 1.5 cm. long, compressed.

14. MELAMPYRUM L.

1. **Melampyrum lineare** Lam. COW-WHEAT. Frequent on the west slope at low and middle altitudes, usually in thin and rather dry woods. B. C. to Idaho, N. C., and N. S.—Annual, 10 to 30 cm. high, minutely hairy or nearly glabrous, usually with a few slender branches; leaves opposite, 2 to 6 cm. long, lanceolate or lance-linear, entire; flowers solitary in the leaf axils or in short leafy spikes; corolla 8 to 12 mm. long, whitish, often tinged with purple, 2-lipped; capsule flat.

79. PINGUICULACEAE. Butterwort Family.

Perennial herbs; flowers very irregular; corolla of united petals, 2-lipped, the corolla tube with a slender spur at the base; stamens 2; fruit a many-seeded capsule.

Plants submerged in water; leaves scattered along the slender stems, divided into numerous threadlike lobes; sepals 2 . . . . . **1. UTRICULARIA.**

Plants growing in wet soil; leaves all clustered at the base of the flower stalk, entire; sepals 5 . . . . . **2. PINGUICULA.**

1. UTRICULARIA L.

1. **Utricularia minor** L. YELLOW BLADDERWORT. Fish Lake, and probably in other lakes of the west slope. B. C. to Calif., N. J., and Greenl.—Leaves bearing small (2 mm. in diameter) bladders; flowers few, in a raceme on a slender stalk; corolla pale yellow, 4 to 6 mm. wide.

2. PINGUICULA L.

1. **Pinguicula vulgaris** L. BUTTERWORT. Wet soil at low and middle altitudes on the east slope; scarce, but abundant in some localities. Alaska to Wash., Vt., and Greenl.; also in Eur. and Asia.—Leaves elliptic or oval, 2 to 5 cm. long; stem 3 to 10 cm. high, 1-flowered; corolla purple, about 1 cm. wide.

The leaves are very fleshy; they seem greasy to the touch, hence the name butterwort. On their upper surface they produce a sticky secretion which entraps small insects and digests them for use as food by the plant. The handsome flowers strongly suggest those of a purple violet.

80. PLANTAGINACEAE. Plantain Family.

1. PLANTAGO L. Plantain.

Perennial herbs; leaves all basal, with conspicuous ribs, entire or somewhat toothed; flowers in very dense spikes, on long naked stalks; sepals 4, slightly united; corolla 4-lobed, thin and papery, greenish or brownish, often persistent in fruit; fruit a small capsule, opening by a caplike lid.

Leaves broadly ovate, 5 to 10 cm. wide or even broader, abruptly rounded at the base. **1. P. major.**

Leaves narrowly lanceolate, 1.5 cm. wide or narrower, long-tapering at the base. **2. P. septata.**

1. Plantago major L. Common plantain. Occasional at low altitudes, by roadsides, on open slopes, or in waste or cultivated ground. Widely distributed in temperate regions; native of Eur.—Leaves petioled, 5 to 25 cm. long, entire or coarsely toothed, glabrous or hairy, 5 or 7-ribbed; spikes 4 to 15 cm. long; capsule about 3 mm. long.

2. Plantago septata Morris. Plains at east entrance, *Umbach*. Alaska to Mont.—Leaves short-petioled, 8 to 12 cm. long, entire, hairy, 5-ribbed; spikes 3 to 6 cm. long.

81. RUBIACEAE. Madder Family.

1. GALIUM L. Bedstraw.

Annual or perennial herbs with 4-angled stems; leaves whorled, entire, narrow; flowers small, white, in cymes or panicles; calyx none; corolla 3 or 4-lobed; stamens 4; fruit of 2 united rounded carpels, dry, 2-seeded.

Fruit (and base of the flower) glabrous . . . . . **1. G. trifidum.**

Fruit covered with hooked hairs.

Leaves mostly 6 in a whorl, bristle-pointed . . . . . **2. G. triflorum.**

Leaves usually 4 (sometimes 2) in a whorl, rounded or obtuse at the apex.

Plants annual; leaves 1-nerved; flowers solitary in the leaf axils. **3. G. bifolium.**

Plants perennial; leaves 3-nerved; flowers panicled . . . . . **4. G. boreale.**

1. Galium trifidum L. Small bedstraw. Common, chiefly at low but sometimes at middle altitudes, in swamps, bogs, or wet thickets. Alaska to Colo., N. Y., and Lab.; also in Eur. and Asia.—Stems very slender, 10 to 40 cm. long, weak and usually reclining, rough on the angles; leaves usually 4 but sometimes 5 or 6 in a whorl, 1-nerved, 5 to 15 mm. long, blunt; flowers 1 to 3 on each peduncle; corolla white, 3-lobed, about 1.5 mm. broad.

2. Galium triflorum Michx. Sweet-scented bedstraw. Common nearly everywhere up to timber line, in bogs, wet thickets, or moist woods, sometimes on open slopes. Alaska to Calif., N. Mex., Ala., and Newf.—Stems weak, ascending, 30 to 60 cm. long, very rough on the angles; leaves oblanceolate, 2 to 4 cm. long, 1-ribbed; flowers mostly 3 on each peduncle; corolla white, 4-lobed.

3. Galium bifolium S. Wats. East entrance, in woods, *Umbach*. B. C. to Calif., Colo., and Mont.—Stems erect, slender, 10 to 15 cm. high, glabrous, usually simple; leaves 2 to 4 in a whorl, 8 to 15 mm. long.; flowers slender-stalked.

4. Galium boreale L. Baby's-breath. Common at all altitudes, on open slopes or rock slides or in woods or thickets. Widely distributed in N. Amer., Eur., and Asia.—Stems 15 to 60 cm. high, often in dense clumps, erect, stout, glabrous or nearly

so; leaves 4 in a whorl, linear or lanceolate, 2 to 5 cm. long; flowers white or yellowish white, in dense panicles, sweet-scented; corolla 4-lobed, about 3 mm. broad.

A showy plant, often forming dense masses. In the park it is sometimes called wild heliotrope, because of the fragrance of the flowers, but their odor does not resemble that of heliotrope.

82. CAPRIFOLIACEAE. Honeysuckle Family.

Shrubs or trailing plants with opposite leaves; petals united, the corolla 5-lobed and often 2-lipped; stamens 5 or sometimes 4; fruit drupelike or a berry, or sometimes dry.

Leaves pinnate, composed of 5 or 7 leaflets . . . . . **1. SAMBUCUS.**
Leaves simple, entire or lobed or toothed.
Plants slender, trailing over the ground; stamens 4; fruit small, dry. **2. LINNAEA.**
Plants erect shrubs; stamens 5; fruit juicy.
Flowers white, in a flat-topped cluster; leaves mostly 3-lobed and toothed; fruit 1-seeded . . . . . **3. VIBURNUM.**
Flowers pink or yellow, clustered in the leaf axils or on slender 2-flowered stalks; leaves mostly entire; fruit containing 2 or more seeds.
Flowers clustered in the leaf axils; corolla about 6 mm. long, pink; fruit white, 2-seeded . . . . . **4. SYMPHORICARPOS.**
Flowers 2 on a slender stalk; corolla about 20 mm. long, yellow or yellowish; fruit red or black, containing more than 2 seeds . . . . . **5. LONICERA.**

1. SAMBUCUS L.

1. Sambucus melanocarpa A. Gray. ELDERBERRY. Common, especially at middle altitudes, and frequently found above timber line; in moist woods or thickets, in meadows, or on open slopes. B. C. and Alta. to N. Mex. and Utah.—Shrub, 1 to 2 meters high, often forming large clumps, glabrous or nearly so; leaflets ovate to lanceolate, 5 to 20 cm. long, toothed; flowers sweet-scented, in dense cymes 4 to 6 cm. broad; corolla creamy white, flat; fruit black, about 5 mm. long, 3 to 5-seeded.

The fruit is juicy and rather sour, but of good flavor. It may be used for pies, jam, etc. The stems contain a large amount of pith.

2. LINNAEA L.

1. Linnaea borealis L. TWINFLOWER. Common on the west slope at low and middle altitudes, in deep or thin woods or on open hillsides; reported from the east slope, but not seen there by the writer. Alaska to N. Mex., N. J., and Greenl.; also in Eur. and Asia. (*L. americana* Forbes.)—Stems very slender, trailing and forming loose mats, finely hairy; leaves evergreen, 8 to 15 mm. long, rounded, with low rounded teeth; flowers 2, on a long slender stalk; corolla pink, 1 cm. long, funnel-shaped.

A very beautiful and delicate plant.

3. VIBURNUM L.

1. Viburnum pauciflorum Pylaie. HIGHBUSH CRANBERRY. Occasional on the west slope at low and middle altitudes, in moist woods or thickets. Alaska to Colo., Pa., and Newf.—Shrub, about 1 meter high; leaves 4 to 10 cm. broad, mostly subcordate at base, somewhat hairy; flower clusters 1 to 3 cm. broad; fruit red, about 1 cm. long.

The fruit is sour but of good flavor. Where the plant is abundant the fruit is often gathered and cooked, and it may be used as a substitute for cranberries, which it resembles in flavor.

4. SYMPHORICARPOS Ludw. Snowberry.

Shrubs with brown branches; leaves entire, or on young shoots often lobed, obtuse; corolla bell-shaped; fruit white.

Stamens not exserted from the corolla . . . . . 1. S. albus.
Stamens shortly exserted from the corolla . . . . . 2. S. occidentalis.

1. Symphoricarpos albus (L.) Blake. Common at low and middle altitudes, in thickets or thin or deep woods or on open slopes. B. C. to Calif., Colo., Va., and N. S.—Slender shrub, 0.5 to 1 meter high, nearly glabrous; leaves usually thin, oval or rounded, 2 to 5 cm. long; corolla pale or deep pink, bearded inside; fruit 6 to 10 mm. long, pure white, not edible.

A handsome shrub when loaded with its fruit; it is often seen in cultivation. The plants bloom for a long time, and flowers and ripe fruit are often found on the same bush.

2. Symphoricarpos occidentalis Hook. Frequent on the east slope at low altitudes, in thickets or thin woods or on prairie or open hillsides. B. C. to Colo., Mo., and Mich.—Similar to *S. albus*, but the leaves usually thicker; corolla deep pink.

5. LONICERA L.

Erect shrubs; leaves entire; corolla often 2-lipped; fruits 2 together, fleshy.—The various kinds of honeysuckle, many of which are vines, belong to this genus.

Fruit red; bracts at base of flowers small and inconspicuous; corolla 2-lipped.
1. L. utahensis.
Fruit black; bracts large and leaflike, at least in fruit; corolla almost regular.
2. L. involucrata.

1. Lonicera utahensis S. Wats. Red twinberry. Frequent at nearly all altitudes, in thickets or thin or deep woods or on open slopes; often growing about timber line, but most common at middle altitudes. B. C. to Utah and Mont. (*Xylosteon utahense* Howell.)—Shrub, 0.5 to 1 meter high, glabrous; leaves broadly oval or rounded, 3 to 6 cm. long, obtuse, pale green; corolla pale yellow, funnel-shaped; fruits partly united, 5 to 8 mm. long, bright red.

The fruits have an insipid flavor; they vary greatly in size, and those of a pair are usually very unequal.

2. Lonicera involucrata (Richards.) Banks. Black twinberry. Common at low and middle altitudes and often about timber line, in deep or thin woods, along streams, or on open slopes. Alaska to Calif., N. Mex., Mich., and Que. (*Distegia involucrata* Cockerell.)—Shrub, about a meter high, usually with few simple stems-leaves mostly ovate, 5 to 15 cm. long, hairy, acute; bracts in fruit large and wine; colored; corolla yellow, short-hairy, the stamens slightly exserted; fruit dull black, 8 to 10 mm. long.

The shrub is conspicuous in either flower or fruit, especially because of the handsome bracts. The fruit has an unpleasant flavor; it falls easily and does not remain long upon the bushes. The shrub is known locally in Montana as skunkberry.

83. VALERIANACEAE. Valerian Family.

1. VALERIANA L. Valerian.

Erect perennial herbs, nearly glabrous; leaves opposite, most of them pinnately lobed or divided; flowers white or pinkish, in loose or dense cymes, the staminate and pistillate flowers mostly on separate plants; calyx developing into hairy bristles; corolla funnel-shaped, 5-lobed; stamens usually 3; fruit dry, achene-like.—The roots have a strong peculiar odor which persists when they are dry.

Corolla of the pistillate flower 2 to 3 mm. long; fruit about 4 mm. long.
1. V. septentrionalis.

Corolla of the pistillate flower 5 to 8 mm. long; fruit about 6 mm. long.
2. V. sitchensis.

1. **Valeriana septentrionalis** Rydb. Occasional on the east slope at low or middle altitudes, in thickets or woods or on open slopes. B. C. to Nev., Que., and Lab.—Plants 20 to 70 cm. high; lowest leaves usually entire, the others pinnate, the leaflets lanceolate to oval, entire or toothed.

2. **Valeriana sitchensis** Bong. Common in meadows above and near timber line, and occasionally found at middle or even at low altitudes, on rock slides, along brooks, or in moist woods or thickets. Alaska to Oreg., and Mont. (*V. scouleri* Rydb.)—Plants 30 to 70 cm. high; leaflets 3 to 7, rounded-ovate to lanceolate, 2 to 7 cm. long, coarsely toothed to entire; corolla white or with a faint tinge of pink; stamens exserted.

A showy plant which blooms soon after the snow melts and continues in flower for a long time. *V. sitchensis scouleri* (Rydb.) Piper is a form with nearly entire leaflets, but all integrades are found between it and the typical form, which has coarsely toothed leaflets.

A hot drink made from this or other species was employed by the Blackfoot Indians as a remedy for stomach affections.

84. CAMPANULACEAE. Harebell Family.

1. CAMPANULA L.

1. **Campanula rotundifolia** L. HAREBELL. Common at all altitudes, usually in thin woods or on open slopes; frequent above timber line, even on rock slides. Alaska to Calif., N. Mex., and N. J.; also in Eur. and Asia. (*C. petiolata* A. DC.)—Perennial, 10 to 40 cm. high, very slender, nearly glabrous; basal leaves ovate or heart-shaped, 1 to 3 cm. long, toothed, slender-petioled; stem leaves linear; flowers few, in racemes, slender-stalked, drooping; corolla bell-shaped, bluish purple, 1.5 to 2 cm. long; fruit a capsule.

A very beautiful and graceful plant, often growing among grasses. The plants bloom all summer. Those of dry places often have very small corollas, 1 cm. long or even shorter. This species is the "bluebells of Scotland."

85. CICHORIACEAE. Chicory Family.

Annual or perennial herbs with milky juice; leaves alternate, or sometimes all at the base of the stem; flowers in heads as in the Asteraceae, but the flowers all with strap-shaped corollas; stamens 5, the anthers united into a tube; fruit an achene, with pappus of bristles at the apex.—By some authors this family is united with the Asteraceae.

Flower head one on each stem; stems naked.

Achenes 10-ribbed or 10-nerved, smooth; bracts unequal and overlapping; flowers yellow or bronze . . . . . 1. AGOSERIS.

Achenes 4 or 5-ribbed, rough with spinelike projections, at least near the apex; main bracts equal in length, a few much shorter ones present at the base of the head; flowers yellow . . . . . 2. LEONTODON.

Flower heads few to many on each stem; stems leafy.

Achenes flattened; flowers blue or pale yellow; leaves usually lobed or with spiny teeth . . . . . 3. LACTUCA.

Achenes not flattened; flowers yellow or white; leaves usually entire or toothed, rarely lobed, never with spiny teeth . . . . . 4. SONCHUS.

Pappus white; achenes tapering toward the apex.
Pappus bristles hairy, dilated and chafflike at base . . . . **5. PTILOCALAIS.**
Pappus bristles not hairy, slender throughout . . . . . **6. CREPIS.**
Pappus yellowish or brownish; achenes not tapering.
Leaves not at all triangular, without lobes at the base; flowers white or yellow; plants hairy . . . . . **7. HIERACIUM.**
Leaves more or less triangular, with lobes at the base; flowers white; plants glabrous . . . . . **8. PRENANTHES.**

1. AGOSERIS Raf. False dandelion.

Perennials with naked stems; leaves clustered at the base of the stem, entire, toothed, or lobed; heads solitary, large; flowers yellow or bronze, often turning purplish; pappus of slender white bristles.—It is necessary to have mature achenes in order to distinguish the species accurately. The species are difficult to distinguish, and poorly understood; it is doubtful whether all those listed below are valid.

Beak of the achene slender, nearly or fully as long as the body of the achene, scarcely ridged at the middle; flowers often bronze or orange.
Leaves finely hairy . . . . . **1. A. elata.**
Leaves glabrous or nearly so.
Leaves with few or numerous narrow lobes . . . . . **2. A. graminifolia.**
Leaves entire or slightly toothed . . . . . **3. A. gracilens.**
Beak short, ridged its whole length; flowers yellow.
Leaves finely hairy.
Outer bracts mostly oblong or oblong-ovate; leaves mostly entire . **4. A. villosa.**
Outer bracts linear-lanceolate; leaves mostly lobed . . . . . **5. A. aspera.**
Leaves glabrous or nearly so.
Bracts glabrous on the back; leaves linear or nearly so . . . . . **6. A. glauca.**
Bracts hairy on the back; leaves linear or broader.
Leaves acute; outer bracts not much broader than the inner ones; plants mostly 20 to 40 cm. high . . . . . **7. A. scorzoneraefolia.**
Leaves obtuse; outer bracts much broader than the inner ones; plants mostly 5 to 15 cm. high . . . . . **8. A. pumila.**

1. Agoseris elata (Nutt.) Greene. Occasional about the foot of Lake McDermott, on sandbars or open rocky slopes. B. C. to Calif., Colo., and Mont.—Leaves oblanceolate or nearly linear, lobed or toothed or some of them entire, green; stems stout, 30 to 50 cm. high, hairy; bracts hairy; flowers yellow or sometimes orange.

2. Agoseris graminifolia Greene. Frequent at middle and high altitudes, in meadows, on rocky slopes, or occasionally in woods; sometimes found above timber line on rock slides. B. C. and Alta. to Ariz.—Leaves linear, green, usually very numerous; stems 15 to 40 cm. high, hairy above; heads 2 cm. high, narrow; flowers bronze, turning purplish.

3. Agoseris gracilens. (A. Gray) Kuntze. Frequent at low altitudes on the east slope, on open hillsides or in thickets; sometimes in meadows above timber line. B. C. and Alta. to Colo.—Leaves oblanceolate, mostly entire, green or rather pale, obtuse or acute; stems 15 to 50 cm. high, hairy below the head; heads broad, about 2 cm. high; flowers orange or bronze, turning purplish.

4. Agoseris villosa Rydb. Frequent on the east slope at low, middle, and high altitudes, on rock slides or open slopes or in woods or thickets. B. C. and Alta. to Utah. (*Troximon villosum* A. Nels.)—Leaves lanceolate or oblanceolate, 6 to 12 cm. long, pale, acute; stems stout, 10 to 40 cm. high, hairy; heads broad, about 2 cm. high.

The plants from alpine localities are rarely much over 10 cm. high.

5. Agoseris aspera Rydb. Open slopes at Iceberg Lake. B. C., Idaho, and Mont.—Leaves 4 to 7 cm. long, pale; stems 5 to 12 cm. high, hairy; heads 10 to 15 cm. high, narrow.

6. Agoseris glauca (Nutt.) Greene. Frequent on the east slope at low altitudes, on open hillsides. B. C. and Wash. to Colo. and S. Dak. (*Troximon glaucum* Nutt.)—Leaves 8 to 20 cm. long, pale, narrowed to the tip; stems slender, 15 to 30 cm. high, glabrous.

7. Agoseris scorzoneraefolia (Schrad.) Greene. Frequent on the east slope at low altitudes, on open hillsides or flats; occasionally in alpine meadows. B. C. to Oreg., Colo., and S. Dak.—Leaves oblanceolate or linear-oblanceolate, 10 to 25 cm. long, pale or green, entire or toothed; stems 10 to 40 cm. high, hairy or glabrous; heads 2 to 3 cm. high, broad.

8. Agoseris pumila (Nutt.) Rydb. Exposed rocky slope above Sexton Glacier. Mont. to Colo. (*Troximon pumilum* Nutt.)—Leaves 3 to 10 cm. long, pale, entire or slightly toothed; stems mostly 5 to 12 cm. high, hairy or glabrous; heads 1.5 cm. high.

2. LEONTODON L. Dandelion.

Perennials with naked hollow stems, each bearing a single head; leaves lobed; flowers yellow; achenes slender-beaked; pappus of numerous soft bristles.

Achenes red or reddish . . . . . **1. L. laevigatum.**
Achenes greenish or greenish brown.
  Outer bracts spreading or reflexed . . . . . **2. L. taraxacum.**
  Outer bracts appressed.
    Involucre 15 to 18 mm. high . . . . . **3. L. ceratophorum.**
    Involucre 8 to 10 mm. high . . . . . **4. L. lyratum.**

1. Leontodon laevigatum Willd. Redseed dandelion. Dry slopes at Belton. Widely distributed in N. Amer.; naturalized from Eur. (*Taraxacum erythrospermum* Andrzej.; *T. laevigatum* DC.; *L. erythrospermum* Eichw.)—Leaves deeply lobed; the lobes triangular; stems 10 to 20 cm. high, slender; heads about 15 mm. high.

2. Leontodon taraxacum L. Common dandelion. Frequent at low altitudes, especially on the west slope, on open hillsides or in waste ground. Native of Eur.; widely naturalized as a weed in N. Amer. (*Taraxacum taraxacum* Karst.)—Leaves 10 to 30 cm. long, usually with triangular lobes; stems 10 to 30 cm. high; heads 1.5 to 2 cm. high.

3. Leontodon ceratophorum Ledeb. Alpine dandelion. Occasional above timber line, on rock slides or rocky slopes; collected by Umbach on plains at east entrance. Alaska to N. Mex. (*Taraxacum montanum* Nutt.; *T. ceratophorum* DC.; *L. monticola* Rydb.)—Leaves 5 to 12 cm. long, toothed or lobed, glabrous; stems stout, 7 to 20 cm. high.

4. Leontodon lyratum Ledeb. Rock slide above Ptarmigan Lake. Alaska to Alta. and Colo. (*Taraxacum rupestre* Greene; *T. scopulorum* Rydb.; *T. lyratum* DC.; *L. rupestris* Rydb.; *L. scopulorum* Rydb.)—Leaves 3 to 8 cm. long, glabrous, with short triangular lobes; stems slender, 2 to 10 cm. high.

3. LACTUCA L. Lettuce.

Plants annual, biennial, or perennial, with leafy stems; heads small, numerous, panicled, the flowers blue or yellow; achenes flattened, the pappus of numerous fine soft bristles.—Cultivated lettuce belongs to this genus.

Flowers yellow; leaves with fine spiny teeth. Achenes with a slender beak. **1. L. virosa.**

Flowers blue; leaves without spiny teeth, often lobed.

Achenes with a slender beak; leaves pale green; heads 1.5 to 2 cm. high.

2. L. pulchella.

Achenes not beaked; leaves bright green on the upper surface; heads 1 cm. high.

3. L. spicata.

1. Lactuca virosa L. PRICKLY LETTUCE. A few plants in dry soil at Belton. Native of Eur.; introduced as a weed in N. Amer.—Biennial, 0.5 to 1.5 meters high, hairy below; leaves oblong or obovate, 10 to 30 cm. long, clasping; heads 10 to 12 mm. high; flowers pale yellow.

In many parts of the West this is a troublesome weed.

2. Lactuca pulchella (Pursh) DC. PRAIRIE LETTUCE. Rare on dry banks at east entrance; perhaps introduced. B. C. to Calif., N. Mex., and Sask.—Glabrous perennial, with rootstocks, 30 to 60 cm. high; leaves entire, toothed, or lobed; heads in a narrow panicle.

3. Lactuca spicata (Lam.) Hitchc. TALL LETTUCE. Frequent on the west slope at low and middle altitudes, in thin woods or on open or brushy hillsides. Idaho to Colo., N. C., and Newf.—Glabrous annual or biennial, 0.5 to 2 meters high, the stem unbranched except at the top; leaves deeply lobed, the lobes usually toothed, pale beneath; heads in a large panicle.

4. SONCHUS L.

1. Sonchus asper (L.) Hill. SOW THISTLE. Collected along railroad at Belton by Umbach. Native of Eur.; naturalized as a weed in N. Amer.—Glabrous annual, 30 to 60 cm. high; leaves clasping, deeply lobed, with spinelike teeth; heads about 12 mm. high; flowers yellow; achenes flat, ribbed, the pappus of soft white bristles.

5. PTILOCALAIS Greene.

1. Ptilocalais nutans (Geyer) Greene. Collected on bluffs at east entrance by Umbach; also at Columbia Falls by Williams, and probably to be found at Belton. B. C. to Calif., Colo., and Mont. (*Microseris nutans* A. Gray.)—Perennial, 20 to 50 cm. high, nearly glabrous; stems with few branches, sparsely leafy; leaves linear, entire, toothed, or with slender lobes; heads 10 to 15 mm. high, on long slender stalks; flowers yellow; pappus white, of hairy bristles, these dilated and scalelike at the base.

6. CREPIS L. HAWKSBEARD.

Low or tall perennials, usually with leafy stems; leaves entire, toothed, or lobed; heads small or large, few or numerous; flowers yellow; achenes with short or no beak; pappus of soft white bristles.

Leaves glabrous.

Plants 10 to 20 cm. high; achenes with a conspicuous beak . . . . . **1. C. elegans.**

Plants 3 to 8 cm. high, in small rounded tufts; achenes scarcely at all beaked.

2. C. nana.

Leaves hairy.

Bracts about 12, with gland-tipped hairs; leaves toothed or shallowly lobed.

3. C. runcinata.

Bracts about 7, woolly, without gland-tipped hairs; leaves deeply lobed.

4. C. intermedia.

1. Crepis elegans Hook. Occasional at low altitudes, on dry brushy slopes or dry flats or along stream beds; abundant at St. Mary. Yukon to Wyo. (*Youngia elegans* Rydb.)—Plants much branched, forming rounded clumps; lowest leaves oval to oblanceolate, 2 to 5 cm. long, entire, toothed, or lobed; heads about 8 mm. high; bracts about 8.

2. **Crepis nana** Richards. ALPINE HAWKSBEARD. Occasional above timber line, on the highest rock slides. B. C. to Utah, Alta., and Lab.; also in Asia. (*Youngia nana* Rydb.)—Plants nearly stemless; leaves long-stalked, rounded, 1 to 2 cm. long, entire or somewhat toothed, thick and succulent, pale, often purplish; heads 8 to 11 mm. long, often shorter than the leaves, with about 8 bracts.

The plants are half hidden by the stones among which they grow.

3. **Crepis runcinata** (James) Torr. & Gray. Low meadow at east entrance; one plant found in lawn at Many Glacier Hotel. Alta. to Colo. and N. Dak.—Leaves mostly basal, obovate or oblanceolate, 4 to 12 cm. long, usually coarsely toothed, hairy; stems 25 to 40 cm. high, slender, with few or no leaves; heads about 1 cm. high.

4. **Crepis intermedia** A. Gray. Dry hillsides at east entrance; scarce. B. C. to Calif., Colo., and Sask.—Plants 30 to 50 cm. high, stout, somewhat woolly; leaves 10 to 15 cm. long, the lobes often toothed; heads 12 to 14 mm. high, very narrow.

7. HIERACIUM L. HAWKWEED.

Low or tall, hairy perennials; leaves entire or toothed; heads large or small, usually several on each stem; flowers yellow or white.—In explanation of the name hawkweed, an early author makes the naive statement that the plant "is so called from hawks. as it is said, making use of the juice to clear the eyesight of their young ones; but which sort they use, there being many, botanists have not yet satisfied us."

Flowers white . . . . . **1. H. albiflorum.**
Flowers yellow.
Plants without tufts of leaves at base of stem; stems very leafy; bracts unequal.
Stems long-hairy near the base . . . . . **2. H. columbianum.**
Stems glabrous or nearly so at the base . . . . . **3. H. scabriusculum.**
Plants with tufts or rosettes of leaves at base of stem; stems with only a few leaves; bracts equal or nearly so.
Leaves densely hairy; heads white-hairy . . . . . **4. H. scouleri.**
Leaves glabrous or nearly so; heads black-hairy . . . . . **5. H. gracile.**

1. **Hieracium albiflorum** Hook. WHITE HAWKWEED. Frequent at low and middle altitudes, on open slopes or in woods or thickets. Yukon to Calif. and Colo.—Plants 30 to 80 cm. high, the stems slender, hairy, with few leaves; lowest leaves oblong or oblanceolate, thinly hairy; heads numerous, 8 to 10 mm. high, in a broad panicle.

2. **Hieracium columbianum** Rydb. Occasional at low altitudes, on open or brushy slopes. B. C. and Wash. to Mont.—Stems slender, 20 to 60 cm. high, purplish; stem leaves lanceolate, sessile, sharply toothed; heads few, 10 to 12 mm. high, glabrous or nearly so.

3. **Hieracium scabriusculum** Schwein. Occasional at low altitudes, on open slopes or in woods or thickets. B. C. to Oreg. and Wis.—Stems stout, 30 to 70 cm. high, purplish; stem leaves lanceolate or linear-lanceolate, most of them toothed, slightly short-hairy; heads few, 10 to 12 mm. high, broad.

It is doubtful whether this and *H. columbianum* are distinct species.

4. **Hieracium scouleri** Hook. Frequent on the east slope at low and middle altitudes, on open rocky hillsides. B. C. to Oreg., Utah, and Alta. (*H. albertinum* Farr.)—Plants 25 to 50 cm. high, often in clumps; leaves oblanceolate or linear-oblanceolate, 5 to 15 cm. long, entire, densely covered with long soft white hairs; heads few, 10 to 12 mm. high.

In most books the hairs are described as yellow, but on the growing plants they are white; they soon turn yellow in the herbarium. The plant is a handsome one, the contrast between the bright yellow flowers and the white hairs being very pleasing. The heads just before flowering are unusually attractive, their dense

covering of soft hairs reminding one of fur. In some of the Glacier Park specimens the heads are not very hairy, and these collections might be referred to *H. griseum* Rydb., which, however, is probably only a form of *H. scouleri*.

5. Hieracium gracile Hook. ALPINE HAWKWEED. Frequent above or near timber line, on rocky slopes and in meadows. Alaska to Calif., N. Mex., and Alta.—Stems usually 10 to 20 cm. high, short-hairy; leaves oblanceolate, 3 to 6 cm. long, long-stalked, entire or with few low teeth; heads usually few, 8 to 10 mm. high; flowers pale yellow.

Very luxuriant plants collected at Granite Park are nearly 40 cm. high and have numerous heads, the lower ones on very long slender stalks.

8. PRENANTHES Vaill.

1. Prenanthes sagittata (A. Gray) A. Nels. RATTLESNAKE-ROOT. Frequent at low and middle altitudes, usually in wet woods or thickets, frequently in swamps. Mont. and Idaho. (*Nabalus sagittatus* Rydb.)—Perennial, glabrous, 30 to 60 cm. high, with very leafy stems; leaves triangular or arrow-shaped, thin, toothed, stalked; heads about 12 mm. high, narrow, in a narrow panicle; flowers pure white; pappus of brownish bristles.

The flowers are rather handsome, but not very showy; they open late in the season.

86. ASTERACEAE. Aster Family.

Herbs or rarely shrubs; leaves alternate or opposite, simple or compound; flowers in heads, clustered on a receptacle, the head surrounded by an *involucre* of *bracts; disk flowers* (the inner flowers of the head) with a small tubular 5-lobed corolla; outer flowers of the head often with a narrow strap-shaped corolla (*ray*); fruit an achene, usually bearing at the summit *pappus*, this representing the calyx and composed of scales, bristles, or awns.—The largest family of plants. The name Compositae is frequently applied to this and the Cichoriaceae, which are often united as a single family.

A. Flower heads without rays.

Leaves with spine-tipped teeth . . . . . **27. CIRSIUM.**

Leaves never with spine-tipped teeth.

Leaves deeply lobed.

Flower head one on each stem; pappus of bristles . . . . . **8. ERIGERON.**

Flower heads several or many; pappus not of bristles.

Heads 7 to 10 mm. broad; plants annual . . . . . **21. MATRICARIA.**

Heads 5 mm. broad or less.

Bracts distinct; pappus of bristles; leaves alternate . . **23. ARTEMISIA.**

Bracts partly united; pappus none; leaves opposite . . . **14. AMBROSIA.**

Leaves entire or toothed.

Leaves not white-hairy.

Leaves linear or nearly so.

Plants covered with sticky hairs, ill-scented . . . . . **17. MADIA.**

Plants without sticky hairs, not ill-scented . . . . . **8. ERIGERON.**

Leaves lanceolate to triangular or broader.

Bracts 5; heads about 4 mm. high . . . . . **13. IVA.**

Bracts 10 or more; heads much larger.

Bracts very obtuse; pappus brownish red; leaves alternate. **4. PYRROCOMA.**

Bracts acute; pappus white or yellowish.

Plants nearly glabrous; heads short-stalked; bracts very unequal in length . . . . . **1. COLEOSANTHUS.**

Plants hairy; heads long-stalked; bracts about equal in length. **25. ARNICA.**

Leaves densely covered with close matted white hairs on one or both surfaces.
Flowering branches densely covered with very sticky hairs; bracts 4 or 5.
12. ADENOCAULON.
Flowering branches without sticky hairs, or with a few but these hidden under the other hairs and the stems not sticky to the touch; bracts numerous.
Leaves triangular, 10 to 20 cm. wide or larger . . . . . **24. PETASITES.**
Leaves not triangular, much less than 10 cm. wide.
Pappus none; leaves, at least some of them, toothed; heads mostly 2 to 3 mm. broad . . . . . **23. ARTEMISIA.**
Pappus of numerous soft bristles; leaves all entire; heads mostly more than 3 mm. broad.
Plants not dioecious, the pistillate and staminate flowers in the same heads; plants usually branched, annual or perennial; heads in dense clusters . . . . . **11. GNAPHALIUM.**
Plants dioecious. the pistillate and staminate flowers on separate plants; plants with unbranched flowering stems, perennial; flowers mostly in racemes or loose clusters.
Plants usually with clusters of leaves at the base, often with runners; leaves broad or narrow; pappus bristles of the pistillate flowers falling off in a ring . . . . . **9. ANTENNARIA.**
Plants without clusters of basal leaves or runners; leaves linear or linear-lanceolate; pappus bristles falling off separately.
10. ANAPHALIS.

AA. Flower heads with rays.
Rays not yellow, mostly white, blue, or purple.
Leaves triangular, 10 to 20 cm. wide or larger . . . . . **24. PETASITES.**
Leaves not triangular, much less than 20 cm. wide.
Leaves divided into numerous narrow lobes.
Flower stems naked; leaves palmately lobed; plants not strong-scented.
8. ERIGERON.
Flower stems leafy; leaves pinnately lobed; plants strong-scented.
20. ACHILLEA.
Leaves entire or toothed or with only a few lobes.
Pappus none; plants glabrous; rays white . . . **22. CHRYSANTHEMUM.**
Pappus of bristles or awns; plants glabrous or usually hairy; rays of various colors.
Heads 3 to 4 mm. broad; rays very short and inconspicuous; plants annual . . . . . **8. ERIGERON.**
Heads mostly 5 mm. broad or larger; rays long and conspicuous; plants nearly all perennial.
Pappus of a few awns; stems each with a single head; bracts broad, with thin whitish margins . . . . . **6. TOWNSENDIA.**
Pappus of numerous soft bristles; heads 1 to many; bracts never with thin whitish margins.
Bracts mostly linear-oblong or broader; heads usually numerous.
7. ASTER.
Bracts very narrowly linear; heads often solitary on the stem.
8. ERIGERON.
Rays bright yellow.
Flower heads very sticky, with gland-tipped hairs or with a resinous secretion; leaves alternate.
Leaves toothed; plants perennial; rays large and showy. . . **2. GRINDELIA.**
Leaves entire; plants annual; rays very small and inconspicuous.
17. MADIA.

Flower heads not very sticky or, if somewhat so, the leaves opposite.
Pappus none or of 2 awns or scales or of chafflike scales.
Leaves arrow-shaped or triangular, covered with matted white hairs on both sides; flower stems leafless or nearly so . . . . **15. BALSAMORRHIZA.**
Leaves never arrow-shaped or triangular, green; stems leafy.
Leaves entire or toothed; rays not lobed . . . . . **16. HELIANTHUS.**
Leaves, at least some of them, lobed; rays 3-lobed at the apex.
Leaves with broad lobes, or most of the leaves only toothed; bracts not in 2 series; rays 1.5 to 3 cm. long . . . . . **19. GAILLARDIA.**
Leaves with linear lobes; bracts in 2 series; rays less than 1 cm. long. **18. HYMENOXYS.**
Pappus of numerous bristles.
Leaves all or mostly opposite . . . . . **25. ARNICA.**
Leaves alternate.
Bracts in one series and about equal in length, a few short ones sometimes present at the base of the head; plants usually succulent. **26. SENECIO.**
Bracts in several series, very unequal, overlapping; plants not succulent.
Heads numerous on each stem, small, rarely more than 5 mm. broad. **5. SOLIDAGO.**
Heads 1 or few on each stem, large, usually more than 1 cm. broad.
Leaves entire; plants long-hairy; leaves thin . . . **3. CHRYSOPSIS.**
Leaves toothed; plants glabrous or very finely hairy; leaves thick and stiff . . . . . **4. PYRROCOMA.**

1. COLEOSANTHUS Cass.

1. Coleosanthus grandiflorus (Hook.) Kuntze. Dry cliffs on Altyn Peak and along Appekunny Creek; rock slides below Sperry Chalets; scarce. Wash. and Oreg. to Alta. and N. Mex. (*Brickellia grandiflora* Ell.)—Perennial herb, 30 to 60 cm. high, slightly hairy; leaves mostly opposite, triangular, stalked, with rounded teeth; heads 12 to 15 mm. high, in a small dense cluster; flowers pale dull yellow; pappus of numerous bristles.

2. GRINDELIA Willd.

1. Grindelia perennis A. Nels. GUM-PLANT. Occasional on the east slope at low altitudes, on open hillsides or prairie, often about dried-up ponds. Alta. and Sask. to Colo.—Perennial, 15 to 40 cm. high, often forming dense clumps, glabrous or nearly so; leaves alternate, oblanceolate or oblong, 2 to 7 cm. long, thick, toothed; heads few or numerous, 1 cm. high, very gummy, with long yellow rays; pappus of a few coarse bristles, soon falling from the achenes.

Easily recognized by the sticky heads. An extract of some species of *Grindelia* is employed as a remedy for the effects of poison ivy. The bright yellow heads are conspicuous on the prairie.

3. CHRYSOPSIS Nutt.

1. Chrysopsis villosa (Pursh) Nutt. GOLDEN ASTER. Common at low and middle altitudes, usually on open slopes, occasionally found near or above timber line. Idaho to Minn., Tex., and N. Mex.—Perennial, 15 to 40 cm. high, usually forming dense clumps, short-hairy; leaves alternate, entire, 1.5 to 4 cm. long, obovate or oblanceolate, finely hairy; heads few or numerous, about 1 cm. high, stalked; rays bright yellow; pappus of yellowish white bristles.

A rather showy but unattractive plant.

4. PYRROCOMA Nutt.

Perennials with thick taproots; leaves alternate, usually with sharp teeth, thick; heads 1 or few on each stem, with conspicuous or very small rays; bracts broad, overlapping; flowers yellow; pappus of yellowish or brownish bristles.

Rays showy; leaves glabrous; heads about 1 cm. high . . . . . **1. P. lanceolata.**
Rays hidden by the pappus; leaves finely hairy, at least at first; heads 1.5 to 5 cm. high, **2. P. erythropappa.**

1. Pyrrocoma lanceolata (Hook.) Greene. Frequent about dried-up ponds on prairie at east entrance. B. C. to Wyo. and Nebr.—Stems numerous, 10 to 20 cm. high, glabrous or nearly so; basal leaves oblanceolate, 5 to 10 cm. long, somewhat toothed; bracts 1.5 to 2 mm. wide.

2. Pyrrocoma erythropappa Rydb. Dry open slopes at east entrance. Idaho and Mont.—Stems few, stout, 15 to 30 cm. high.; basal leaves oblanceolate or obovate, usually entire, very thick; bracts 3 to 5 mm. wide, with a narrow thin border.

5. SOLIDAGO L. Goldenrod.

Low or tall perennials with rootstocks; leaves alternate, entire or toothed; heads small, panicled, with short rays; flowers yellow; pappus of slender whitish bristles.

Stem leaves, at least most of them, sharply toothed; leaves mostly lanceolate.
Leaves lanceolate, mostly 13 to 25 mm. wide; panicle usually broad and with long branches . . . . . **1. S. serotina.**
Leaves narrowly lanceolate or linear-lanceolate, mostly 5 to 12 mm. wide; panicle narrow, with short branches . . . . . **2. S. elongata.**
Stem leaves all or mostly entire, sometimes with low rounded teeth; leaves mostly oblanceolate.
Leaves very hairy on the stalks or on the margins near the base; plants of alpine or wet situations . . . . . **3. S. ciliosa.**
Leaves not hairy on the margins near the base, or very inconspicuously so; plants of low dry situations.
Heads 6 to 7 mm. high . . . . . **4. S. concinna.**
Heads 5 mm. high or less . . . . . **5. S. missouriensis.**

1. Solidago serotina Ait. Frequent at low altitudes, in low thickets or on open or brushy slopes, sometimes in woods; on the west slope occasionally found also at middle altitudes. B. C. to Colo., Ga., and Newf.—Stems stout, 0.5 to 1 meter high, usually glabrous or nearly so, often tinged with red or purple; leaves 5 to 15 cm. long, sessile, nearly glabrous but somewhat roughened on the veins beneath; heads about 5 mm. high.

Some of the specimens referred here have nearly as small panicles as *S. elongata*, but this is doubtless due to the fact that they grew in dry places.

2. Solidago elongata Nutt. Frequent at low altitudes, in bogs, low thickets, or deep woods, sometimes on open hillsides. B. C. to Calif., Nev., and Mont.—Stems slender, 0.5 to 1 meter high, glabrous or nearly so, very leafy; leaves 5 to 10 cm. long, slightly roughened; heads about 5 mm. high.

3. Solidago ciliosa Greene. Alpine goldenrod. Common above timber line, in meadows or on rock slides; occasional at middle or even low elevations, on open slopes or in woods or bogs. B. C. and Alta. to N. Mex. and Ariz.—Plants 5 to 30 cm. high, the stems stout, glabrous below; lowest leaves oblanceolate, shallowly toothed, glabrous, 2 to 7 cm. long, stalked; panicle narrow, usually dense; heads 5 to 7 mm. high, the bracts acute.

4. Solidago concinna A. Nels. Frequent on the east slope at low altitudes, on dry open hillsides, in aspen woods, or rarely on stream banks. B. C. and Alta. to Colo.—Stems stout, 20 to 50 cm. high, glabrous or nearly so; lowest leaves stalked, oblanceolate, 6 to 15 cm. long, entire or somewhat toothed, thick; bracts mostly acute.

5. Solidago missouriensis Nutt. Frequent on the east slope at low altitudes, on dry, brushy or open hillsides. B. C. to Oreg., Colo., and S. Dak.—Stems stout, 15 to 40 cm. high, glabrous; lowest leaves oblanceolate, 5 to 10 cm. long, glabrous, entire or slightly toothed; bracts mostly obtuse.

6. TOWNSENDIA Hook.

1. Townsendia parryi D. C. Eaton. Occasional on the east slope at low altitudes, on dry hills, shale banks, or prairie. Alta. to Idaho and Wyo.—Biennial, 10 to 20 cm. high; stem with appressed hairs, bearing a single head, leafy; leaves at base of stem spatulate, glabrous on the upper surface; head large, the rays 12 to 15 mm. long, purplish pink; pappus of long bristles.

The plants bloom early in the season.

7. ASTER L. Aster.

Perennials with rootstocks; leaves alternate, toothed or entire; heads few or many, mostly in panicles or corymbs, with purple to white rays; pappus of numerous whitish bristles.

Involucres and peduncles with viscid glands.
- Stem leaves ovate or obovate, very rough, coarsely toothed . . **2. A. conspicuus.**
- Stem leaves linear, lanceolate, or oblong, not rough, mostly entire.
  - Leaves lanceolate or oblong, mostly 1 to 3 cm. wide; involucre 1 cm. long. **3. A. sayianus.**
  - Leaves linear or linear-oblong, less than 1 cm. wide; involucre 6 to 7 mm. long. **4. A. campestris.**

Involucres and peduncles without glands.
- Bracts hairy (sometimes only minutely hairy) on the back.
  - Bracts not bristle-tipped; rays pink to purple.
    - Heads 1.5 cm. high; rays pink; stems glabrous or nearly so. **1. A. engelmannii.**
    - Heads 1 cm. high or less; rays mostly purple; stems hairy.
      - Stem leaves oblanceolate or obovate, narrowed at the base; heads 1 or few. **5. A. meritus.**
      - Stem leaves linear or narrowly oblong, clasping; heads numerous. **6. A. nelsonii.**
  - Bracts tipped with a short bristle; rays white.
    - Pubescence of the stems of appressed hairs . . . . . **7. A. polycephalus.**
    - Pubescence of the stems of loose spreading hairs.
      - Heads about 5 mm. high . . . . . **8. A. exiguus.**
      - Heads 6 to 9 mm. high . . . . . **9. A. crassulus.**
- Bracts glabrous on the back, the margins sometimes hairy.
  - Plants glabrous throughout . . . . . **10. A. laevis.**
  - Plants hairy, at least on the upper part of the stem.
    - Outer bracts much shorter than the inner ones, never leaflike.
      - Heads about 1 cm. broad; stem leaves linear-lanceolate. **11. A. occidentalis.**
      - Heads about 1.5 cm. wide; stem leaves lanceolate or oblong. **12. A. fremontii.**
    - Outer bracts mostly as long as the inner ones or longer, often leaflike.
      - Heads numerous, 6 to 8 mm. high; outer bracts often reflexed. **13. A. oreganus.**
      - Heads few, 10 mm. high or more; outer bracts not reflexed. **14. A. frondeus.**

1. Aster engelmannii D. C. Eaton. Pink aster. Frequent, especially on the east slope, at low and middle altitudes, in low thickets or in woods; often found near or just above timber line. B. C. and Wash. to Nev., Colo., and Alta. (*Eucephalus*

engelmannii Greene.)—Stems stout, unbranched, 0.5 to 1 meter high, usually glabrous, very leafy; leaves mostly ovate, 5 to 10 cm. long, sessile, entire; heads few, in a corymb, the bracts pale, often purplish; rays few, pink or rarely lavender.

The rays are not nearly so numerous as in our other species, and they are rather widely spaced.

2. Aster conspicuus Lindl. ROUGH ASTER. PLATE 52, A. Common at low and middle altitudes, in thickets or thin woods, sometimes on open slopes. B. C. to Oreg., Wyo., and S. Dak.—Stems 30 to 60 cm. high, glabrous or rough, very leafy; leaves 7 to 15 cm. long, obtuse or acute, thick, sessile; heads few or numerous, 10 to 13 mm. high; rays pale purple.

3. Aster sayianus Nutt. Common at low and middle altitudes, in bogs, wet thickets, or moist woods, sometimes among aspens or on open slopes. B. C. to Oreg., Mont., and Alta.—Stems slender, 30 to 80 cm. high, hairy, usually purplish, very leafy; leaves thin, 4 to 8 cm. long, entire or slightly toothed, sessile; heads few, in a leafy cluster; rays usually deep purple, sometimes pale purple.

4. Aster campestris Nutt. Occasional on the east slope at low altitudes, on dry open hillsides or low flats. B. C. to Oreg., Colo., and Alta.—Stems 20 to 40 cm. high, stiff and brittle, rough-hairy; leaves sessile, 2 to 4 cm. long; heads few or numerous; rays bright purple.

The plant blooms at the end of summer.

5. Aster meritus A. Nels. Abundant above timber line on rock slides and open slopes; occasional at middle or even low altitudes, on flats or open rocky slopes. B. C. to Wyo. and S. Dak.—Plants 5 to 20 cm. high, often prostrate, usually forming loose mats, the stems purplish, hairy; leaves 2 to 7 cm. long, finely hairy, entire or toothed, sessile, obtuse or acute; rays purple to lavender.

A showy plant, often conspicuous, especially on rock slides, forming great mats over the ground. It is abundant in sand along the river at Belton, but it is typically an alpine species.

6. Aster nelsonii Greene. Frequent on the east slope at low altitudes, on open hillsides or rocky flats or in low thickets. Wash. and Oreg. to Mont. and Colo.—Plants stout, 20 to 50 cm. high, the stems with mostly appressed hairs; leaves 4 to 7 cm. long, rough, thick; heads about 8 mm. high; rays pale purple.

7. Aster polycephalus Rydb. Prairie at east entrance. Alta. to Ariz., Tex., and Nebr.—Stems 20 to 50 cm. high; leaves linear, 2 to 5 cm. long, rough-hairy; heads 6 to 8 mm. high; rays 4 to 5 mm. long.

8. Aster exiguus (Fernald) Rydb. Occasional at low altitudes, on open slopes. Wash. to Tex., Pa., and Vt.—Plants 10 to 40 cm. high, often branched, very leafy; leaves linear or oblong, 1 to 3 cm. long, finely hairy, sessile; rays 3 to 4 mm. long.

9. Aster crassulus Rydb. Dry banks at east entrance. Sask. to Calif., Colo., and N. Dak.—Plants branched, 25 to 50 cm. high; leaves linear or linear-oblong, 2 to 5 cm. long, sessile, finely hairy; heads numerous, the bracts broad, with spreading tips; rays 4 to 6 mm. long.

10. Aster laevis L. Common at low and sometimes at middle altitudes, on brushy slopes, in woods, or on flats. B. C. to N. Mex., La., and Ont.—Plants pale green, 30 to 60 cm. high; leaves ovate or lanceolate, entire or toothed, the lower ones long-stalked; heads few or numerous, 8 to 9 mm. high, the bracts very unequal, closely appressed; rays pale blue or purple.

A showy plant, abundant along the automobile road on the east side of the park, often forming large dense patches.

11. Aster occidentalis Nutt. Belton, in sandy thickets. Yukon to Calif. and Colo.—Plants 20 to 60 cm. high, nearly glabrous; leaves entire or toothed, bright green; heads numerous; rays pale purple.

12. Aster fremontii (Torr. & Gray) A. Gray. Low thickets at east entrance. B. C. and Alta. to Colo. and Utah. (*A. umbachii* Rydb.)—Plants stout, 20 to 60 cm. high, nearly glabrous, very leafy; leaves 3 to 10 cm. long, entire; heads few or numerous; rays purple, 7 to 10 mm. long.

13. Aster oreganus Nutt. Frequent at low altitudes, in swamps or bogs or in low thickets. B. C. to Nev. and Mont.—Stems slender, 20 to 70 cm. high, nearly glabrous; leaves linear-lanceolate, 3 to 8 cm. long, sessile, bright green, entire; panicles very leafy; rays lavender or pinkish.

14. Aster frondeus (A. Gray) Greene. Common nearly everywhere, in woods or thickets or on open slopes; frequent above timber line. B. C. and Alta. to Colo.—Plants 15 to 90 cm. high, nearly glabrous; leaves mostly oblanceolate, 5 to 15 cm. long, entire; rays purple.

The commonest aster of the park, flowering nearly throughout the summer. The plants are somewhat variable and many of the forms have been separated as species. Those growing above timber line are usually only 10 to 20 cm. high; this form is *A. apricus* (A. Gray) Rydb., but it differs from *A. frondeus* only in size.

8. ERIGERON L. Fleabane.

Perennials or occasionally annuals; leaves alternate, sometimes all at the base of the stem, entire, toothed, or lobed; heads small or large, usually with showy rays, these white, pink, or purple; pappus of slender bristles.

Rays inconspicuous, erect or nearly so, usually inrolled from the sides; leaves entire
  Heads only 3 to 4 mm. broad; lower leaves often toothed . . . . **1. E. canadensis.**
  Heads 7 to 12 mm. broad; leaves entire.
    Heads many on each stem; plants mostly 20 to 40 cm. high . . . . . **2. E. acris.**
    Heads usually 1 or 2 on each stem; plants mostly 5 to 15 cm. high.
      Heads not black-hairy . . . . . **3. E. jucundus.**
      Heads densely black-hairy . . . . . **4. E. unalaschkensis.**
Rays conspicuous, long and spreading; in one species the rays sometimes wanting, but the leaves deeply lobed.
  Leaves divided into linear lobes . . . . . **5. E. compositus.**
  Leaves entire or toothed.
    Stems low, usually less than 15 cm. high, each with a single head.
      Rays white . . . . . **6. E. caespitosus.**
      Rays pink or purple.
        Bracts densely woolly with soft hairs.
          Lowest leaves very hairy, often 3-toothed . . . . . **7. E. lanatus.**
          Lowest leaves glabrous or nearly so, entire . . . . . **8. E. uniflorus.**
        Bracts glabrous or with glands or with short stiff hairs.
          Leaves glabrous or nearly so; bracts not hairy . . . . . **9. E. leiomerus.**
          Leaves hairy; bracts short-hairy . . . . . **10. E. nanus.**
    Stems tall, usually 20 to 60 cm. high or more, sometimes low but each stem then with 2 or more heads.
      Rays white or pink.
        Stems with fine, closely appressed hairs . . . . . **11. E. ramosus.**
        Stems with short or long spreading hairs.
          Heads about 1.5 cm. broad; bracts with long loose hairs . . . **13. E. asper.**
          Heads 1 cm. broad or less; bracts with short, often close hairs.
            Leaves entire; plants in clumps, less than 20 cm. high. **6. E. caespitosus.**
            Leaves mostly with low teeth; plants not in clumps, usually 30 to 50 cm. high . . . . . **12. E. philadelphicus.**

Rays purple.

Tips of the bracts loose and spreading; heads nearly always one on each stem. **14. E. salsuginosus.**

Tips of the bracts appressed; heads usually several on each stem.

Leaves very hairy . . . . . **15. E. conspicuus.**

Leaves glabrous except on the margins and sometimes on the main veins.

Bracts with long spreading hairs . . . . . **16. E. speciosus.**

Bracts minutely hairy and glandular . . . . . **17. E. macranthus.**

1. Erigeron canadensis L. HORSEWEED. Occasional in waste or cultivated ground at Belton and about the head of Lake McDonald. Widely distributed in N. Amer. (*Leptilon canadense* Britton.)—Annual, 30 to 100 cm. high, very hairy; leaves linear or oblanceolate, 2 to 10 cm. long; heads very numerous, in a long narrow panicle; flowers white.

2. Erigeron acris L. Rather rare, at low altitudes, in thin woods or on brushy slopes. Alaska to B. C., Colo., Me., and Lab.; also in Eur. and Asia. (*E. droebachensis* Muell.: *E. yellowstonensis* A. Nels.)—Biennial or perennial, with hairy or nearly glabrous stems; leaves entire, the lowest ones spatulate or oblanceolate, 5 to 10 cm. long; heads 6 to 8 mm. high, with very short rays.

A somewhat variable plant, several forms of which are treated by some authors as separate species. The flower heads are inconspicuous.

3. Erigeron jucundus Greene. Frequent above timber line, in meadows or on rock slides or exposed summits; sometimes found on cliffs or open slopes at middle altitudes. B. C. to Colo. and Que.—Stems finely hairy, often clustered; lowest leaves spatulate, entire, hairy; heads about 6 mm. high, the bracts often purplish; rays very short, pink.

4. Erigeron unalaschkensis (DC.) Rydb. Rocky slopes at Swiftcurrent Pass. Alaska to Mont., Lab., and Greenl.—Perennial, hairy; leaves 1 to 3 cm. long, spatulate; heads solitary, 8 to 10 cm. high, the bracts purplish; rays white.

5. Erigeron compositus Pursh. CUTLEAF FLEABANE. Frequent above timber line, on rock slides and exposed summits; occasional at middle and low altitudes, on exposed slopes. Alaska to Calif., Colo., Sask., and Greenl.—Plants perennial, often in dense tufts; stems naked or with a few linear entire leaves, bearing a single head; basal leaves 1 to 4 cm. long, 1 or 2 times divided, hairy or glabrous; heads about 7 mm. high; rays white or pink, sometimes none.

The glabrous form is *E. compositus nudus* Rydb. Plants with and without rays often grow side by side.

6. Erigeron caespitosus Nutt. WHITE FLEABANE. Frequent on the east slope at low altitudes, on dry rocky hillsides or flats. Yukon to Utah and Colo.—Plants 10 to 15 cm. high, densely tufted, finely hairy; leaves oblanceolate, 4 to 10 cm. long, entire; obtuse, 3-nerved; heads 6 to 7 mm. high; rays white, 6 to 10 mm. long.

7. Erigeron lanatus Hook. Open rocky slopes at Piegan Pass. B. C., Alta., and Mont.—Perennial, loosely tufted, hairy; heads 10 to 12 mm. high, densely white-woolly; rays pale purplish.

8. Erigeron uniflorus L. Frequent above timber line on rocky slopes or exposed summits. Alaska to Calif., Colo., and Mont.; also in Eur. (*E. simplex* Greene.)—Plants perennial, 5 to 10 cm. high, hairy; lowest leaves spatulate or oblanceolate, 2 to 4 cm. long; heads 8 to 10 mm. high, white-woolly; rays pink.

9. Erigeron leiomerus A. Gray. Moist rocky slopes at Sexton Glacier and Piegan Pass. Alta. to Utah and N. Mex.—Basal leaves spatulate, 2 to 5 cm. long, obtuse; heads 5 to 7 mm. high, the bracts purplish; rays pale purple.

10. Erigeron nanus Nutt. Moist open slopes at Morning Eagle Falls; rare. Mont. to Colo. and Utah. (*E. poliospermus* A. Gray.)—Lower leaves linear-oblanceolate, 3 to 5 cm. long, obtuse; heads 5 to 7 mm. high; rays pink or white.

11. Erigeron ramosus (Walt.) B. S. P. DAISY FLEABANE. Occasional on dry brushy slopes or in waste ground at Belton. B. C. to N. S. and Fla.—Annual, 30 to 70 cm. high, branched, with slender stems; stem leaves linear, entire; heads numerous, 3 to 4 mm. high, with numerous white rays about 5 mm. long.

Probably introduced here; a common weed in the eastern States.

12. Erigeron philadelphicus L. Sandbar along creek at east entrance; only one plant found. B. C. to Calif., Fla., and Lab.—Biennial, the stems slightly branched above; lowest leaves oblanceolate, short-stalked; stem leaves clasping; heads 4 to 5 mm. high; rays pinkish, very numerous, 5 to 6 mm. long.

13. Erigeron asper Nutt. Collected on hillsides at east entrance by Umbach. Mont. and Alta. to N. Dak.—Stems 20 to 50 cm. high, very hairy; lower leaves linear-oblanceolate, 3 to 10 cm. long, entire or somewhat toothed, hairy; heads 1 to 4, 5 to 7 mm. high; rays white or pink.

14. Erigeron salsuginosus (Richards.) A. Gray. SHOWY FLEABANE. PLATE 52, B. Abundant above and just below timber line, in moist meadows or on rock slides; sometimes found in moist places at middle altitudes, occasionally in woods. Alaska to Calif., N. Mex., and Sask.—Stems 15 to 50 cm. high; lowest leaves oval, obovate, or spatulate, 5 to 10 cm. long, glabrous or nearly so; heads about 1 cm. high, 1.5 to 2 cm. broad; rays broad, purple or pale purple.

Our showiest species of *Erigeron*, often the most conspicuous and abundant plant of high meadows.

15. Erigeron conspicuus Rydb. Occasional at low altitudes on the east slope, on open hillsides or in meadows. Wash. to Mont. and Colo.—Stems clustered, 25 to 50 cm. high, very hairy, densely leafy; stem leaves lanceolate, sessile, entire; heads 8 mm. high, 1.5 to 2 cm. broad; rays narrow, purple.

16. Erigeron speciosus DC. Frequent on the east slope at low altitudes, among aspens, on open hillsides, or in low thickets. B. C. and Alta. to Colo. and Oreg.—Stems clustered, 30 to 50 cm. high, glabrous or nearly so, very leafy; stem leaves oblong or lanceolate, entire; heads 7 to 8 mm. high; rays narrow, purple.

17. Erigeron macranthus Nutt. Frequent on the east slope at low and middle altitudes, on open hillsides, in aspen woods, or along streams. B. C. to Oreg., N. Mex., and Alta.—Stems clustered, 20 to 50 cm. high, glabrous or nearly so; stem leaves ovate to linear-lanceolate, entire; heads 7 to 8 mm. high; rays narrow, bluish purple.

This and the last two preceding species are similar in general appearance. They are showy plants but seldom occur in abundance.

9. ANTENNARIA Gaertn. PUSSYTOES.

Perennials, usually densely woolly, often with long or short runners; leaves alternate, entire, usually forming rosettes; heads without ray flowers, in corymbs or racemes, the pistillate and staminate flowers on separate plants; achenes with copious pappus of white bristles.—The species are difficult to separate, and the validity of many of them is uncertain.

Plants with erect stolons or with none.

Heads 4 to 5 mm. high; bracts nearly glabrous, scarious throughout. **1. A. luzuloides.**

Heads 6 to 10 mm. high; bracts very woolly below, only the tips scarious.

Bracts with a large dark spot; bracts of pistillate heads acute; plants 10 to 20 cm. high . . . . . **2. A. lanata.**

Bracts with small or no dark spot; bracts of pistillate heads obtuse; plants usually 30 to 40 cm. high . . . . . **3. A. anaphaloides.**

Plants with prostrate runners.
Heads on long slender stalks, in loose racemes; bracts nearly glabrous; leaves glabrous on the upper surface . . . . . **4. A. racemosa.**
Heads usually short-stalked, in corymbs; bracts woolly at the base; leaves glabrous or usually woolly.
Upper portion of the bracts pink, white, or yellowish white.
Leaves glabrous on the upper surface . . . . . **5. A. howellii.**
Leaves woolly on the upper surface.
Bracts with pink tips . . . . . **6. A. rosea.**
Bracts with white or yellowish white tips.
Leaves of the runners loose, narrowly oblanceolate; bracts with dark spots . . . . . **7. A. corymbosa.**
Leaves of the runners dense, spatulate; bracts without dark spots.
Bracts of the pistillate heads obtuse . . . . . **8. A. arida**
Bracts of the pistillate heads (at least the inner ones) acute. **9. A. microphylla.**
Upper portion of the bracts blackish, dark green, or pale or dark brown.
Leaves becoming glabrous and green . . . . . **10. A. chlorantha.**
Leaves very woolly on both sides.
Leaves of the runners broadly obovate-wedge-shaped, nearly sessile. **11. A. pulvinata.**
Leaves of the runners spatulate or oblanceolate, narrowed into distinct petioles.
Bracts very dark, nearly black . . . . . **12. A. media.**
Bracts brown or pale brown.
Pubescence of the leaves of closely appressed yellowish hairs. **13. A. flavescens.**
Pubescence of the leaves of rather loose white hairs.
Bracts of the pistillate heads acute or acutish . . . **14. A. oxyphylla.**
Bracts of the pistillate heads obtuse.
Involucres somewhat viscid; bracts with pale tips. **15. A. sedoides.**
Involucres not viscid; bracts with brown tips . . **16. A. umbrinella.**

1. Antennaria luzuloides Torr. & Gray. Frequent on open, rocky, or brushy slopes at middle altitudes, or sometimes above timber line. B. C. to Oreg., Wyo., and Mont.—Plants slender, 20 to 40 cm. high; leaves linear-oblanceolate, 3 to 8 cm. long, acute or obtuse, silky-woolly, usually with conspicuous nerves; heads numerous, pale brown. Plants often deformed by galls.

2. Antennaria lanata (Hook.) Greene. Rare on open rocky slopes about Gunsight Pass. B. C. to Oreg., Mont., and Alta.—Plants densely and loosely white-woolly; leaves narrowly oblanceolate, 3 to 8 cm. long; heads few, densely clustered; bracts with pale tips.

3. Antennaria anaphaloides Rydb. Occasional on dry hillsides at low altitudes. B. C. to Oreg., Colo., and Mont.—Plants densely silky-woolly; leaves narrowly oblanceolate, 8 to 15 cm. long, acute, conspicuously nerved; heads numerous, in a dense corymb, the bracts with white tips.

4. Antennaria racemosa Hook. Frequent in meadows above timber line; sometimes on open grassy slopes at lower levels. B. C. to Calif., Wyo., and Alta.—Plants 15 to 40 cm. high, with long runners; leaves oval or spatulate, 3 to 6 cm. long, obtuse, stalked, bright green on the upper surface, woolly beneath; heads few, 6 to 8 mm. high, the bracts greenish, acute.

5. Antennaria howellii Greene. Meadow among aspens at east entrance; the species has been collected at Columbia Falls and so is probably to be found about Belton.

B. C. and Wash. to Mont. and Alta.—Plants matted, 15 to 30 cm. high; leaves oblanceolate or obovate, 2 to 5 cm. long, obtuse or acutish, closely white-woolly beneath; heads 8 to 10 mm. high, the bracts very acute.

6. Antennaria rosea (D. C. Eaton) Greene. Frequent at low altitudes, in gravelly meadows, on open rocky slopes, in aspen woods, or in low thickets. Yukon to Calif., Colo., and S. Dak.—Plants slender, 15 to 40 cm. high, loosely woolly; leaves oblanceolate 1.5 to 3 cm. long, obtuse or acute; heads few, about 5 mm. high, loosely or densely clustered, the bracts obtuse, with pale or deep pink tips.

The form with deep pink bracts is a handsome plant.

7. Antennaria corymbosa E. Nels. Meadows about the east entrance, *Umbach*. Oreg. to Mont. and Colo.—Plants slender, 20 to 30 cm. high; basal leaves 1.5 to 3 cm. long, acute; heads few, 4 to 5 mm. high; bracts of the pistillate heads obtuse.

8. Antennaria arida E. Nels. Gravelly meadows below Lake McDermott, and dry rocky slopes of Altyn Peak. Idaho and Mont. to N. Mex. and Utah.—Plants 10 to 15 cm. high; leaves spatulate, 1 to 1.5 cm. long, obtuse, closely woolly; heads 6 to 8 mm. high.

9. Antennaria microphylla Rydb. Low meadow at St. Mary, abundant; dry gravel bank at Belton, frequent. Yukon to Nebr. and N. Mex.—Plants slender, 15 to 30 cm. high; leaves oblanceolate, obtuse or acutish, with closely appressed pubescence; heads few, densely clustered, 5 to 6 mm. high.

10. Antennaria chlorantha Greene. Meadows about Iceberg Lake and Grinnell Glacier. B. C. and Mont.—Plants 5 to 15 cm. high; leaves oblanceolate, 1.5 to 2.5 cm. long, acutish, at first loosely woolly but becoming glabrous and green; heads densely clustered, 5 to 7 mm. high, the bracts dark green.

11. Antennaria pulvinata Greene. Frequent above timber line, on open rocky slopes or in moist meadows. Alta., B. C., and Mont.—Plants matted, 5 to 10 cm. high; leaves 1 to 1.5 cm. long, rounded at the apex, loosely woolly; heads few, densely clustered, the bracts dark green.

12. Antennaria media Greene. Common above timber line, in meadows or on moist rocky slopes. B. C. to Calif., Colo., and Alta.—Plants matted, 5 to 12 cm. high; leaves obtuse, 1 to 2 cm. long, loosely woolly; heads few, densely clustered; inner bracts of the pistillate heads acute.

13. Antennaria flavescens Rydb. Collected on Mount Henry by Umbach. Wash. to Mont. and Colo.—Plants matted, 10 cm. high; leaves about 1 cm. long; heads densely clustered, 4 to 5 mm. high; bracts very obtuse.

14. Antennaria oxyphylla Greene. Moist cliffs near Gunsight Pass, and open banks near Lake McDermott. Idaho to Nebr. and Wyo.—Plants 20 to 40 cm. high; leaves spatulate-obovate, 1.5 to 3 cm. long; heads 6 to 7 mm. high.

15. Antennaria sedoides Greene. High rock slides at Iceberg Lake. B. C. to Man. and Colo.—Plants loosely matted, about 10 cm. high; leaves spatulate, about 1 cm. long; heads 5 to 6 mm. high; lower portion of the bracts greenish or brownish.

16. Antennaria umbrinella Rydb. Open slopes at Sun Camp and Cracker Lake; also collected at Duck Lake by Weller. B. C. to Colo.—Plants matted, 7 to 12 cm. high; leaves spatulate, 1 to 1.5 cm. long; heads few, 5 mm. high, densely clustered.

10. ANAPHALIS DC.

1. Anaphalis margaritacea (L.) Benth. & Hook. PEARLY EVERLASTING. Frequent at low altitudes, on dry banks or in woods, swamps, or thickets. Widely distributed in N. Amer.; also in Asia.—Perennial with slender rootstocks, 20 to 40 cm. high; leaves alternate, linear to oblong, 3 to 8 cm. long, entire, white-woolly, sometimes becoming green on the upper surface; heads 6 to 7 mm. high, in a loose or dense cluster; bracts white and papery; flowers yellow; pappus of slender bristles.

The flower heads are conspicuous and rather attractive; they last all summer. It is probably this plant (or perhaps it is one of the species of *Antennaria*) that is seen by tourists, who report that they have found on one of the trails edelweiss "exactly like what I saw when I was in Switzerland." It is scarcely necessary to state that no plant with a very close resemblance to edelweiss is found in the Rocky Mountains.

11. GNAPHALIUM L.

Annuals, biennials, or perennials, with white-woolly pubescence; leaves alternate, narrow, entire; heads without rays, in small dense clusters, the bracts papery; pappus of slender bristles.

Plants biennial, 50 to 80 cm. high; heads nearly glabrous, the clusters not leafy. **1. G. macounii.**

Plants annual, 5 to 15 cm. high; heads woolly, the clusters surrounded by leaves. **2. G. palustre.**

1. Gnaphalium macounii Greene. TALL CUDWEED. At low altitudes, infrequent; in thin woods or on dry open slopes. B. C. to Ariz., Pa., and N. S. (*G. decurrens* Ives.)—Plants solitary, with 1 or few slender stems; leaves linear or oblanceolate, 4 to 10 cm. long, the upper surface becoming green, covered with small glands; heads 5 mm. high, sometimes in broad panicles, the bracts yellowish white.

2. Gnaphalium palustre Nutt. LOW CUDWEED. East entrance, in open moist ground, frequently about ponds on prairie. B. C. to Calif., N. Mex., and Nebr.—Plants loosely woolly, usually much branched; leaves spatulate or oblanceolate, 1 to 2 cm. long, woolly on both sides; heads 3 to 4 mm. high, in small woolly clusters, the bracts brownish white.

12. ADENOCAULON Hook.

1. Adenocaulon bicolor Hook. PATHFINDER. Abundant on the west slope at low and middle elevations; local on the east slope, frequent about Sun Camp, but apparently absent in the Many Glacier region; in dry or moist woods or thickets. B. C. to Calif., Mont., and L. Superior.—Perennial, with rootstocks, 0.3 to 1 meter high; leaves alternate, triangular and heart-shaped, 5 to 20 cm. long, thin, green on the upper side, white-woolly beneath, with low rounded teeth; heads about 3 mm. long, the 4 or 5 bracts spreading in fruit; flowers pure white; achenes bearing small stalked glands, spreading.

A characteristic plant of the west slope. The very sticky achenes adhere readily to clothing.

13. IVA L.

1. Iva xanthifolia Nutt. Reported from Belton by Jones. Wash. to N. Mex. and Mich. (*Cyclachaena xanthifolia* Fresen.)—Coarse annual, about 1 meter high; leaves mostly opposite, petioled, ovate, 5 to 10 cm. long, toothed, rough-hairy; heads panicled, 4 to 5 mm. broad, the flowers greenish yellow; achenes without pappus.

14. AMBROSIA L. RAGWEED.

Annuals or perennials, strong-scented; leaves mostly opposite, divided into narrow lobes; flowers greenish yellow, in small heads, the staminate and pistillate in separate heads; rays none; achenes hard, with a few short spines; pappus none.

Plants perennial, with rootstocks; leaves once lobed, the lobes usually toothed. **1. A. psilostachya.**

Plants annual; leaves twice lobed . . . . . **2. A. elatior.**

1. Ambrosia psilostachya DC. WESTERN RAGWEED. Waste ground about Belton and east entrance; rare and evidently introduced. Calif. to La. and Ill.—Plants 20 to 60 cm. high, with short appressed hairs; leaves thick, with broad lobes; achenes often unarmed.

2. Ambrosia elatior L. COMMON RAGWEED. A few plants along the railroad at Belton; evidently introduced. Widely distributed in N. Amer.—Plants 0.3 to 1 meter high, with appressed or spreading hairs; leaves thin, divided into narrow lobes; achenes with a few sharp spines.

The pollen from this plant is one of the chief causes of hay fever.

15. BALSAMORRHIZA Hook.

1. Balsamorrhiza sagittata (Pursh) Nutt. BALSAMROOT. Frequent on the east slope at low and middle altitudes, on dry open hillsides. B. C. to Calif., Colo., and S. Dak.—Perennial, 30 to 60 cm. high, densely covered with close matted white hairs; root very thick and resinous; leaves arrow-shaped or heart-shaped, erect, 10 to 30 cm. long, long-stalked, entire or nearly so; flower stalk leafless, bearing a few showy heads, the involucre 2.5 cm. broad, the yellow rays 2 to 3 cm. long.

The Blackfoot Indians, like many other western tribes, are said to use the roots for food. In some parts of the West in early days the white settlers also used the roots in times of scarcity, and the plant is known in Utah as "Mormon biscuit."

16. HELIANTHUS L. SUNFLOWER.

Annuals or perennials; leaves opposite or alternate, entire or toothed; heads large, solitary or in corymbs, stalked, the bracts unequal and overlapping; pappus of 2 scales or awns.

Plants annual; upper leaves conspicuously stalked; bracts 5 to 6 mm. wide.
1. H. annuus.

Plants perennial; upper leaves sessile or nearly so; bracts 1.5 to 3 mm. wide.
Leaves ovate, the upper ones opposite; head usually one on each stem; central flowers of the head purplish brown . . . . . **2. H. subrhomboideus.**
Leaves narrowly lanceolate, the upper ones alternate; central flowers yellow.
3. H. fascicularis.

1. Helianthus annuus L. COMMON SUNFLOWER. A few plants found on the east slope along railroad and roadsides; evidently introduced. Wash. to Calif., Tex., and Sask. (*H. lenticularis* Dougl.)—Plants 1 to 2 meters high or often lower, hairy; leaves mostly alternate, broadly ovate, rough, toothed, long-stalked; heads 4 to 5 cm. broad.

2. Helianthus subrhomboideus Rydb. Dry shale slopes at east entrance. Man. and Alta. to N. Mex. and Ark.—Plants 30 to 60 cm. high, with slender rootstocks; stems hairy below, purplish; leaves 4 to 8 cm. long, most of them near the base of the stem, short-stalked, very rough, entire or toothed; heads 1.5 to 2 cm. broad, the bracts ovate, hairy on the margins.

3. Helianthus fascicularis Greene. A few plants in dry soil near Many Glacier Hotel; apparently introduced. Alta. and Sask. to N. Mex. and Ariz.—Stems 0.5 to 1 meter high, glabrous or nearly so; leaves 5 to 15 cm. long, rough, nearly entire, the lower ones opposite; heads 2 to 3 cm. broad, the bracts linear.

17. MADIA Molina.

1. Madia glomerata Hook. TARWEED. Common on the east slope at low altitudes, on prairie or open hillsides, often in cultivated ground and about dried-up ponds on prairie. B. C. to Calif., N. Mex., and Sask.—Annual, 20 to 40 cm. high, hairy and very sticky; leaves alternate, entire, linear; heads about 6 mm. high, the bracts inclosing the achenes; flowers yellow, the rays very short, 3-lobed; pappus none.

The plant has a strong and unpleasant odor.

18. HYMENOXYS Cass.

1. Hymenoxys richardsonii (Hook.) Cockerell. Collected on dry hills at east entrance by Umbach. Sask. to Mont.—Perennial, 10 to 30 cm. high, usually in small

dense clumps, slightly hairy; leaves alternate, divided into narrowly linear lobes; heads 1 or few, 8 mm. high; flowers yellow; pappus of 5 scales.

From a closely related species of Colorado, rubber was for a time extracted upon a commercial scale.

19. GAILLARDIA Foug.

1. **Gaillardia aristata** Pursh. BROWN-EYED SUSAN. Common on the east slope at low and middle altitudes, infrequent on the west slope, but found at Belton and doubtless elsewhere; on prairie or open slopes; occasionally growing on slopes above timber line. B. C. to Oreg., Colo., and S. Dak.—Perennial, 30 to 60 cm. high, hairy; leaves oblanceolate, entire or more commonly toothed or lobed; heads long-stalked, the involucre 2 to 3 cm. broad, the rays 2 to 3 cm. long, broad, 3-lobed, yellow, often purplish at the base; disk flowers brownish purple.

A handsome plant, often cultivated under the name of blanket-flower. The cultivated plants are scarcely superior to some of the wild ones in the size of their heads.

20. ACHILLEA L.

1. **Achillea lanulosa** Nutt. YARROW. Common, especially at high and low altitudes, in meadows or on rock slides, open slopes, or prairie. B. C. to Calif., Mex., Sask., and Ont.—Perennial, 15 to 50 cm. high, with a strong odor, silky-hairy; leaves alternate, also in basal tufts, 3 to 10 cm. long, plumelike, 2 or 3 times divided into numerous small narrow lobes; heads 4 to 5 mm. high, in flat-topped clusters, the bracts with brown borders; rays 2.5 to 4 mm. long, white, rarely pink; pappus none.

Yarrow is one of the common plants in nearly all parts of the United States. The leaves are very handsome.

21. MATRICARIA L.

1. **Matricaria matricarioides** (Less.) Porter. PINEAPPLE-WEED. Frequent on the east slope at low altitudes, in waste ground or on open slopes or prairie. Alaska to Calif., Ariz., and N. Dak.: also in Eur. (*Chamomilla suaveolens* Rydb.)—Annual, nearly glabrous, 5 to 30 cm. high, usually much branched; leaves alternate, 2 or 3 times divided into short linear lobes; heads without rays, 6 to 8 mm. broad, the disk rounded; bracts thin, with whitish margins; flowers greenish yellow; pappus an inconspicuous crown.

The plant has a strong but not unpleasant odor. The dried flowers were used by the Blackfoot Indians as a perfume.

22. CHRYSANTHEMUM L.

The cultivated chrysanthemums belong to this genus.

1. **Chrysanthemum leucanthemum** L. OX-EYE DAISY. Occasional about Belton, on brushy slopes or in waste ground. Native of Eur.; naturalized as a weed in N. Amer. (*Leucanthemum leucanthemum* Rydb.)—Perennial, 30 to 100 cm. high, glabrous; leaves linear to obovate, toothed or lobed; heads long-stalked, the involucre about 1.5 cm. broad, the bracts with a narrow brown band near the margin; rays white, 12 to 15 mm. long.

One of the commonest weeds of the eastern States, but rare in the Rocky Mountains.

23. ARTEMISIA L. WORMWOOD.

Herbs or shrubs, usually perennial, with aromatic odor and bitter flavor; leaves alternate, usually white-woolly; heads small, paniculed, without rays; achenes usually glabrous, without pappus.

Plants shrubby. Leaves linear, entire . . . . . **1. A. cana.**
Plants herbaceous.
Leaves glabrous.
Leaves divided into numerous linear lobes . . . . . **2. A. biennis.**
Leaves linear, entire . . . . . **3. A. dracunculoides.**

Leaves hairy or woolly.
Leaves silky-hairy, the hairs straight, not matted; leaves divided into numerous linear lobes.
Leaves 1 to 1.5 cm. long, densely covered with white silky hairs; heads very hairy. . . . . **4. A. frigida.**
Leaves 3 to 12 cm. long or longer, thinly hairy; heads glabrous or slightly hairy.
Heads very numerous, 2 to 3 mm. broad . . . . . **5. A. forwoodii.**
Heads few, 4 to 5 mm. broad . . . . . **6. A. spithamaea.**
Leaves woolly, at least on the lower surface, with matted white hairs.
Leaves twice divided into linear lobes, often green on the upper surface. **7. A. discolor.**
Leaves entire, toothed, or once lobed, white on both surfaces.
Lower leaves entire or shallowly toothed . . . . . **8. A. gnaphaloides.**
Lower leaves lobed.
Leaves deeply lobed, the lobes numerous, linear or oblong . **9. A. floccosa.**
Leaves with a few (3 or 5) broad lanceolate lobes . . . **10. A. diversifolia.**

1. Artemisia cana Pursh. SAGEBRUSH. Frequent on prairie about the east entrance. Oreg. to Sask., Colo., and Utah.—Densely branched shrub, 30 to 60 cm. high, covered with fine whitish hairs; leaves 2 to 4 cm. long, acute; heads in a spikelike panicle.

The common sagebrush, *Artemisia tridentata* Nutt., apparently does not grow about the park.

2. Artemisia biennis Willd. In dried-up pools on prairie about the east entrance; scarce. B. C. to Calif., N. J., and N. S.—Biennial, 30 to 100 cm. high, with purplish stems; lobes of the leaves linear or lanceolate, toothed or lobed; heads 2 to 3 mm. wide, in a dense, very leafy panicle; flowers yellow.

3. Artemisia dracunculoides Pursh. Dry flats near St. Mary and Babb. B. C. to Calif., Tex., and Mo.—Plants perennial, erect, 0.5 to 1 meter high, glabrous; leaves 3 to 7 cm. long; heads glabrous, 2 to 3 mm. wide.

4. Artemisia frigida Willd. Rocky flats or prairie about St. Mary and the east entrance, frequent; dry gravel bank near Belton, rare. Alaska to Idaho, Ariz., and Tex.; also in Asia.—Silky-hairy perennial, 15 to 40 cm. high, forming dense silvery clumps; leaves twice divided into very slender lobes; heads 4 to 5 mm. broad, in narrow panicles; flowers yellow.

Among the Blackfoot Indians a decoction of the plant was used as a drink in cases of fever. The leaves were chewed as a remedy for heartburn. Branches were generally tied to articles which were offered to the sun.

5. Artemisia forwoodii S. Wats. Occasional on the east slope at low altitudes, on open rocky hillsides or on flats. Yukon to Ont., Mich., and Ariz. (*A. camporum* Rydb.)—Plants in clumps, 20 to 50 cm. high, with stout stems; leaves long-stalked, 2 or 3 times divided into linear lobes; heads 2 to 3 mm. high, in narrow dense panicles.

6. Artemisia spithamaea Pursh. Collected on Mount Henry by Umbach. Wash. to Colo., Que., and Greenl.—Similar in appearance to *A. forwoodii*, but the plants lower, 10 to 30 cm. high; leaves once or twice divided into linear lobes.

7. Artemisia discolor Dougl. Frequent at nearly all altitudes on the east slope, on the west slope chiefly at high altitudes; on open, usually rocky slopes, on rock slides, or in thickets; frequent above timber line. B. C. and Wash. to Sask. and Colo. (*A. michauxiana* Besser.)—Perennial, 20 to 50 cm. high, forming dense bushy clumps; leaves 3 to 6 cm. long, white-woolly beneath, often green and glabrous on the upper surface; heads 3 to 4 mm. high, green, in narrow, usually spikelike panicles.

The plants are somewhat variable. The typical form has a narrow panicle and rather broad leaf segments; *A. michauxiana* is the form with spikelike panicles and narrow leaf segments. Both forms occur in the park, but the second one is much more common.

8. Artemisia gnaphaloides Nutt. Frequent at low altitudes, on dry, open or brushy slopes or in low thickets; rarely found on open slopes above timber line. Alta. to Colo., Tex., Mo., and Ont.—Plants whitish, 30 to 60 cm. high, often forming large patches; leaves lanceolate or oblanceolate, 2 to 10 cm. long, the upper ones entire, the lower mostly toothed, sharp-pointed; heads 4 mm. high, white-woolly, in narrow spikelike panicles.

9. Artemisia floccosa Rydb. Low thickets below Lake McDermott, and brushy slopes along Appekunny Creek. Oreg. to Mont. and Wyo.—Plants 20 to 40 cm. high, often forming dense clumps, whitish; leaves 3 to 5 cm. long, the upper ones often entire; heads about 4 mm. high, white-woolly.

10. Artemisia diversifolia Rydb. Frequent at low and middle altitudes, on open, gravelly or grassy slopes or dry prairie. B. C. to Calif., Colo., and Nebr.—Plants whitish, 30 to 80 cm. high, often forming broad dense clumps; lower leaves 5 to 10 cm. long, with 3 or 5 lobes pointing forward, the upper leaves mostly entire; heads 3 to 4 mm. high, woolly, in narrow panicles; flowers pale yellow.

It is probable that this and *A. floccosa* are merely forms of *A. gnaphaloides*.

24. PETASITES L.

1. Petasites sagittata (Pursh) A. Gray. SWEET COLTSFOOT. Not common, but found in swampy meadows below Lake McDermott and at St. Mary and Grinnell Lake. Alaska to Colo., Minn., and Lab.—Perennial, with thick rootstocks; flower stalk with bracts but no leaves, 20 to 30 cm. high, bearing a few heads; leaves all rising from the ground, long-stalked, heart-shaped or triangular, 15 to 40 cm. long, shallowly toothed, green on the upper side, white-woolly beneath; heads 7 to 10 mm. long, the flowers purplish or whitish.

The flowers appear early in the season. The leaves are conspicuous and remind one somewhat of those of burdock.

25. ARNICA L. ARNICA.

Perennials with rootstocks, more or less hairy; stems leafy, the leaves opposite, entire or toothed; heads 1 or few, large, the bracts equal in length; rays yellow, rarely absent; pappus of slender, white or brownish bristles.—The species are difficult to distinguish, and they are imperfectly understood; it is doubtful whether all those listed below are valid. The arnica used as a drug is obtained from a European species of this genus. In our species the rootstocks have the characteristic arnica flavor and odor. The arnicas are among the most abundant and showy flowers of the park.

Rays none . . . . . **1. A. parryi.**
Rays present, showy.
  Pappus brownish or yellowish, finely hairy.
    Stem leaves narrowly lanceolate, entire or minutely toothed, finely hairy; achenes hairy and with fine glands . . . . . **2. A. longifolia.**
    Stem leaves lanceolate or ovate, usually coarsely toothed, coarsely hairy; achenes hairy but without glands.
      Basal leaves not heart-shaped . . . . . **3. A. mollis.**
      Basal leaves heart-shaped . . . . . **4. A. diversifolia.**
  Pappus white, merely roughened, not hairy.
    Basal leaves heart-shaped or broadly ovate, usually long-stalked.
      Achenes densely hairy . . . . . **5. A. cordifolia.**
      Achenes glabrous or glandular or with a few scattered hairs above.
        Heads (from base to end of pappus) 10 to 12 mm. high . . . . **6. A. gracilis.**
        Heads 15 to 18 mm. high.
          Lower stem leaves stalked; heads turbinate . . . . . **7. A. latifolia.**
          Lower stem leaves sessile; heads campanulate . . . . . **8. A. granulifera.**

Basal leaves lanceolate or oblanceolate, short-stalked.
Stems with numerous pairs of leaves, the upper leaves not much reduced. **9. A. foliosa.**
Stems with 1 to 3 pairs of leaves, the upper ones much reduced.
Heads campanulate, covered with viscid hairs; plants of low altitudes. **10. A. fulgens.**
Heads turbinate, hairy but not viscid; plants of alpine situations.
Leaves glabrous or thinly hairy, green . . . . . **11. A. alpina.**
Leaves densely covered with long soft whitish hairs . . **12. A. tomentosa.**

1. Arnica parryi A. Gray. RAYLESS ARNICA. Aspen thicket at east entrance; moist open hillside on trail to Iceberg Lake. B. C. to Oreg., Colo., and Alta.—Stems hairy, leafy, 20 to 50 cm. high; basal leaves ovate or oblong, entire or slightly toothed, hairy; heads 3 to 9, 12 to 15 mm. high, dull yellow; pappus brownish.

2. Arnica longifolia D. C. Eaton. Frequent, especially at low and high altitudes, in alpine meadows, in wet thickets, or on open slopes. Wash. to Calif., Colo., and Mont.—Plants often tufted, very viscid, 25 to 60 cm. high; leaves mostly linear-lanceolate, 5 to 15 cm. long, bright green, minutely hairy, sessile; heads few, about 1 cm. high.

3. Arnica mollis Hook. Common at low and middle altitudes, in damp woods or wet thickets, along streams, on open slopes, or in bogs; frequently found in wet meadows above timber line. B. C. and Wash. to Colo. and Alta.—Plants green, hairy, 20 to 60 cm. high, often forming dense clumps; stem leaves sessile, 4 to 10 cm. long; heads 1 to 5, 12 to 15 mm. high.

4. Arnica diversifolia Greene. Moist rocky slopes at Sexton Glacier, and perhaps elsewhere. B. C. to Calif., Mont., and Alta.—Plants 25 to 50 cm. high, finely glandular-hairy, basal leaves usually toothed, the stem leaves ovate to lanceolate, sessile; heads 1 to 5.

5. Arnica cordifolia Hook. Collected in thickets at east entrance by Umbach; also obtained by Williams at Columbia Falls, and probably to be found about Belton. B. C. to Calif., N. Mex., and Alta.—Stems hairy, 20 to 50 cm. high; basal leaves broadly heart-shaped, 3 to 10 cm. long, usually toothed; stem leaves 2 to 4 pairs, mostly stalked; heads 1.5 to 2 cm. high, hairy.

6. Arnica gracilis Rydb. Abundant near and above timber line, in wet meadows or on open slopes or rock slides; occasionally found in wet thickets at middle altitudes. B. C. and Wash. to Wyo. and Alta.—Stems 10 to 50 cm. high, glabrous or nearly so; basal leaves ovate to rounded, toothed or entire, 2 to 6 cm. long; stem leaves 2 to 4 pairs, the lower ones stalked; heads 1 to 5.

7. Arnica latifolia Bong. Abundant on the east slope at low and middle altitudes, usually in deep woods. Alaska to Utah and Colo.—Stems 30 to 70 cm. high; basal leaves heart-shaped, 5 to 15 cm. long, toothed, finely hairy or nearly glabrous; heads usually 5 to 9; bracts minutely glandular and sometimes hairy.

Very abundant and showy about Lake McDermott, often forming large dense patches in the woods. The plants bloom in the early summer and do not remain in flower long.

8. Arnica granulifera Rydb. Frequent in alpine meadows; sometimes in woods at middle altitudes. Mont.—Stems 25 to 35 cm. high, somewhat hairy; basal leaves ovate, usually absent at flowering, slightly toothed; stem leaves broadly ovate, 4 to 9 cm. long, toothed, obtuse; heads 1 to 5.

9. Arnica foliosa Nutt. Frequent on the east slope at low altitudes, in wet meadows or thickets, in aspen woods, or about low places on prairie. Alaska to Utah and Colo.—Stems 20 to 60 cm. high, woolly; leaves linear or linear-lanceolate, densely and finely hairy, 5 to 10 cm. long, usually entire, the lower ones slender-stalked; heads 1 to 7, 8 to 10 mm. high, often woolly.

10. Arnica fulgens Pursh. Collected along Kennedy Creek by Weller. B. C. to Calif., Colo., and S. Dak. (*A. pedunculata* Rydb.)—Stems 20 to 40 cm. high, hairy; leaves mostly basal, oblong to linear-lanceolate, 5 to 10 cm. long, finely hairy, entire; heads 1 or 3, 12 to 15 mm. high.

11. Arnica alpina (L.) Olin. Common above timber line, on rock slides or rocky slopes or in meadows. Alaska to Wash., Colo., Alta., Lab., and Greenl.; also in Eur.—Stems 10 to 20 cm. high, somewhat hairy; stem leaves 1 to 3 pairs, mostly lanceolate, toothed or entire; heads 1 to 3, about 1 cm. high.

12. Arnica tomentosa Macoun. Open rocky slopes and summits at Piegan Pass and Sexton Glacier. B. C., Alta., and Mont.—Stems 8 to 12 cm. high, densely woolly; stem leaves 1 or 2 pairs, lanceolate, entire; head 1, 10 to 12 mm. high.

26. SENECIO L. RAGWORT.

Perennials or rarely annuals; leaves alternate, entire, toothed, or lobed; heads 1 to many, with conspicuous yellow rays (except in one species); involucre composed of one series of equal (not overlapping) linear bracts, with a few short bracts at the base; achenes very narrow, with pappus of soft white bristles.

Plants annual; rays none . . . . . **1. S. vulgaris.**
Plants perennial; rays present.
  Heads about 2.5 cm. high . . . . . **2. S. megacephalus.**
  Heads less than 1.5 cm. high.
    Lowest leaves entire, densely white-woolly on both sides.
      Bracts about 21 . . . . . **3. S. canus.**
      Bracts about 13 . . . . . **4. S. purshianus.**
    Lowest leaves more or less toothed, green.
      Leaves triangular, sharp-pointed, toothed . . . . . **5. S. triangularis.**
      Leaves not triangular, often blunt-pointed, toothed or lobed.
        Upper stem leaves not much if at all smaller than the lower ones; plants in small bushy clumps . . . . . **6. S. fremontii.**
        Upper stem leaves much smaller than the lower ones; plants erect, never in bushy clumps.
          Stem bearing 1 or rarely 2 heads.
            Heads and leaf stalks woolly at the base; leaves very thick and fleshy. **7. S. conterminus.**
            Heads and leaf stalks glabrous . . . . . **8. S. ovinus.**
          Stem bearing several or numerous heads.
            Stem leaves toothed; lowest leaves sharp-pointed; bracts with dark tips . . . . . **9. S. hydrophiloides.**
            Stem leaves lobed; lowest leaves rounded at the tip; bracts not with dark tips.
              Leaves at base of stem mostly 2 to 3 cm. long, long-tapering at base, thick and fleshy . . . . . **10. S. cymbalarioides.**
              Leaves at base of stem mostly 4 to 7 cm. long, never long-tapering at base, thin.
                Lower leaves mostly broadly notched at base, the teeth usually low and blunt . . . . . **11. S. pseudaureus.**
                Lower leaves truncate to acute at base, the teeth mostly sharp and spreading . . . . . **12. S. burkei.**

1. Senecio vulgaris L. Weed in garden at Lewis's; reported from Belton by Jones. Native of Eur.; naturalized in N. Amer.—Plants 10 to 40 cm. high, nearly glabrous; leaves deeply lobed; heads 7 to 9 mm. high, the bracts with black tips.

2. Senecio megacephalus Nutt. Frequent at middle and high altitudes, usually on open slopes. B. C., Idaho, Mont., and Alta.—Plants 20 to 60 cm. high, usually in dense clumps; leaves oblanceolate or oblong, 5 to 20 cm. long, thick, woolly at

first but becoming glabrous and green; heads 1 to 3, woolly, very showy; rays deep yellow, 1.5 to 2 cm. long.

3. Senecio canus Hook. Frequent at nearly all altitudes, on open slopes or in low meadows; infrequent above timber line. B. C. to Calif., Colo., and Nebr.—Plants tufted, 20 to 40 cm. high, whitish; leaves at base of stem rounded to oblong, long-stalked, the stem leaves usually lobed, sessile; heads numerous, 10 to 12 mm. high, nearly glabrous; rays bright yellow.

4. Senecio purshianus Nutt. Occasional at low altitudes on the east slope, in dry rocky soil. B. C. to Sask., Tex., and Utah.—Plants tufted, 10 to 25 cm. high, similar in appearance to *S. canus;* heads few, mostly 7 to 8 mm. high.

5. Senecio triangularis Hook. TALL RAGWORT. Common nearly everywhere except at the highest altitudes, most abundant at middle elevations and just above timber line; in moist or wet woods or thickets or on moist open slopes. Alaska to Calif., N. Mex., and Sask. (*S. saliens* Rydb.)—Stems erect, often clustered, 0.2 to 1.5 meters high, glabrous; stems very leafy; leaves 3 to 20 cm. long, stalked, coarsely toothed; heads few or numerous, 6 to 10 mm. high; rays bright yellow.

Senecio saliens is a low form with thick and somewhat fleshy leaves; it is common above timber line, often growing with the typical form and grading insensibly into it. The plants are showy, but they do not remain long in flower.

6. Senecio fremontii Torr. & Gray. Abundant on rocky slides and open slopes above timber line; occasional on open rocky slopes at middle altitudes. B. C. to Oreg., Wyo., and Mont.—Plants usually forming dense bushy clumps 10 to 15 cm. high, glabrous; leaves rounded to obovate, 1.5 to 3 cm. long, coarsely toothed, fleshy, sessile, or short-stalked; heads 8 mm. high, 1 or few on each stem; rays bright yellow.

One of the handsomest and most conspicuous plants of alpine slopes.

7. Senecio conterminus Greenm. Frequent on the highest rock slides and on exposed rocky summits. Mont., B. C., and Alta.—Plants solitary or in small tufts, somewhat woolly, especially at first; basal leaves long-stalked, rounded, 1 to 1.5 cm. long, with few low teeth; head 8 to 10 mm. high; bracts usually purplish; rays bright yellow.

The species has not been reported previously from Montana.

8. Senecio ovinus Greene. Common above timber line, in wet meadows and on rocky slopes. Alta. and B. C. to Wyo.—Plants often tufted or matted, glabrous, 5 to 15 cm. high; basal leaves rounded, long-stalked, 1 to 2 cm. long, with few low teeth; heads 7 to 8 mm. high; rays bright yellow.

A handsome and often conspicuous little plant.

9. Senecio hydrophiloides Rydb. Frequent at low altitudes on the east slope, in marshes, low meadows, or wet thickets; on wet slope at Iceberg Lake. B. C. and Wash. to Mont.—Plants solitary, 50 to 90 cm. high, somewhat woolly when young but becoming glabrous; basal leaves long-stalked, oblanceolate or nearly ovate, with fine spreading teeth, somewhat fleshy; heads about 1 cm. high, narrow.

10. Senecio cymbalarioides Nutt. Open slopes at Cracker Lake; also at the east entrance and Duck Lake. B. C. and Mack. to N. Mex.—Plants 20 to 30 cm. high, nearly glabrous; basal leaves with few low teeth; heads several, 7 to 9 mm. high.

11. Senecio pseudaureus Rydb. Low thickets at east entrance; common. B. C. to Sask., N. Mex., and Calif.—Plants 30 to 60 cm. high, bright green, nearly glabrous; basal leaves long-stalked, obtuse, the stem leaves deeply toothed or lobed; heads 8 to 10 mm. high.

12. Senecio burkei Greenm. Common at low altitudes, in wet woods, thickets, or meadows, along streams, and rarely on open slopes. B. C. and Idaho to Minn.—Plants 30 to 80 cm. high, nearly or quite glabrous; leaves bright green, the lower ones on long slender stalks, the upper ones deeply lobed; heads usually few, 10 to 12 mm. high.

27. CIRSIUM Hill. THISTLE.

Coarse biennials or perennials; leaves alternate, toothed or lobed, very spiny; heads large, without rays, the bracts tipped with spines; pappus of hairy bristles.

Leaves closely white-woolly on both sides . . . . . **1. C. undulatum.**
Leaves green, or woolly only on the under side.
Stems winged; upper surface of the leaf covered with small appressed spines.
2. C. lanceolatum.
Stems not winged; upper surface of the leaf not spiny.
Bracts with loose cobwebby hairs; leaves woolly on the under side.
3. C. hookerianum.
Bracts not hairy; leaves glabrous or nearly so . . . . . **4. C. arvense.**

1. Cirsium undulatum (Nutt.) Spreng. PRAIRIE THISTLE. Dry shale slopes at east entrance. B. C. to Ariz. and Mich.—Plants 30 to 60 cm. high; leaves with short broad lobes; heads few, 3 to 4 cm. high; bracts with stout spiny tips, not woolly; flowers rose-purple.

2. Cirsium lanceolatum (L.) Hill. COMMON THISTLE. Infrequent on the east slope, but common on the west slope, in woods or fields or on open hillsides. Native of Eur.; widely naturalized in N. Amer.—Plants about a meter high, green, the stems with spine-toothed wings; leaves deeply lobed, extremely spiny, thinly woolly beneath; heads usually numerous, 4 to 5 cm. high, the bracts with slender sharp spines; flowers rose-purple.

A few plants with white flowers were found. It is very unfortunate that this noxious weed has become so abundant on the west slope; it grows everywhere at low altitudes through the woods and well up along the trails. At Belton it forms almost impenetrable tangles of considerable extent. On the east slope it is still rare, but it is likely to become abundant.

3. Cirsium hookerianum Nutt. WHITE THISTLE. Common, especially on the east slope, at low and middle altitudes, in woods or on open slopes; occasionally in meadows above timber line. B. C., Alta., and Mont.—Plants 0.3 to 1 meter high, green; leaves oblong-oblanceolate, lobed or often toothed, green on the upper surface and sometimes underneath; heads few or numerous, 3 to 4 cm. high, the bracts ending in sharp spines; flowers dirty white.

Above timber line the plants often flower when only 15 cm. high.

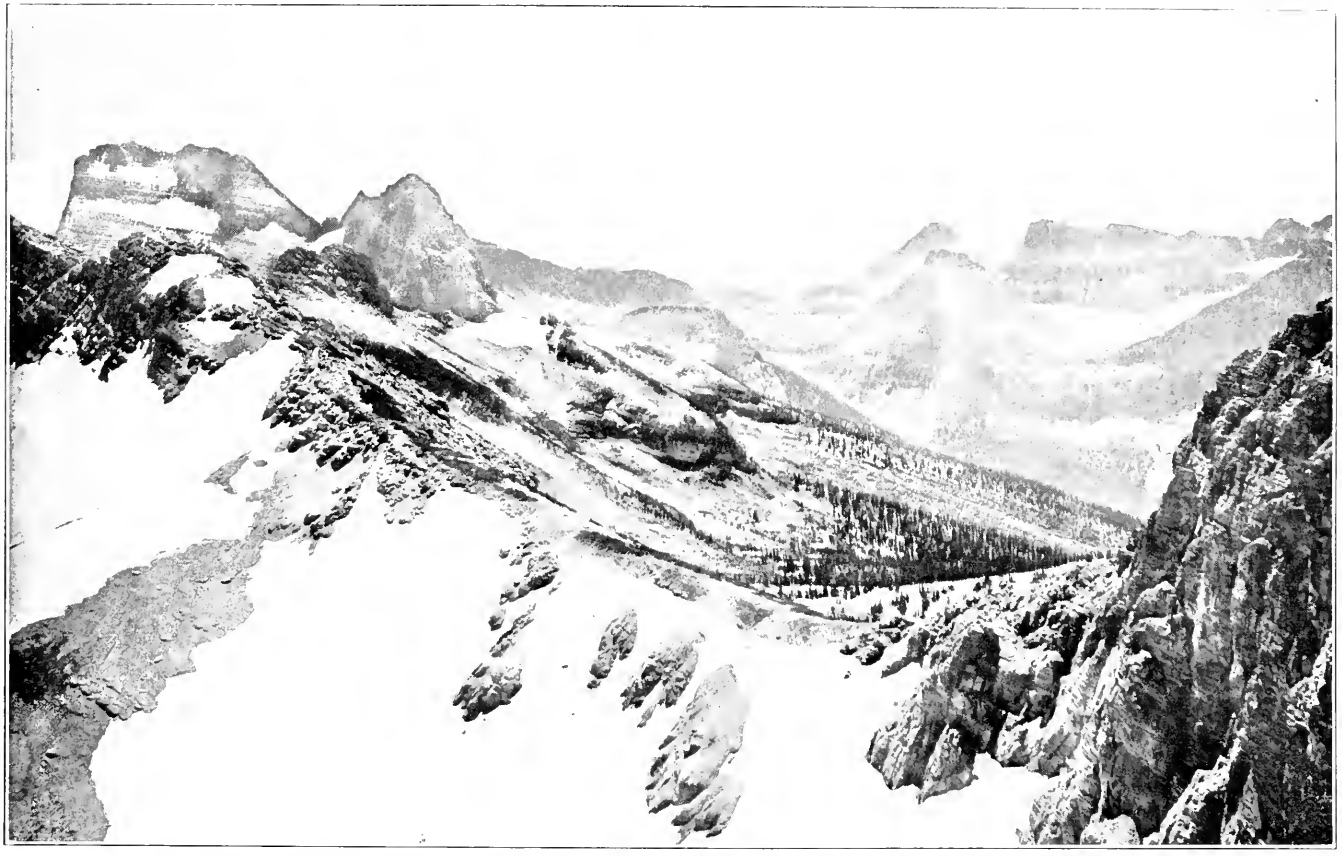
4. Cirsium arvense (L.) Scop. CANADA THISTLE. Occasional about Belton, along the railroad and in cultivated fields. Native of Eur.; naturalized as a weed in N. Amer.—Plants 0.3 to 1 meter high, with long rootstocks, green, glabrous or nearly so; leaves with short lobes; heads usually numerous, about 2 cm. high, the bracts with very short spines; flowers purple.

The following family should have been inserted on page 326, preceding the Santalaceae:

LORANTHACEAE. Mistletoe Family.

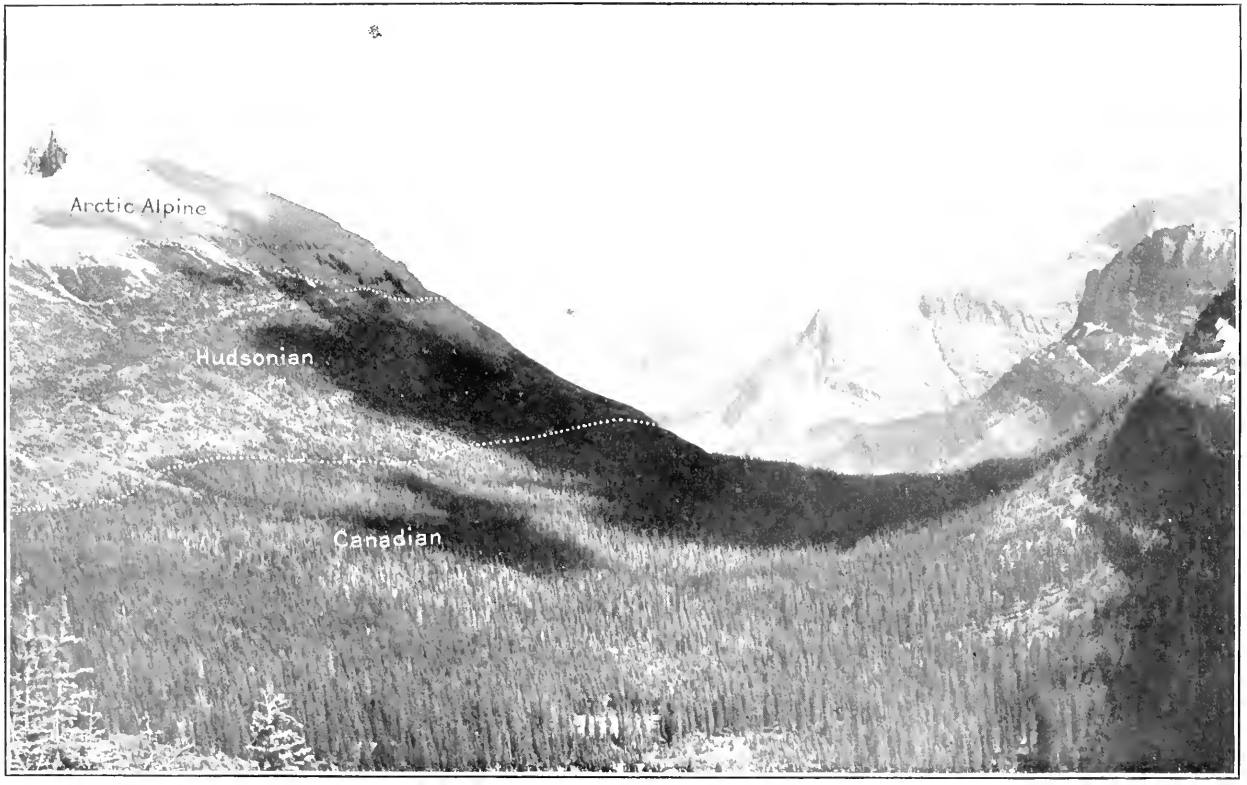
1. RAZOUMOFSKYA Hoffm.

1. Razoumofskya americana (Nutt.) Kuntze. Occasional on the east slope, parasitic upon the branches of lodgepole pine. B. C. to Colo. and Sask.—Plants yellowish, 2 to 10 cm. high, branched, glabrous; leaves opposite, reduced to scales; flowers solitary, axillary, minute; fruit a small blue berry.



VIEW SOUTH FROM THE GARDEN WALL, SHOWING THE MOUNTAINS OF THE WEST SLOPE.

The slopes are mostly above timber line; the timber visible consists chiefly of fir and spruce, of the Hudsonian Zone. Photograph by Scenic America Company; from National Park Service.



VIEW SOUTHEAST FROM ICEBERG LAKE.

The dotted lines indicate the limits of the life zones: (1) Canadian, the heavily timbered valleys and lower slopes, covered chiefly with fir, spruce, and Douglas fir; (2) Hudsonian, with a scattered growth of small fir, spruce, and pine, and intervening meadows; (3) Arctic-Alpine, the area wholly above timber line. Photograph from National Park Service.

SWIFTCURRENT VALLEY.

Chief Mountain in the distance. The dark areas are timbered and belong to the Canadian Zone. The tree in the foreground is a limber pine. The light-colored areas, clothed with grasses and other herbs, are characteristic of the Transition Zone, as represented on the east slope. Photograph by Fred H. Kiser, from National Park Service.

POND NEAR SWIFTCURRENT CREEK BELOW LAKE MCDERMOTT.

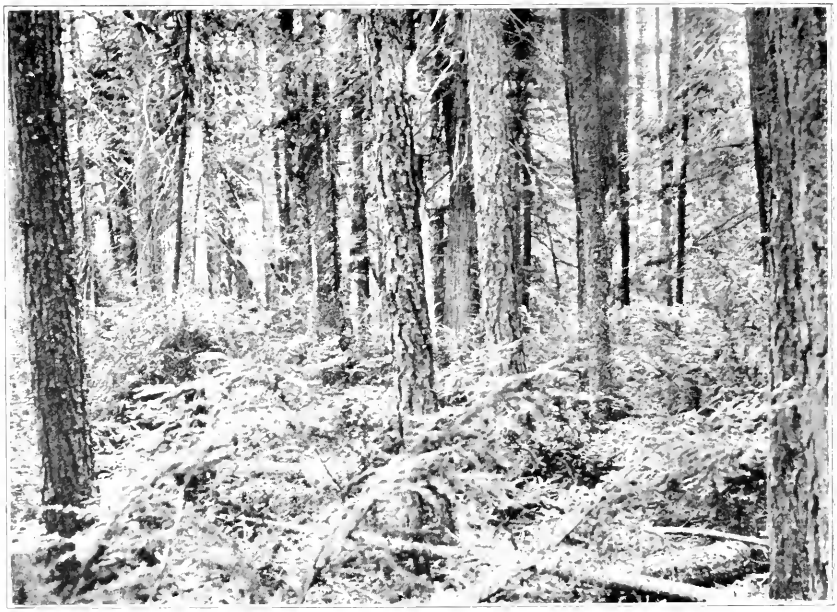
The vegetation is that of the Canadian Zone, the trees chiefly fir and spruce. The marshes are filled with grasses and sedges, and the bordering thickets are composed of willows. A beaver dam in the foreground. Photograph by Fred H. Kiser, from National Park Service.

VIEW FROM A POINT NEAR GRANITE PARK; HEAVENS PEAK AT THE RIGHT.

The heavy timber in the distance is characteristic of the Canadian Zone, as represented on the west slope at middle altitudes. The trees in the foreground are mostly stunted alpine firs. Photograph by Fred H. Kiser; from National Park Service.

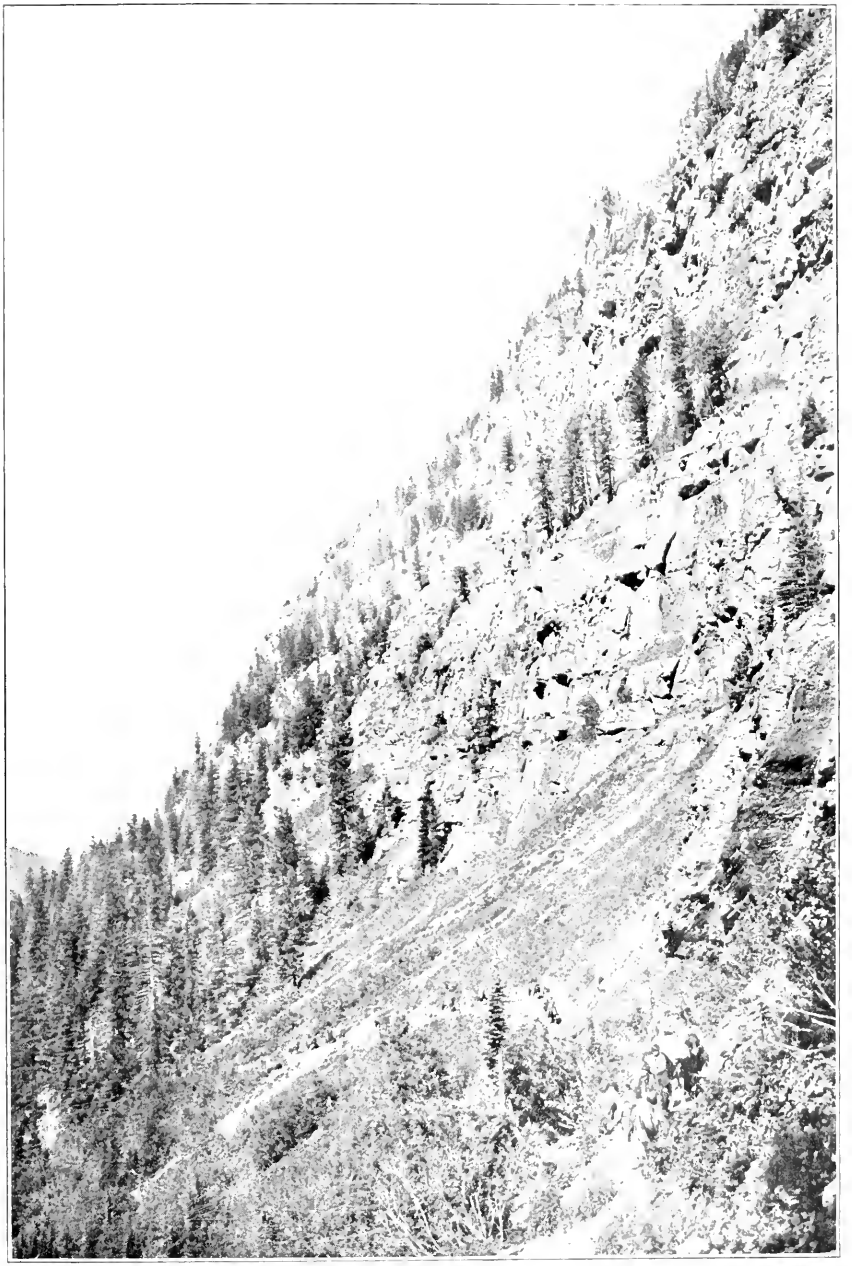
A. LIMBER PINE (PINUS FLEXILIS), ON ALTYN PEAK, OVERLOOKING LAKE McDERMOTT.

Trees of this species growing in exposed places are usually contorted by the wind. The foggy appearance of the distant portions of the view is due to smoke from forest fires.



B. DENSE FOREST OF HEMLOCK AND GIANT CEDAR NEAR LAKE McDONALD.

The shrubby undergrowth consists of yews and young hemlocks.



MOUNTAIN SIDE BELOW SPERRY CHALETS.

A characteristic scene in the Canadian Zone. A large rock slide is shown at the foot of the cliff, covered with various shrubs. Photograph by Fred H. Kiser; from National Park Service.

A SHORE OF LAKE MCDONALD.

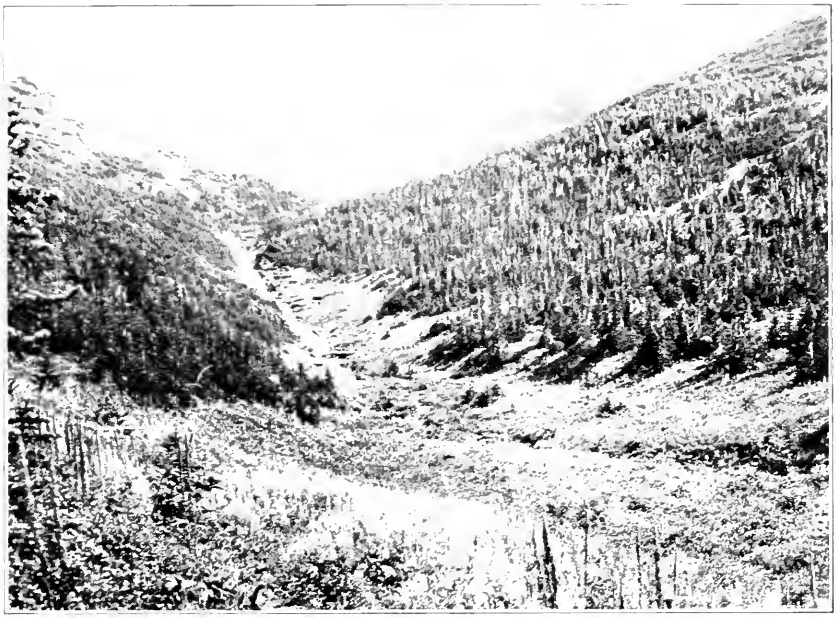
The trees are chiefly larch and western white pine; those along the beach are cottonwood, mountain alder, and canoe birch.

B. SPHAGNUM BOG AT JOHNS LAKE.

The encroachment of the forest is indicated by the young trees. The portion of the bog shown is overgrown with coarse grasses and is not typical. Pondlilies are growing in the lake.

VIEW ON THE TRAIL TO PIEGAN PASS.

The vegetation is that of the Hudsonian Zone, the trees being fir and spruce. The white flowers are those of beargrass (*Xerophyllum tenax*). Photograph by Fred H. Kiser; from National Park Service.



A. DWARFED TREES AT SWIFTCURRENT PASS.

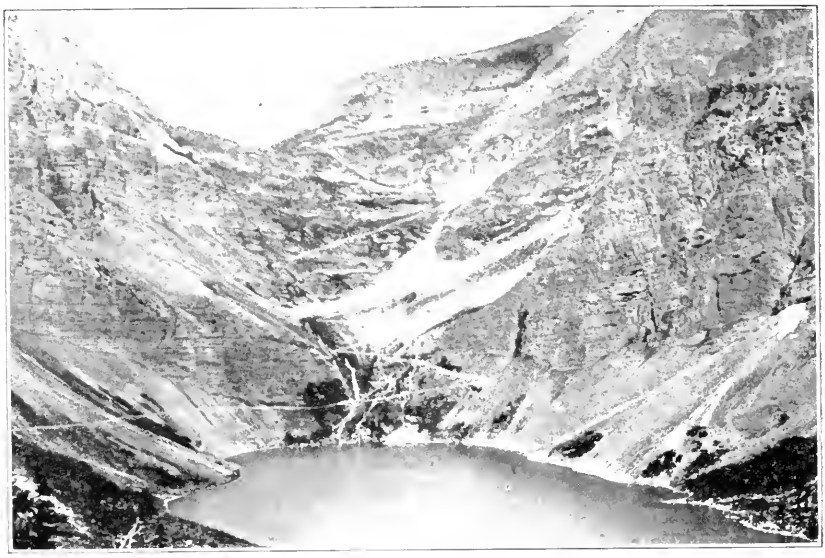
A characteristic formation of the Hudsonian Zone. The trees are mostly alpine fir and whitebark pine and average about 2 meters in height. Their branches extend to the ground, and in the more exposed places the trunks are often prostrate.

B. MEADOW NEAR GRANITE PARK.

One of the flower fields of the Hudsonian Zone. The flowers are mostly showy fleabane (*Erigeron salsuginosus*), but there was present an equal amount of red Indian paintbrush not visible in the photograph. The trees are chiefly alpine fir. The hazy appearance of the distant portions of the view is due to smoke from forest fires.

PTARMIGAN LAKE IN MIDSUMMER.

On the east slope near Iceberg Lake. A typical Arctic-Alpine area. Some heavy timber, of the Canadian Zone, is visible in the distance at a lower elevation. The dark areas at the right are thickets of willow bushes. The slopes of loose stones, which appear barren of vegetation, are furnished with a sparse growth of showy-flowered herbaceous plants. The water of the lake is turquoise-blue. Photograph from National Park Service.



A. LAKE ELLEN WILSON AND GUNSIGHT PASS.

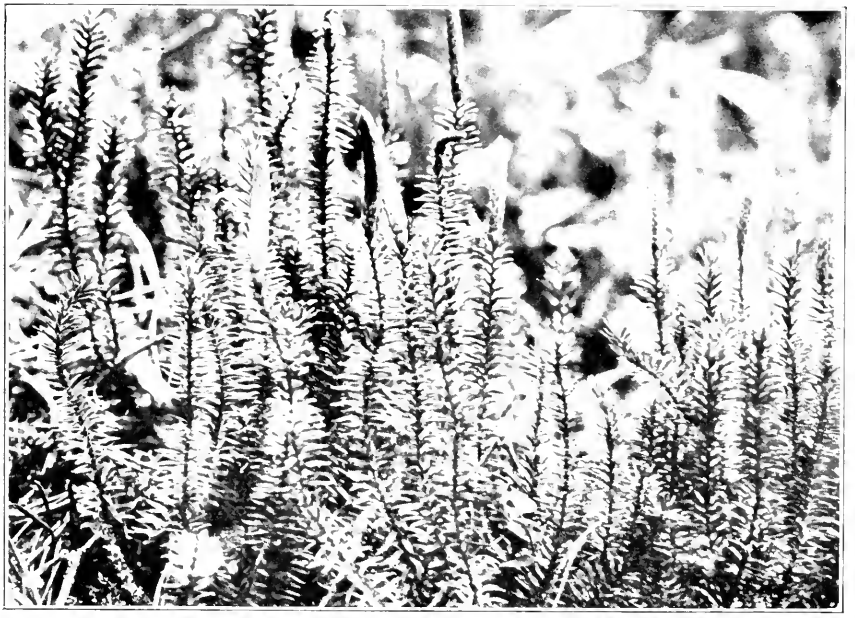
The zigzag line is the trail from Gunsight Pass to Sperry Chalets. This area is nearly all Arctic-Alpine, but the dark portions in the lower corners are Hudsonian and covered with small trees.

B. AN ARCTIC-ALPINE ROCK SLIDE.

A close view showing the characteristic vegetation of numerous kinds of small herbs, mostly with showy flowers. In many places in the park rocks break into thin flat slabs, which at high altitudes in level places are pressed down by the weight of the snow until they resemble carefully laid pavements.

A. FIR CLUBMOSS (LYCOPODIUM SELAGO).

In sphagnum at Johns Lake; about half natural size. This species grows more commonly above timber line. It does not have separate fruit spikes like those of the other species.



B. STIFF CLUBMOSS (LYCOPODIUM ANNOTINUM).

Nearly natural size. The only clubmoss common on both slopes of the park. The fruit spikes are not stalked.

A. RUNNING-PINE (LYCOPODIUM CLAVATUM).

Growing in the edge of a sphagnum bog at Johns Lake. About half natural size. Note the stalked fruit spikes.

B. QUEENCUP (CLINTONIA UNIFLORA).

Two-thirds natural size. Flowers white. One of the most abundant and attractive flowers of deep woods.

A. WESTERN YEW (TAXUS BREVIFOLIA).

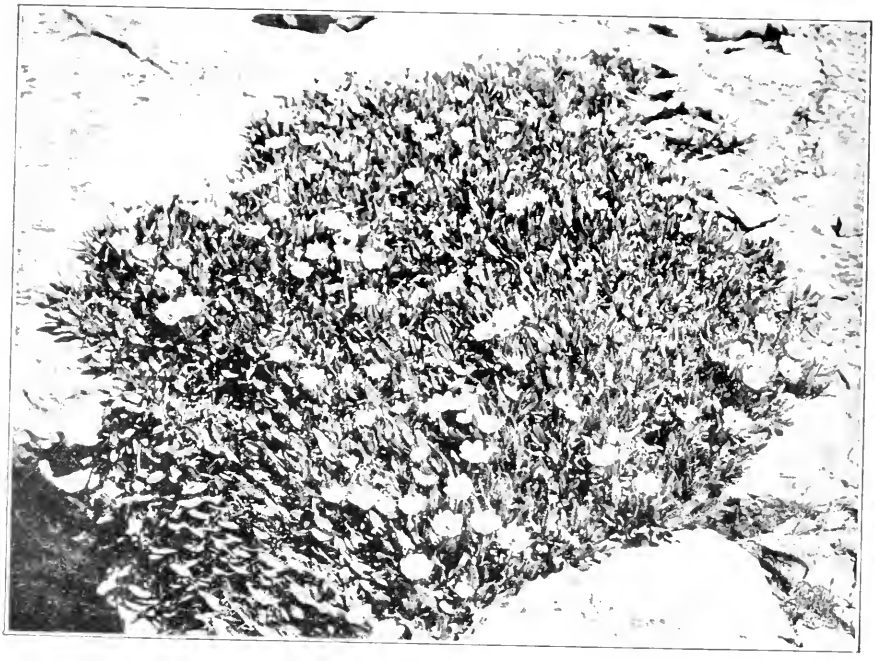
Half natural size. A common shrub of deep woods, found only on the west slope. Fruit red.

B. LADIES'-TRESSES (IBIDIUM ROMANZOFFIANUM).

Half natural size. Flowers white, sweet-scented. An attractive orchid, growing in wet places.

A. PURPLE CLEMATIS (CLEMATIS COLUMBIANA), IN FRUIT.

About half natural size. A woody vine growing at middle altitudes. Flowers with four large purple petal-like sepals.



B. WHITE DRYAD (DRYAS OCTOPETALA), ON ROCKS OF TRIPLE DIVIDE PEAK.

Flowers white, with eight petals. A common plant above timber line. Photograph by H. T. Cowling; from National Park Service.

A. Alpine Bistort (Polygonum viviparum).

About natural size. Flowers white, but usually replaced by green bulblets. Common above timber line.

B. Spiny Currant (Ribes lacustre).

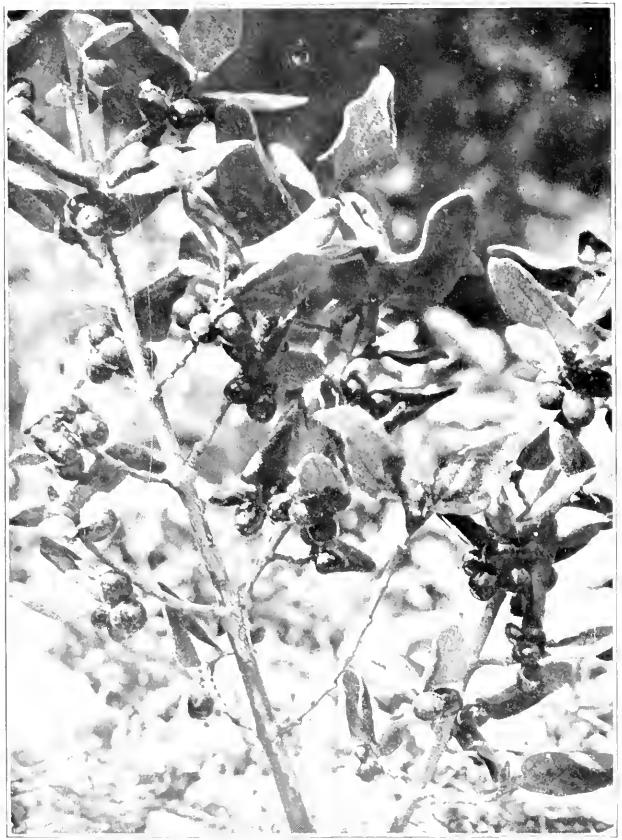
About half natural size. Fruit nearly black, edible, but somewhat bitter; flowers green and purplish. A common shrub of the Hudsonian and Canadian zones.

A. RED RASPBERRY (RUBUS STRIGOSUS).

A dwarf form, growing on rock slides, shown here at about natural size. Six berries are visible on this plant. In favorable places the red raspberry is a meter high.

B. BLUE PHACELIA (PHACELIA LYALLII).

About half natural size. Flowers purplish blue. A common and showy plant of rock slides.



A. CANADA BUFFALOBERRY (LEPARGYREA CANADENSIS).

Half natural size. Fruit bright red, showy, extremely bitter; flowers small and inconspicuous. A shrub, 0.5 to 1.5 meters high, found chiefly in the Canadian Zone.

B. COW PARSNIP (HERACLEUM LANATUM).

Flowers white; plants a meter high or taller. Often pointed out by the guides of the park as the "sacred rhubarb."

A. ROUGH ASTER (ASTER CONSPICUUS).

About half natural size. Flower heads with pale purple rays. Common at low and middle altitudes.

B. SHOWY FLEABANE (ERIGERON SALSUGINOSUS).

Plants 15 to 50 cm. high, the heads with pale purple rays. One of the

INDEX.

[Synonyms in italics.]

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