

MONTANA BOTANY NOTES

CONTAINING

Description of New Species, List of Plants Not Heretofore Recorded
From the State, and Notes on Disputed Species,
With Five Plates

BY

MARCUS E. JONES, A. M.

Prepared From Material Collected at the
University of Montana Biological Station

UNIVERSITY OF MONTANA
Missoula, Montana, U. S. A.
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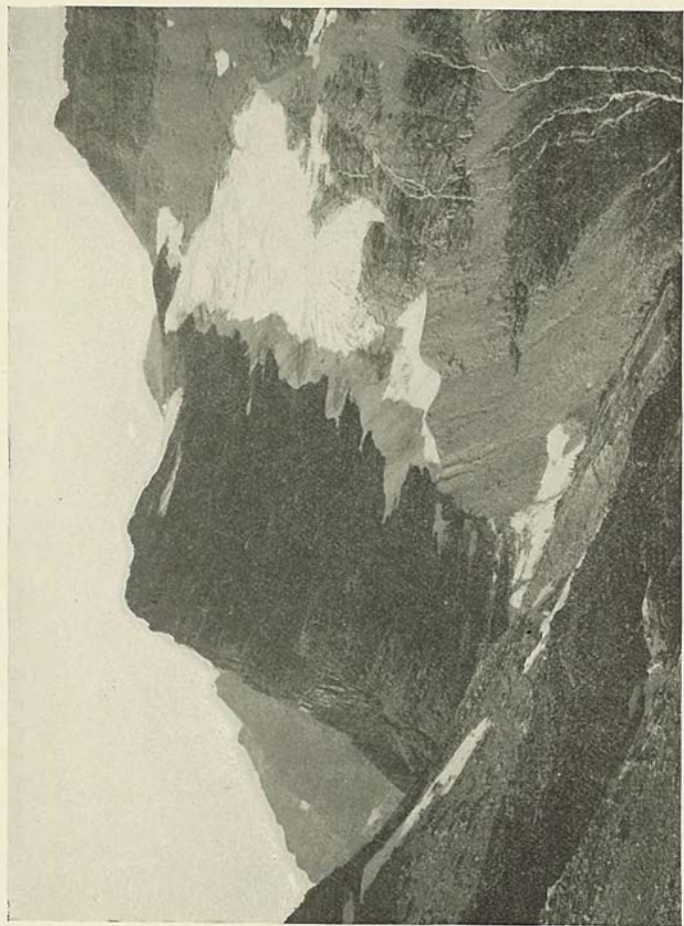


PLATE I.

Cliffs, glacier and waterfalls, looking west at Gunsight Pass, on the Hudson Bay side, continental divide, showing characteristic country in which collections of alpine plants were made.

CORRECTIONS.

The author's distance from the printer and the loss of the last corrected proofs in transit prevented the correction of certain serious errors.

The drawings in the body of the work were by Miss Gertrude Norton, those in the appendix were by Miss Carol Evans.

Mrs. Joseph Clemens was with our party in 1908 on all the trips but the one to McDonald peak and the Hot Springs, and she collected nearly every species that the writer also got. Miss Norton was with the party but did not make any extensive collections as she had previously done much botanizing in the region.

The list of new species and combinations on page 7 is very incomplete and the body of the work must be consulted for the new names.

In the key to *Tsuga*, page 10, the names *heterophylla* and *Mertensiana* were transposed by the printer, *heterophylla* should come first, but the description in the key should stand as given without transposition.

Ranunculus Pygmaeus, page 27, should be *R. pygmaeus*.

Heucheriod, page 33, should be *heucheroid*.

Colville, page 34, should be *Coville*.

Spiraea densifolia, page 35, should be *Spiraea*.

Peptotaenia, page 41, should be *Leptotaenia*.

Cicuta Douglassii, page 42, should be *Douglasii*.

Erase *Krynitzkia crassi* on page 44.

Brichellia, page 48, should be *Brickellia*.

Thousands, page 61, should be thousandths.

Omit *Whitewater* on page 67.

Carex ablata should be *oblata* wherever used, see pp. 68, 69.

Other minor errors occur but are of no special significance.

Montana Botany Notes were issued June 10th, 1910.

PREFACE

The object of this paper is simply to publish at this time the main results of the work done by Marcus E. Jones in connection with the Biological Station at Bigfork, so far as important notes, changes of names due to exhaustive field work and new species are concerned. The ecological work and detailed statement of species and localities, zonal distribution, etc., are reserved for a subsequent paper. In addition such additions to the Flathead drainage flora as have been made by Prof. Elrod, Miss Norton and others are here given for the first time, and credited to them. The total flora passed in review covers some 1700 species. The flora of the Flathead Lake region has now been thoroughly worked up except the early spring flora which is meager. It has been the Mecca of botanists for over a decade, but the only publications on its flora have been a paper on the trees, and one on the lichens and mosses and fungi, all of them very incomplete, and sporadic articles on the ferns and horsetails. The collections of Williams, Mrs. Kennedy, MacDougal, Canby, and others from this region have been reported in Rydberg's list of the flora of Montana. This present list does not include any commentary on the identifications of Rydberg except on a few important species of rare occurrence.

Detailed studies of the trees were made and the results are given in this paper.

The fungi on living leaves were carefully studied and collected.

A careful collection of the mosses was also made and nearly a hundred and thirty-five species were added to the known flora.

In 1908 the main work was around Flathead Lake and the adjacent mountains. In 1909 the main work was in the Bitter Root, on McDonald Peak, at Ravalli, the Flathead Plains, Swan River, and the magnificent Sperry Glacier region where the alpine flora reaches its greatest development. Work was also done at Monida and Lima in both years and along the Oregon Short Line, Northern Pacific and Great Northern railways at way stations.

NEW SPECIES DESCRIBED

Glyceria flavescens.

Carex Stantonensis, Stanton Lake Carex.

Sedum Elrodi, Elrod's Stonecrop.

Hypericum Nortonae, Miss Norton's St. John's Wort.

Cogswellia Altensis, Alta Cogswellia.

Cymopterus Elrodi, Elrod's Cymopterus.

Sambucus decipiens, The deceptive Elderberry.

Cylindrosporium simile Peck, Fungus on *Ceanothus sanguinea*.

Cylindrosporium simile var. *pruinum* Peck, n. var. Fungus on foliage of *Prunus emarginata*.

Roestelia tubulata Kern, n. sp. Fungus on *Crataegus Douglasii*.

Septoria streptopidis Peck. On living leaves of *Streptopus roseus*, *Prosartes trachycarpa*.

MONTANA BOTANY NOTES

MARCUS E. JONES

After some four or five seasons spent in various parts of Montana, the last two being in the vicinity of Flathead Lake and the Sperry Glacier region, in connection with the Biological Station work of the State University, it seems advisable to publish at this time the new species and varieties discovered, and such changes of names as the critical field work has proved are needed. To this list is added such plants as are found for the first time within the Flathead drainage.

Polypodium vulgare L. **P. hesperium** Maxon. This is found sparingly from McDonald lake in the Mission mountains, to MacDougal peak, both in the alpine and Middle Temperate life-zones, and also in the Sperry glacier region. The high altitude forms are diminutive, but the plants growing around Bigfork are the normal ones and show all sorts of intergrades.

Phegopteris alpestris (Hoppe) Mett. This abounds in the alpine basins of the Bitter Root mountains at Como peak and in the Sperry Glacier region. It has doubtless been overlooked from its resemblance to *Asplenium Filix foemina*, and from its similar habit.

Phegopteris polypodioides Fee. This grows at Gunsight pass in the alpine basin of the lake, just south of Sperry Glacier.

Cheilanthes Feei, Moore. A form of this, with slightly larger final divisions grows sparingly at Mission Creek, and the Sperry Glacier; also found on Silloway peak by MacDougal, and at Sperry Glacier by Williams. This is wrongly referred by Rydberg to *C. gracillima*.

Cryptogramme Stelleri (Gmel.) Prantl. This has been found at Camass Lake by Williams, at Lake McDonald by Umbach, and by myself at Mission Creek. It grows in crevices of wet rocks, subalpine.

Pellaea densa Brack is locally abundant at McDonald lake and on Mission Creek in the Mission mountains, Middle Temperate life zone.

Asplenium viride Hudson. This is frequent on Mission Creek and at Gunsight Pass, growing in crevices of rocks, subalpine. This is what Rydberg wrongly refers to as *A. Trichomanes*. There are occasional stipes that are nearly black.

Polystichum Lonchitis var. **scopulinum** (Eaton Ferns. N. A. 2. 125 as *aculeatum* var.). The most marked forms of this seem surely to belong to *P. aculeatum*, but so far as I can find it is never found with that species, but always either with *P. Lonchitis* or where that naturally grows, it passes directly into that species both in Utah and Lambert Valley in the Mission mountains, where it is alpine.

Cystopteris. Underwood in the sixth edition of his fern book takes up *Filix* to supersede *Cystopteris* because Adanson in 1763 published *Filix*, but the genus was improperly published, as no species were named. In addition Ludwig published a genus called *Filix* in 1757, but also did it improperly, as there were no species named. The name *Filix* was taken up by Gilib in 1792 and *F. bipinnata* was published which is *Athyrium* or *Asplenium Filix-foemina*. Therefore the genus *Filix* has no standing and cannot supersede *Cystopteris*.

Polystichum munitum (Kaulf.) Presl. MacDougal seems to have gotten this at the foot of MacDougal peak, though it is far out of range.

Botrychium ternatum var. **Coulteri** (Underwood Torr. Bull. 25 537 (1898) as species). Darby and Swan Lake. Tweedy was right in placing this as a variety of *B. ternatum*, as it intergrades freely.

Botrychium ternatum var. **silaefolium** (Presl. Rel. Haenke 1 76 (1830) as species). Bigfork and Swan Lake. This also grades directly into the type.

Equisetum palustre L. Common at Bigfork, the Mission and Hot Springs; also on MacDougal peak.

Equisetum Telmateia Ehrh. This grows in very wet meadows Swan Lake, marsh east of Polson, Dayton.

Isoetes Howellii Eng. Abundant at Bigfork in overflowed flats. First collected by Prof. Cowles's party and referred to *I. Bolanderi*. Also by Fitzpatrick at Swan Lake.

Lycopodium Selago L. Lake McDonald, Umbach, Sperry Glacier and Blackfoot Glacier, alpine.

Lycopodium obscurum L. Belton.

Lycopodium complanatum L. Frequent in dark woods, Bigfork, Swan Lake, Belton, Gunsight Lake.

Selaginella rupestris var. **densa** (Rydberg Fl. Mont. 17 (1900) as species). This is common and varies directly into the type.

Selaginella rupestris var. **Columbiana**. Leaves and bracts rather abruptly contracted into a short awn. Stems diffuse and slender, much as in *S. rupicola*. Spikes sharply angled. Macrospores favose. Flathead Lake at Bigfork and Snake River, Idaho, near Weiser.

Taxus brevifolia Nutt. Sylva 3 86 t. 108 (1849). Yew. Ground Hemlock. This cannot be separated from the eastern *T. Canadensis* except by the very slightly looser sterile catkins. The habit is the same. It is separated from the *T. baccata* of Europe by the broader and blunter leaves. Our plant is a straggling or prostrate shrub 1-20 feet high, with trunk mostly less than an inch thick. Leaves dark green above and shining, lighter but not white below, narrowed at base, 13-25.5 mm. long, about 2 mm. wide, persistent, sharply acute at both ends, appearing flat, but convex above and concave below, with twisted petiole, the arrangement and color of upper side resembles that of *Abies grandis*, and the lower prostrate branches of which it is easily mistaken by the novice, especially since it often grows with the fir. The petiole is about 2 mm. long, the upper half being round except at tip, then it widens to an oblong and flat and adnate area which joins the leaf ridge of the twig as a prolongation of it. At maturity the narrow free part of the petiole breaks off irregularly, leaving a seeming and oblique knot simulating the cushion of the spruce, but has no scar at the tip as that does, because the leaf is not jointed to it there. The season's twigs are apple green, smooth, last season's twigs are reddish brown, the older ones browner, and at last flaking up in papery layers. The old bark of the main trunk is rather purplish beneath and flaky, like *Thuya*, but in few and short layers. It is a slow grower, with small rings; wood white with dark red center and inclined to be translucent, hard. The leaves are a kind of yellowish green color. The flowers for the next season form the fall before. This grows at Huckleberry Spring and along the Swan Lake road for half a mile or so; also at the Hemlocks, preferring damp and dark woods. Collected also, by Elrod at the Hemlocks. The berries are red, juicy and sweet, with a resinous flavor, about 6.5 mm. long, soft and open at the tip, single in the axils. The branches with the leaves have the same flat, wand-like appearance of the fir and divide in much the same way, though they are more open and slender. It ranges northward and westward and in the Puget Sound region attains the dimensions of a tree. With us it is a low and straggling shrub forming dense thickets when several plants grow together, the branches matting down loosely with the snow. It is common in the mountains from Mission Creek to the British line and is a very bad shrub for mountain climbers because of its being so smooth and decumbent. McDonald Lake, Umbach.

ABIES, FIR.

Our two firs have the bracts concealed, being shorter than the scales. The trees are spire-like, with short branches either horizontal or drooping. Twigs stout. Wood soft and rather brittle, while light in weight. Good for finishing lumber, but not good for general purposes, soon rotting; not as resinous as most wood in this family. The young bark is not roughened, white or light and full of mostly large transverse blisters containing liquid resin. The older bark is very thick and corky and not flaking up, but growing in thick ridges.

Abies amabilis (Loud.) Forbes. Blankenship is right in saying that this species does not grow in Montana, but it does not appear that Rydberg intended to say (Fl. Mont. p. 12) that it grows in the state. He seems to have inserted it and described it so that it might be looked for. Surfaces of leaves not differing greatly in color, rather light.

Surfaces of leaves not differing greatly in color, rather light. Tips of trees long and needle-like. Cones nearly black. Mostly alpine on slopes.

A. lasiocarpa.

Surfaces of leaves conspicuously different in color, the upper dark-green and glossy, the lower silvery. Cones greenish-brown. Trees of the low lands along streams.

A. grandis.

Abies lasiocarpa (Hook) Nutt. Sylva 3 138 (1849), *pinus lasiocarpa* Hooker Fl. Bor. Am. 2 163 (1842), *Abies subalpina* Eng. and var. *fallax* Eng. Everywhere next to timber line on the mountains (though not seen on McDonald peak) where it grows not only along streams, but on slopes and mesas. There it forms the chief forest tree, from 50 to 100 feet high, though it is intermixed with the spruce and pine. The branches are short, stiff and ragged, mostly horizontal. It also occurs sparingly at Swan Lake and along the Swan Lake road with *A. grandis*. It is usually a tree about 2 feet in diameter, and the leaves, especially the upper ones are short, rarely over an inch long and often little flattened and angled. MacDougal peak, Umbach.

Abies grandis Lindley Penn. Cycl. 1 30 (1833). Great Silver Fir. This is frequent along streams and rivers and at springs and swamps in the low lands and upward as far as subalpine, where it is replaced by *A. lasiocarpa*. It never forms a conspicuous part of the forest though it is a picturesque tree. All the branches are much drooping. Bark without roughness, except the blisters, which are 13-19 mm. long. On trees over 6 inches thick the lower bark begins to get corky and split. All but the season's twigs reddish brown, these apple green and minutely pubescent. Scar circular and slightly raised. Bark of old trees near the base (which are 2-3 feet in diameter) is 2-3 inches thick and corky, but gray, and the lines of fissuring are not so wavy as in the red fir, the areas smaller. It occurs all around the lake and in all the canons; also at Hot Springs. Tree often 150 feet high. Not common in the Sperry Glacier region.

Pseudotsuga mucronata (Raf.) Sudworth Cont. Nat. Herb. 3 266 (1895). *Abies mucronata* Raf. Atl. Jour. 120 (1832), *P. taxifolia* Britton, *P. Douglasii* Carriere. This is very common in moist woods everywhere and on moist slopes almost to timber line, thus forming a large and valuable timber tree. It forms about half of the forests in this region, preferring the uplands and well drained slopes. The wood is reddish, compact and tough, and heavy, not easily rotting. Trees often 4 feet in diameter. The outline is oblong to oblanceolate, with a short triangular tip. Twigs inclined to be reddish. Leaves rather thin, petioled, flat, appearing rather 2-ranked by the bending of the petiole, rather dark green, leaving oval scars. The bark is very thick and deeply cracked much higher up the trunk than in the firs. The branches are slender and inclined to droop. Tree cone-bearing all over and not at the tip exclusively as in the firs. Easily distinguished from the firs by the pendulous cones and reddish twigs, and from the spruces by the absence of tooth-like cushions on the twigs, and by the presence of an exerted, 3-toothed tongue under each scale, and by the very thick and corky bark, which is thin and scaly in the spruces. This tree is beginning to be killed out at Bigfoot by a borer. Polson, Umbach. Not seen in the Sperry Glacier region.

PICEA, SPRUCE.

Twigs smooth. *P. Columbiana*.

Twigs pubescent. *P. Engelmanni*.

Blankenship reports *Picea alba* Link from Belton and other localities, but all the plants so referred are *P. Columbiana* Lemmon, which replaces *P. Parryana* in our region.

Picea Columbiana Lemmon Gard. and Forest 10 183 (1897). White Spruce. Columbian Spruce. Whether this spruce can be separated from the *P. alba* of the east is still in doubt. The distinctions relied on by Rydberg do not hold, but the smooth twigs clearly separate it from *P. Engelmanni*, as well as its more narrow and spire-like outline of *P. Parryi* and habitat, which is that of the white spruce, namely along streams and in wet places, instead of slopes and mountain sides as in *P. Engelmanni*. The cones generally have entire and thick margined very broadly obovate scales and are narrowly elliptical before maturity. After opening they are elliptical and 1-1.5 inches long. The outline of the tree is lanceolate. Lower branches drooping and short. Twigs innumerable, white, shiny and smooth. Last year's ones tan colored and smooth, short and rigid, with the cushions not over 2-5 mm. high. All leaves very shortly apiculate, oblique at base and truncate. Bark of tree dark gray and rough to the twigs, lower bark scaly and thin, but the whole tree is without scaly bark up to 6 inches in diameter and is finely roughened all over. The tree is never blue like *P. Parryi*. It is seldom over 2 feet in diameter and often 100 feet high. The largest tree seen was 12 feet 9 inches around. It is not common, though it is found in all localities up to the sub-alpine. Kalispell, Williams, also Belton. Alta, Lake McDonald. Not on the Atlantic slope. Deer Lodge Valley.

Picea Engelmanni (Parry) Eng. Trans. St. Louis Acad. 2 212 (1863). *Abies Engelmanni* Parry same citation. Engelmann's Spruce. This is a tree with oblong outline and rather rounded top, mostly 50 to 75 feet high and 1-2 feet in diameter, much wider and shorter than *P. Columbiana*. The twigs are pendent, about a foot long. Leaves less rigid, spreading in all directions, acute, slender, mostly nearly straight, about 1 inch long. The cones are elliptical before opening, about 2 inches long and 1 inch wide, about a half longer than *P. Columbiana*, shortly rounded at both ends. Scales rather dark, straight, nearly entire in the type to somewhat lacerate, thin and with narrowed tips in ours, not evidently obovate. Twigs reddish and minutely pubescent. This is very abundant near timber line on all the peaks and on subalpine slopes is frequent. Elrod peak, Elrod. It is the only spruce on the Atlantic slope. The wood of both species is compact and hard and tough and nearly white and makes fine lumber. It is shipped as Oregon Fir all over the west. The bark is characteristic, being thin and very flaky and reddish, not forming thick ridges as in the firs, it exudes much resin, but there are few or no blisters as in the firs and is not smooth as in the firs. It is at once separable from Parry's spruce by the pubescent twigs and dark and short cones, while the twigs of the other are smooth, and the cones apple green and often 4 inches long, and the scales are thin and very lacerate, with narrow tips.

TSUGA, HEMLOCK.

The hemlocks are the most graceful and beautiful of the evergreens. Their tall and spire-like outline, with needle-like tip, and their long and drooping slender branches with quill-like twigs, 2-4 feet long pendent and dangling their clusters of cones in flat wands could be mistaken for the spruces by the casual observer. The trees are mostly 100 to 200 feet high and grow in dark and damp woods along rivulets at the bases of the mountains or alpine and are rare.

(7) Plants of the Middle Temperate zone, cones .5-1 inch long. *T. Mertensiana*.
Alpine, cones 1.5-2 inches long. *T. heterophylla*.

Tsuga heterophylla (Raf.) Sargent Sylva 12 73 (1898), *Abies heterophylla* Raf. Atl. Jour. 119 (1832). Western Hemlock. This is a tree with the habit and appearance of the pyramidal forms of *Juniperus scopulorum*, and also

Picea Columbiana, but the tip more needle-like, habit about that of *Cupressus Arizonicus*. The branches droop and the fruiting twigs are pendulous in clusters. It grows along with the firs, some trees being 50 to 60 feet high with us. The branches are very many, rather dense and with many twigs. Season's twigs barely 2 mm. wide, drooping as are also all the younger twigs of 2-3 years' age, very pubescent with spreading hairs, 2-6 inches long, round, reddish yellow, the convex leaf ridges 4.5 mm. long and ending in a dark red appressed and truncate cushion about as broad as long, to which the twisted and flattened leaf petiole, about 2 mm. long is jointed. Leaf blade 13 mm. long, 1 mm. wide, entire, flat, with one dorsal groove and low convex back, and concave lower side, very dark green above and glaucous below, apex obtuse and rounded, base triangular-acute and set at an angle to the petiole, smooth. Last season's twigs light-reddish brown, 3-year-old twigs reddish brown, with papery bark splitting between the leaf ridges and flaking up like birch bark, the leaf cushions falling off with them. Twigs that are 13 mm. thick also have reddish brown papery bark scaling up somewhat. The older bark scales up like the spruce, but is more shreddy, like the *Arbor Vitae*. Cones apple green, pendulous on twigs 1-2 inches long, about 1 inch long, 11 mm. thick, elliptical-lanceolate, acute, smooth and waxy, but apparently puberulent when young. Scales 13 mm. long, elliptical-oval, with very narrow and reddish and entire margins. Seeds very small, 2 mm. long. Wings 4 to 6 times as long and very thin and rounded. Bracts not visible in the green cones. Wood white and soft and very flexible, with red center. This is very rare in our region so far as known. A few individuals grow at the Hemlocks at the foot of MacDougal peak near Echo Lake and at Swan Lake. It also abounds in the Sperry Glacier region. It does not grow on the Atlantic slope.

Tsuga Mertensiana (Bong.) Carriere Trait. Conif. Nouv. Ed. 250 (1867). *Pinus Mertensiana* Bong. Mem. Ac. St. Pet. 6 2 45 (1832). *Tsuga Pattoniana* Eng. Black Hemlock. Leaves 13-25.5 mm. long, angular, acutish, narrowed below, often arched, keeled on both sides, unequal and appearing as if in clusters. Cones 1.5-2 inches long, cylindrical, 13-17.5 mm. thick. Seeds 5 mm long, with an obliquely abovate wing. This has been reported from the Sperry Glacier region, McDonald peak and Bitter Root mountains, but it is doubtful if it grows east of the Cascades. It has probably been confounded with the longer coned forms of the above. The Sperry Glacier species is not *Mertensiana*.

Blankenship in his additions to the Montana flora quotes *Tsuga Mertensiana* records from various Government reports as occurring on the high mountains. All these records are errors, for *Picea Columbiana*, whose cones resemble the *Tsuga*. No *Tsuga* grows at high elevations in Montana. They all belong to the Middle Temperate life-zone.

JUNIPERUS, JUNIPER, CEDAR.

Alpine shrubs mostly, tufted from the root and prostrate or widely spreading with sharp and prickly leaves about 12 mm. long. Berries in the axils.

J. communis.

Not alpine. Leaves scale-like (sometimes needle-like in *Virginiana*).

Prostrate or decumbent at base, shrubs,

J. Sabina.

Trees or shrubs, with distinct and erect trunks. Berries terminal.

Leaves with entire margins, in pairs.

J. Virginiana.

Leaves with plainly denticulate margins, mostly in threes. *J. occidentalis*.

Juniperus communis L. 1040. The type is a small tree with a trunk, and does not occur with us.

Juniperus communis var. *depressa* Pursh Fl. 2 646 (1814). Depressed variety. This is the common form at low elevations growing in the open woods on flats where the stems are many from the root and decumbent at base and then ascending 3 to 4 feet high, forming a kind of bowl shaped mass 6 to 10 feet in diameter. Common all along the eastern side of the Lake in the Middle Temperate life-zone. Occasional in the Sperry Glacier region, especially on the Atlantic slope.

Juniperus communis var. *montana* Ait. Hort. Kew 3 414 (1788). *J. Sibirica* Burgstl., *J. communis* var. *alpina* Wall. Alpine variety. This forms dense mats at and near timber line and is mostly prostrate throughout and usually has shorter and blunter leaves. The berries of both the varieties are blue with a white bloom and are barely edible. The species has little use in Montana, though the branches make good floors for beds. The plants have a strong odor when bruised and produce juniper oil in abundance when distilled. The berries form a portion of the food of grouse at high elevations and the mats form the best of shelter from enemies and the weather. It grows best on steep ridges and exposed slopes and cliffs. MacDougal peak, MacDougal; also Umbach. It is common.

Juniperus Virginiana L. 1039. Red Cedar. Red Juniper. This is the characteristic tree of the Lake shores, being found everywhere just at the storm line. It also grows on subalpine cliffs straggling over the rocks. Along the shores it occurs in two forms, the more common one being a bushy and rounded clump with one or more trunks 10 to 20 feet high growing on rocks or shallow soil. Where the soil is deep it assumes the proportions of a tree even 75 feet high and often pyramidal in outline. It varies in thickness from a few inches to almost 2 feet. The bark is rather thin and dark. The branches are smooth and olive colored and do not flake up at all for several feet in length, then they flake slowly, but not at all as in the variety which grows in more arid conditions and therefore flakes up more quickly. The inner bark is dull and the wood of the twigs white to the core. The spray is fine and open. Berries about 2 mm. wide and blue when ripe. The wood of the old trees has a narrow white band near the bark, the rest is dull red and not purplish as in the variety. The odor is strong and aromatic. The texture of the wood is compact, very fibrous and splitting into very slender splinters, very flexible, heavy. It makes the best of fire wood, good posts, is rarely large enough for lumber and is much used as an insect exterminator because of the strong odor. The bark of the main trunk is not evidently shreddy, but is deeply cracked in narrow ridges, and it never hangs in long shreds floating in the wind as on the white juniper. Where the bark cracks up on the twigs it does so in rectangular pieces, not in papery shreds. The distinction of rounded top separating this from the variety amounts to nothing. The ripening of the berries is indifferently annual or biennial, though in the typical species it is more nearly annual. The only distinction that amounts to anything between this and the variety is the finer spray, smaller berries and dull purple wood. Also at McDonald peak at 5,500 alt.; Wild Horse Island, Elrod; Bigfork, Umbach. Not seen in Sperry Glacier region.

Juniperus Sabina L. 1039. Creeping Juniper. This belongs to the Virginiana section and is creeping, flat on the ground for the most part. It grows on dry slopes, but does not seem to be nearer our region than the Atlantic slope, except at Garrison and Upper Marias Pass and Deer Lodge Valley.

Juniperus Virginiana var. *scopulorum* (Sargent Gard. and Forest 10 420 (1897) as species). This variety does not grow in the Flathead region unless it occurs on the west side on rolling hills. The wood is bright purple, the berries about 4.5 mm. wide, the spray much shorter and a little thicker, and the bark of the twigs flaking up except for a short distance near the ends into small blocks and leaving the purplish under bark exposed. It abounds on dry hills and cliffs where the rainfall is less than 20 inches per annum throughout eastern Montana and southward through Idaho. In Utah it is found only in the mountains on cliffs and slopes. It is mostly with rounded top, but is occasionally pyramidal, but rarely reaches 50 feet high then. The differences between the type and variety are only such as would occur in a moister climate. There is a Coast form of this plant along the Sound whose relationship is not yet fully established, but it is probably only the most developed form, due to better soil and still more humid climate.

Juniperus occidentalis Hooker Fl. Bor. Am. 2 166 (1840). Western White Juniper. This has not yet been reported from our region, but is likely to grow west of the Lake on the dry hills. It is characterized by the thick twigs, large berries, compact spray, rounded apple tree-like top and very stout and erect trunk 1 to 2 feet thick, as well as by the leaves being in threes.

THUYA, ARBOR VITAE.

Thuja plicata Donn Hort. Cantab. Ed. 6 249 (1811). *T. gigantea* Nutt. Giant Cedar. Arbor Vitae. Cedar. This is a very tall and graceful tree, outline conical, or linear-subulate in cross section, with spreading and much drooping branches. The scale-like leaves green and shining, acuminate, rather pubescent. Comes clustered toward the ends of the twigs, 13 mm. long, the scales with a thin and acute mucro. Wood is fine grained, very flexible and soft, light colored, reddish at center, durable, splitting readily into fine flakes and much used for shingles. With us it is a slender tree rarely a foot thick and 100 feet high, growing on wet north slopes along with the larch and fir in the shade. The bark shreds up into long and thin flakes 1 to 2 feet long, which are reddish. The upper stems smooth and light brown. Branches many and slender. It is at once recognized by the scale-like leaves arranged on branches, forming great flattened wands, and by the cones. Huckleberry Spring, on the Swan River road. This is sold as white cedar by the lumbermen throughout Montana. Common at McDonald Lake in the Mission Mountains. Not seen on the Atlantic slope.

At both lakes there are magnificent forests with some trees 4 feet in diameter.

CHAMAECYPARIS, YELLOW CEDAR.

Chamaecyparis Nootkatensis (Lamb). Spach. Hist. Veg. 11 333 (1842). *Cupressus Nootkatensis* Lambert Gen. Pin. 2 18 (1824). This has been reported from near our region, but is probably an error for the Thuja.

PINUS, PINE.

Leaves less than 5 in each cluster. Bark rough.

Leaves in twos, 2-3 inches long. Cones persistent for years, small, about 1.5-2 inches long, obliquely-triangular-ovate when closed. Slender trees with many and mostly whorled branches.

P. contorta.

Leaves in threes, rarely in twos, about 6 inches long. Cones oval 3-4 inches long, dark-purple. Branches seldom opposite, few, large. Very large trees

P. ponderosa.

Leaves in fives. Bark smooth on all the upper part of trees, very resinous. Wood soft and white, rather brittle.

Cones ovate to almost round, very dark, rarely 3 inches long. Low and scraggly trees growing in rocky places in subalpine situations.

P. albicoulis.

Cones nearly apple-green, cylindrical, 4-8 inches long.

Low and scraggly trees, widely branched. Leaves rigid, dark-green. Branches few and large.

P. flexilis.

Tall and stately trees with slender, weak and light-green leaves. Bark oak-like. Branches whorled and many.

P. monticola.

Pinus contorta Douglas in London Arb. Frut. 4 2292 f. 2210, 2211 (1838). What corresponds partly with the type of this species is a small and scraggly tree growing at timber line on McDonald peak, and probably elsewhere. It has small and very oblique cones not opening for several years after maturity and slender leaves 1 to 1.5 inches long. The type is a tree of the wet coasts of the Sound in a very different life zone. Upper Marias Pass, Lake Louise.

Pinus contorta var. *Murrayana* (Murr.) Eng. Bot. Cal. 2 126 (1880), *Pinus Murrayana* Murr. Bot. Exp. Oregon 740 t. 3. f. 2. (1860). Lodgepole Pine. This is a strict and slender tree with tapering trunk, growing in dense thickets and singly all over the mountains to timber line in dry places, horizontal, slender, whorled branches. Cones clustered, about 2 inches long, with strong knobs and slender prickles. The bark is thin and scaly and light-brown, and rough even to the twigs, not conspicuously resinous. Leaves 2 to 3 inches long. Outline of tree is lanceolate with an acuminate tip. This is the most common evergreen in the region taking it as a whole. There are few places where it has reached the dimensions of a lumber tree because of the frequent fires, but back of Yellow Bay it forms immense thickets over square miles of land, growing so thickly that it is difficult to force one's way through it afoot. It is everywhere on the slopes of McDonald peak, is very abundant on the uplands back of Bigfork going up to the limit of the subalpine at 5500 feet. It is occasionally 150 feet high. The wood is tough, hard, compact and reddish, and when large enough makes fine lumber. It is much used for poles for fencing, for posts and the like. Everywhere to the top of the mountains in the Bitter Root valley. Occasional on both slopes in the Sperry Glacier region.

Pinus ponderosa var. *scopulorum* Eng. Bot. Cal. 2 126 (1880). Yellow Pine. This is a magnificent tree 100 to 150 feet high, with straight trunk tapering but little, the lower branches falling early and only here and there a great branch straggling off, trunk often 100 feet long without a branch and 2 to 6 feet in diameter, with brick-colored, thick, flaky bark cracking up into great flat areas 2 to 4 inches wide and a foot or more long. The very slender leaves are about 6 inches long in swabs at the ends of the twigs. The cones before opening are oval-oblong, 3 to 4 inches long, but on opening are about oval-ovate, dark colored. Prickles stout and incurved. Wood rather yellowish, compact, tough, heavy. Leaves often in twos. The cones and leaves vary greatly. This is the great lumber tree of the region. It abounds on the mainland on tablelands and slopes to the subalpine at 5500 feet alt. in dry places and on all the shores and islands of the lake. It never grows in thickets, even the seedlings do not grow close together as with the lodge-pole pine. Bigfork, Umbach. Everywhere to the top of the mountains in the Bitter Root valley.

Pinus albicaulis Eng. Trans St. Louis Acad. 2 209 (1868). White-barked Pine. Bastard Alpine Pine. This grows at high elevations at and near timberline on all the mountains on the edges of rocky meadows and slopes and ridges. It is a scraggly tree, generally with the trunk dividing into two or more great limbs which are tortuous or curved and sparingly branched with short and thick twigs and smaller branches whose swollen bark is full of pitch. The leaves form narrow swabs at the ends. The nearly black cones are single to clustered near the ends, and are heavy but small. The main trunk is a foot or two thick with rather thin bark cracking into oblong areas flat on the top much like the oak. The wood is soft and white and full of resin and very brittle, of little value save for fuel. Trees rarely over 50 feet high growing along with the alpine fir and red fir. Common at timber line on both slopes in the Sperry Glacier region.

Pinus flexilis James Long's Exp. 2 35 (1823). Bastard Pine. This is not yet known nearer than Deer Lodge valley. Its cones are narrow and over twice as long as in *albicaulis* and the tree grows in the Middle Temperate life zone mostly but in other respects much resemble it.

Pinus monticola Douglas in Lamb. Desc. Pin. Ed 2, 3 27 t. 87 (1837). White Pine. This is the most magnificent pine of them all. It often grows to 200 feet high, with a straight symmetrical and clean trunk, with thin (except at base) and oak-like bark. It is often 6 feet in diameter but is still a slender tree. It has an airy appearance because of the rather long internodes and the almost thread-like and glaucous leaves 2 inches long.

The cones are resinous, light but often 8 inches long, few and almost always at or near the tip of the tree. The bark is olive-gray and smooth on all the branches and even the trunk for many feet down. Bark of the main trunk below is light-gray, cracked into small rectangular and oblong areas 1 to 2 inches long which are not flaky and never over an inch thick and flat-topped. Outline of tree is linear with an acuminate tip. Its branches like the lodgepole pine but is more open and with branches longer and flexible. It grows along the Swan Lake road sparingly in moist places and in the fir forests near the Hemlocks in the most magnificent proportions. It is remarkably free from knots. The wood is white and soft. It is considered the best timber tree of all, but is not plentiful. Not found on McDonald peak nor on any of the islands. Lake McDonald, Umbach. Locally abundant in the Lake McDonald region.

LARIX, LARCH, TAMARACK.

Alpine, twigs and bud scales woolly.

L. Lyallii.

Plants of the Middle Temperate life zone. Twigs and scales smooth.

L. occidentalis.

Though the larch differs superficially from *Picea* in a marked degree in the deciduous and fascicled secondary leaves, yet it is closely related to it in all permanent characters as is shown by the development of the young plants and the character of the primary leaves. Its arrangement with the pines is a wholly artificial one for ease in classification.

Larix Lyallii Parl. Enum. Sem. Hort. Reg. Mus. Fl. 259 (1863). Alpine larch. This tree grows at and near timber line on the high peaks. It is seldom 100 feet high and branches rather low down into one to three large and candelabrum-like divisions which are mostly erect above the curved base. The trunk is large for the height and straight, seldom making more than one length of good lumber. The bark and wood are much the same as in the western larch. It grows on rocky slopes and among glacial boulders, never in wet places. In our region it has not been found on the Flathead Lake side of any of the ranges but occurs on the eastern side of the Swan range in the alpine basins but sparingly. It has been found on Elrod peak, Mt. Lo Lo, also by Jones in the main range west of Hamilton. It also occurs on Mt. Haggin back of Anaconda and probably southward to the Sawtooth and Seven Devils mountains, Idaho and the Blue Mountains or Wallowas of eastern Oregon. It extends northward into British America and westward. Not seen in the Sperry Glacier region.

The following field study of *Larix Lyallii* growing on Como peak was made this year. Subalpine. Young trees much like *L. occidentalis* but more widely branched. Bark rough and cracking up into irregular and thick flakes like *Pinus Murrayana* on the base of trees that were only 4 inches thick. Upper bark light gray and smooth, powdery or granular. Two-year-old twigs the same in color and with thin hair-like flakes or fibrous shreds. Last year's twigs chestnut-colored and woolly. Season's twigs were woolly and green and with single leaves as in the other species. Regular leaves needle like and a little tapering at base, very soft, about an inch long. Cones erect even when the twigs are pendent. Scales erose and puberulent at tip, deep purple. Branches very slender and pendent often. Outline of old trees ovate. Branches large, dichotomously several times branched. Habit more that of *Pseudotsuga* but more open. Branches either ascending or drooping. Trunks sometimes forked and candelabrum-like, but mostly simple.

Larix occidentalis Nutt. Sylva 3 143 t. 120 (1849). Western Larch. Tamarack. The young season's branches have raised ridges along the stem like the spruce, which end abruptly in an oblique scar to which the primary leaves are jointed, but this scar is not horizontal at the end of a short and woody and persistent pedicel as in the spruces, but the leaves of both are single in a place like the firs. The second year the twigs

are roughened by these now leafless ridges though otherwise smooth and are tan-colored. After the twigs are two years old they are covered by resinous particles like warts and are dark-gray or brown. The outline of the tree is linear-lanceolate and it appears sparsely branched with relatively very short branches which are often clustered in bunches, mostly alternately, and mostly drooping. Twigs either erect or pendulous. In young trees especially the twigs are often several feet long and droop like the weeping willow forming very beautiful and symmetrical trees. The tree is much infested with mistletoe which produces great knobs from which arise innumerable branchlets. Season's twigs about 2 mm. thick, dull-red, very slender, a few inches to a foot long as a rule, slightly pubescent, arising from the wart-like knobs of the previous year, except the terminal twig which arises from the bud of the previous year, but even it has at its base the rosette of secondary leaves which is characteristic of the knobs and also has the knob there. The second year the lateral buds of the first year produce rosettes of many leaves and also thicken into warty knobs about 6.5-9 mm. long and wide which persist in the stem indefinitely and give it its very knotty appearance. The third year these knobs develop twigs from the center and a second rosette of leaves at the base or produce sterile or fertile cones with a rosette of leaves at their base, or often produce only another rosette of leaves. The twigs of the season have the basal rosette leaves about 2 inches long, 6.5 mm. wide and 3 mm. thick, they are obtusely 4-angled, needle-like, but a trifle wider above and with a very short point at the rounded tip. These leaves gradually pass into the primary leaves of the twigs which are about 1 inch long above and nearly the same width throughout and with a short and acuminate tip. These leaves are alternate, one in a place, terminating a leaf-ridge which is exactly like hemlock (that is convex on the back and chestnut-colored, ending in a truncate projection which stands out its width above the end of its attachment where it is jointed squarely to the leaf which is sessile and without a petiole, and is deciduous, this projection after a year or two being only a knob in the bark and thus differing from the spruce). Therefore the larch and hemlock are the nearest related, and both are closely related to the spruce. The cones mostly fall when ripe but sometimes persist a year, especially when they produce a rosette of leaves at the tip which occurs frequently. Rarely they produce season's twigs from the tip and the upper and sometimes the lower bracts are altered into leaves, but with the center of the cone still seed bearing. The cones are 1-2 inches long, .75-1 inch wide, rounded at both ends. The bracts are tridentate and with the central tooth variously prolonged but the body of the bract is not exerted, bract red to purple at least at base. Scales nearly oval, about 9 mm. wide, the tips recurved a trifle and a little erose, about 13 mm. long. Wings of seeds half-ovate and as long as the scales, very thin, rounded. The cones ripened on Sept 1st, this season at Bigfork but at Coeur d'Alene Lake they were not ripe two weeks later though the elevation was much less, they seem to mature at once after frost. The bark of the older twigs is smooth and drab-colored except for the darker areas representing the old leaf-ridges which gradually widen and at last break into shallow cracks exposing the reddish under bark and letting the bark flake up in one thick layer. With age the bark gets rougher and more flaky and darker till the outer flakes fall off and leave it reddish. On the main trunk the bark is scaly and thin above, but on old trees it cracks into large and flat areas 2 to 4 inches wide and 6 to 18 inches long, reddish. The old trees have conspicuously brick-colored bark in great areas like the yellow pine but brighter. The tree is often 200 feet high, straight, with trunk tapering but little, the outline is linear-lanceolate. The branches are so small that they do not leave the wood knotty. The wood is rather reddish, soft, compact, finely grained and straight and splits readily in thin flakes. This tree forms about half

of the forest of the eastern side of the Lake and by far the most lumber. The trees grow close together in dense forests and are often 4 feet in diameter. They prefer moist soil on north slopes or along bottoms and extend up to about 5500 feet altitude or the limit of the Middle Temperate zone. It is less common at Dayton, Hot Springs and McDonald peak than at Bigfork. Common in the Sperry Glacier region. Not seen on the upper Bitter Root.

Potamogeton Friesii Ruprecht. Polson Swamp.

Andropogon scoparius Mx. Dayton. This is the first time it has been reported west of the Atlantic slope.

Stipa minor (Vasey) Scribner. Common on low prairies Bigfork and Wild Horse Island.

Stipa Nelsoni Scribner. Monida, Alta, Blackfoot Glacier.

Agrostis exarata Trin. Alta, Belton.

Polypogon Monspeliensis (L.) Desf. Ravalli.

Calamagrostis neglecta (Ehrh.) Gaertn. Evaro, Alta.

Calamagrostis blanda Beal. Daphnia Lake at Bigfork. Too close to *C. Canadensis*.

Calamagrostis rubescens Buckley. Bigfork, Swan Lake, Bull Island.

Trisetum cernuum Trin. Bigfork, Swan Lake.

Trisetum canescens Buckley. Bigfork, Alta, Evaro.

Deschampsia calycina Presl. Ronan.

Spartina gracilis Trin. Polson.

Poa purpurascens Vasey. Sperry Glacier.

Poa reflexa V. & S. Sperry Glacier.

Poa alpicola Nash. Blackfoot Glacier.

Poa leptocoma Trin. Blackfoot Glacier.

Poa pudica Rydberg. Blackfoot Glacier.

Poa interior Rydberg. Sperry Glacier. A doubtful species.

Poa crocata Rydberg. Sperry Glacier.

Poa Lettermanni Vasey. Sperry Glacier.

Poa Howellii V. & S. Daphnia Lake at Bigfork.

Poa laevigata Scribner. Deer Lodge valley, Sperry Glacier.

Poa Nevadensis Vasey. Alta.

Poa brachyglossa Piper. Monida, Alta, Evaro.

Poa confusa Rydberg. Garrison.

Poa Olyneyae Piper. McDonald Lake Mission Mts., Darby.

Poa acuminata Scribner. Lambert Valley.

Poa annua L. Ronan, Missoula, Lake McDonald.

Glyceria elata (Nash Fl. Mont. 54 (1900) as *Panicularia*). Bigfork.

Glyceria pauciflora Presl. Ronan, McDonald Lake in the Mission Mts.

Glyceria borealis Piper. Swan Lake, Bigfork, Yellow Bay, Upper Marias Pass, Ronan.

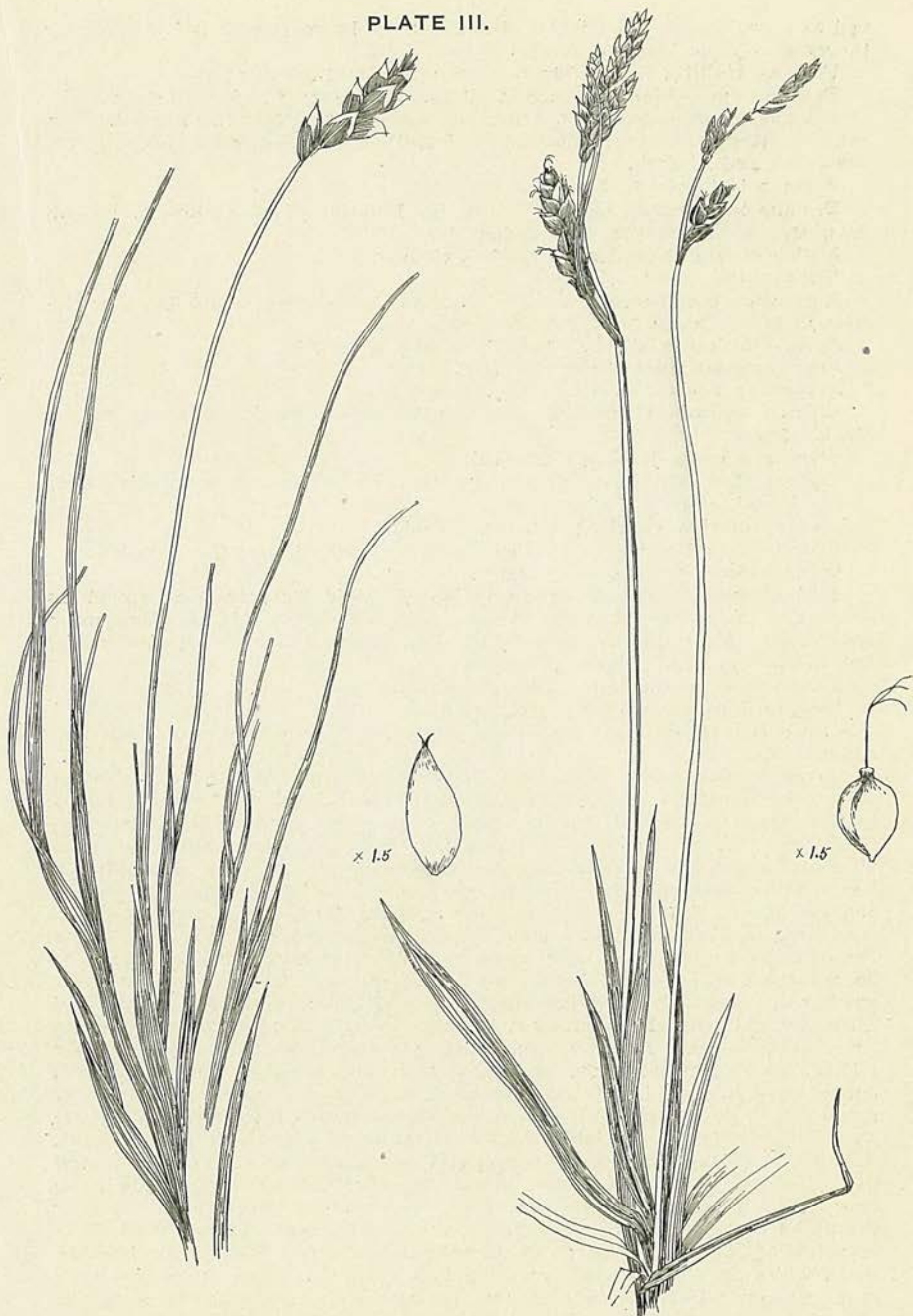
Glyceria flavescens n. sp. This is close to *G. grandis*, but shorter and more rigid, stems 13 mm. thick at base, erect, 2.5-3 feet high not creeping at base. Even the upper sheaths nearly as long as the internodes which are short, making the stems very leafy. Upper leaves 6 to 12 inches long and nearly 13 mm. wide, shortly acuminate, smooth except on the scabrous edges, yellowish-green, a little paler below but not glaucous. Panicle scarcely exerted, obovate-cuneate, very dense, erect, with several erect rays at each joint which branch repeatedly, only the upper branches spreading. Spikelets linear-lanceolate, acute, about 11 mm. long, about 5-flowered, greenish-yellowish. Glumes hyaline, white, turning tawny with age, the upper 3-nerved at base. Lemma narrower and a trifle longer and less scabrous than in *G. grandis*, not turning purple. This has the habit of *Phragmites* and grows in large patches in bogs. Gathered at Swan Lake Aug. 24, 1908 while *G. grandis* at the same place was all out of bloom and even the seed fallen two weeks earlier. It differs from *G. grandis* in the swab-like panicle, lutescent flowers and leaves, broader

PLATE II.



GLYCERIA FLAVESCENS JONES N. S.

PLATE III.



CAREX STANTONENSIS JONES
N. S.

CAREX PARRYANA VAR HALLII
BAILEY

and shorter leaves, short internodes and very leavy stems, and much later flowering season. Middle Temperate life zone.

Festuca Hallii (Vasey) Piper. Bigfork, MacDonald peak.

Bromus Pumpellianus Scribner. Alta. Blackfoot Glacier, Bigfork.

Bromus Richardsoni Link. Bigfork, Swan Lake, Ravalli. Also the var. *pallidus* (Hook.) Shear, MacDougal and McDonald peaks, Wild Horse Island, Whitefish and Bigfork.

Bromus tectorum L. Missoula, Colville.

Bromus marginatus Nees. Bigfork, St. Ignatius Mission, Ronan, Ravalli Alta, McDonald Lake in the Mission Mts.

Melica stricta Bolander. Blackfoot Glacier.

Melica bella Piper. Alta.

Agropyron occidentale Scribner. Bigfork, Ronan, McDonald Lake in the Mission Mts., Upper Marias Pass, Browning.

• *Agropyron lanceolatum* S. & S. Wild Horse Island.

Argopyron biflorum (Brign.) R. & S. Alta.

Argopyron Scribneri Vasey. MacDougal Peak.

Elymus triticoides Buckley. Ravalli, Blackfoot Glacier, Browning, Upper Marias Pass.

Elymus glaucus Buckley. Ravalli.

Elymus Canadensis L. Bigfork, St. Ignatius Mission, Yellow Bay, Wild Horse Island, Upper Marias Pass.

Scirpus riparius (R. Br.) Spreng. Monida.

Scirpus robustus Pursh. Bigfork, Hot Springs, St. Ignatius Mission.

Scirpus microcarpus Presl. Darby.

Scirpus microcarpus var. *robrotinctus* (Fernald Rhodora 2 20 (1900) as species. This hardly deserves varietal rank, all sorts of intergrades occur constantly. Alta, Bigfork, Swan Lake, St. Ignatius Mission, Hot Springs, Polson Swamp, Bull Island, Common.

Eriophorum gracile Roth. Sperry Glacier.

Eleocharis rostellata Torr. Hot Springs.

Carex Deweyana var. *sparsiflora* Bailey. Yellow Bay in damp and dark woods.

Carex nardina Fries. This plant is very common on all the alpine peaks and rocky meadows of the Sperry Glacier region, and in Lambert Valley in the Mission Mts. Though it agrees with other material from the Cascades sent out by the Gray Herbarium, it does not accord with the usual character given this species. In case it should prove distinct it may bear the name *Carex Stantonensis*. Densely caespitose, with many large and brown sheaths like *C. filifolia*, and with thick crowns. Root leaves many, filiform, channeled, smooth, truncate, rigid, erect, .5 mm. wide, about 4 inches long and as long as the stems which are filiform. Spike single, inclined to be clavate and narrowed below, but acute at tip. The two lowest perigynia contiguous, the rest imbricated closely. Spike staminate at tip and with few stamens, 13 mm. long, 5 mm. wide. Bracts none. Scales ovate-oval, acute, fully 2 mm. long, chestnut-colored but with lighter midrib, closely investing the perigynia and fully as wide, very thin, with entire edge. Perigynia closely appressed but with tip inclined to turn out, manifestly inflated and with papery covering, about a third longer than the akene and inclined to wrinkle lengthwise as if nerved, tip a little oblique, with very short oblique beak, not cleft down the outside to speak of and nearly entire. Perigynia white except the chestnut-colored tip, about as long as the inflated scale, smooth except the scabrous edges above and near the tip on the back, apparently plano-convex, not winged, oblong-ovate. This is manifestly a close ally to *C. Lyoni* but differs in the much broader scale, while the perigynia are wanting in the mature state. It is also near to *C. rupestris* but the stigmas are two and not three and the perigynia are not smooth above as in that species. Collected by Williams on a mountain above Stanton Lake, Aug., 1894 and distributed as *C. Pyrenaica*.

- Carex grvida* Bailey. Swan Lake.
- Carex conjuncta* Boott. Polson Swamp, Whitefish, Sand Point, Idaho.
- Carex diandra* Schrank. Ours is the var. *ramosa* (Boott) Fernald. Bigfork, Swan Lake, Rost Lake, Ronan, Alta.
- Carex stenophylla* Wahl. Upper Marias Pass, Deer Lodge Valley.
- Carex scirpoides* Schkr. Bigfork, Swan Lake, MacDougal peak.
- Carex scoparia* Schkr. Evaro.
- Carex Liddoni* Boott. Garrison, Alta, Evaro.
- Carex adusta* Boott. Ronan.
- Carex leptalea* Wahl. Bigfork, Rost Lake, Swan Lake, Bull Island, Yellow Bay.
- Carex scirpoidea* Mx. Lambert Valley, rather common in the Sperry Glacier region.
- Carex aquatilis* Wahl. Polson Swamp, Monida, Whitefish, Silver Bow.
- Carex rigida* Good. Lima, Monida.
- Carex lenticularis* Mx. Bigfork, Swan Lake, Sand Point, Idaho.
- Carex acutina* Bailey. Blackfoot Glacier,, Alta, Swan Lake.
- Carex Nebraskensis* Dewey. Evaro, Ravalli, Bigfork, Yellow Bay, Hot Springs, Monida.
- Carex Parryana* Dewey var. *Hallii* (Olney) Rydberg. Whether this is a good species I am not able to say at present. Prof. Bailey also regarded it as a variety of *C. Parryana* and called it var *unica*. A detailed description of it is appended.
- This appears to be near *C. Pennsylvanica*. Stems leafless except at very base, 1 foot high, smooth, obtusely-3-angled, filiform, 1 mm. thick, erect and stiff, light-green. Leaves several basal, 3 inches long, 4 mm. wide at base, linear-subulate, yellowish-green, flat, rigid. Bracts enlarged, chestnut-colored and scale-like at base, sheathing, the lowest with a setiform green bristle about 1 inch long below the lowest spike, the others much reduced but present. Terminal spike 19 mm. long by 2 mm. wide, sessile, all staminate, with oval mostly obtuse scales which have broad hyaline, and lacerated edges and chestnut-colored center, 2 mm. long. Pistillate spikes contiguous, about 3, the uppermost at base of the staminate one and very small and few-flowered, 4.5-6.5 mm. long, 2 mm. wide, sessile, the others longer, 13-19 mm. long and 6 to 15 flowered, loose and very narrow, 2 mm. wide, the scales reaching about to the middle of those above on the lower part of the spike. Lowest spikes on filiform peduncles but erect, the peduncles not longer than the spikes except when the lowest spike is subradical, when the peduncle is 3 to 4 inches long. Scales very broadly ovate, barely acute to cuspidate, dark-chestnut-colored, with white and hyaline edges, about 2 mm. long, embracing the oval, very convex and smooth (but papillose with oblong bosses) perigynia, which are abruptly contracted at both ends to a short beak or stipe, faintly-several-nerved, tip with serrate edges, mostly green, 1.5 mm. long. Monida on dry prairies. Middle Temperate life zone. This differs from *C. Parryana* in the sheathing bracts and smooth appearing perigynia, etc.
- Carex Pennsylvanica* Lam. Alta.
- Carex Pennsylvanica* var. *pinicola*. Leaves 11-15.5 mm. wide. Pistillate flowers more numerous, plants more robust. Alta among pines on dry hillsides. Middle Temperate life zone.
- Carex Idahoa* Bailey. Monida, Butte, Ryan's Lake.
- Carex polygama* Schkuhr. Rost Lake, Monida, foot of MacDougal peak.
- Carex atrata* L. Sperry and Blackfoot Glaciers.
- Carex atrata* var. *ovata* (Rudge) Boott. Sperry and Blackfoot Glaciers. Ours answer well to *C. chalciolepis* but are not all copper colored.
- Carex Mertensii* Prescott. Blackfoot Glacier.
- Carex alpina* Swartz. Sperry Glacier, McDonald Lake in the Mission Mts., Darby.

Carex physocarpa Presl. Bigfork, Evaro, Alta, Ravalli.

Carex vesicaria L. Bigfork, Polson Swamp, Alta.

Carex monile Tuck. Common at Bigfork, Polson Swamp, Monida, Hot Springs.

Carex retrorsa Schw. Bigfork, Rexford.

Carex retrorsa var. *Hartii* (Dewey) Gray. Polson Swamp and Swan Lake.

Carex lurida Wahl. Bigfork, Swan Lake.

Juncus Balticus var. *littoralis* Eng. Wild Horse Island, Polson Swamp.

Juncus Drummondii E. Meyer. Common in alpine meadows and on rocky ridges, MacDougal peak, McDonald peak, and on all the peaks of the Sperry Glacier region.

Juncus Drummondii var. *Parryi* (Eng. Rev. Junc. 446 (1866) as species). Como peak, McDonald Lake, Mission Mts.

Juncus triglumis L. Sperry Glacier.

Juncus Dudleyi Wiegand. This is one of the few segregates from *J. tenuis* that seems to hold. Bigfork, St. Ignatius Mission, Sand Point, Idaho.

Juncus Greenei Oakes. Whitefish.

Juncus tenuis var. *anthelatus* Eng. Darby.

Juncus castaneus Smith. Blackfoot Glacier.

Juncus acuminatus Mx. Polson Swamp and Sand Point, Idaho.

Juncus alpinus Vill. *J. truncatus* Rydberg. Ours is the var. *insignis*. Common on the flats all around Flathead Lake and Swan Lake.

Juncus Nevadensis Wat. Alta, Hamilton, Wild Horse Island, Polson Swamp.

Juncus Columbianus Coville. Browning.

Luzula spicata (L.) Dec. Gunsight Pass and Sperry Glacier.

Luzula parviflora (Ehrh.) Desv. Lambert Valley.

Luzula Piperi (Coville) in Piper Fl. Wash. (1906) as *Juncoides*) Alpine meadows, MacDougal peak, Sperry Glacier, Alta.

Acorus Calamus L. Abundant at Polson Swamp and adjacent mainland, if introduced it must have been long ago.

Xerophyllum tenax (Pursh) Nutt. This abounds on all the mountains from Alta and the Mission mountains northward. It includes *X. Douglasii* Wat. There is great variability in the flowers.

Tofieldia glutinosa (Mx.) Pers., *T. intermedia* Rydberg. Sperry Glacier.

Tofieldia palustris Huds. Gunsight Pass and Lake.

Stenanthium occidentale Gray. Blackfoot Glacier and Gunsight Pass.

Zygadenus elegans var. *Coloradensis* (Rydberg Torr. Bull. 27 524 (1900) as species). *Z. alpinus* Blankenship. This intergrades freely with the type. Common mostly in alpine places, MacDougal peak and all through the Sperry Glacier region.

Zygadenus venenosus Wat. Frequent in all sorts of places and elevations. MacDougal and McDonald peaks, Wild Horse Island, St. Ignatius Mission, Yellow Bay, Polson, Bull Island, Bigfork, Evaro, Alta, Ronan, McDonald Lake in the Mission Mts. The segregates of Rydberg have no standing whatever.

Veratrum viride Ait. MacDougal and McDonald peaks, throughout the Sperry Glacier region, Upper Marias Pass, McDonald Lake, Mission Mts. This is the only *Veratrum* in the region though *V. Californicum* has been reported.

Allium Schoenoprasum var. *Sibiricum* (L.) Hartm. This hardly deserves varietal name as both forms grow together. Gunsight Pass and Lake, Belton, Upper Marias Pass.

Allium fibrosum Rydberg. Rydberg was right in separating this from *A. reticulatum*. Daphnia Lake, Lima.

Allium reticulatum Fraser. Common along the upper Missoula river.

Smilacina sessilifolia (Baker) Nutt. Bigfork, St. Ignatius Mission, Yellow Bay, MacDougal and McDonald peaks, Bull Island and Wild Horse Island, Alta, Upper Marias Pass, Sperry Glacier.

Smilacina stellata (L.) Desf. Bigfork, Alta.

Smilacina amplexicaulis Nutt., *Vagnera brachypetala* Rydberg. Common at Bigfork, Yellow Bay, Wild Horse Island, Bull Island, St. Ignatius Mission, Ravalli, Evaro, Alta, Gunsight Lake, Upper Marias Pass.

Disporum trachycarpum (Wat.) B. & H. Somers, Bigfork, Yellow Bay, throughout the Sperry Glacier region.

Disporum Oreganum (Wat.) B. & H. Somers, Bigfork, Yellow Bay, Ravalli, Evaro, McDonald Lake, Mission Mts.

Streptopus amplexifolius (L.) DC. St. Ignatius Mission, McDonald peak, Swan Lake, Missoula, Alta, Sperry Glacier, Gunsight Lake.

Habenaria leucostachys (Lindl.) Wat. Alta. Common in the Sperry Glacier region.

Habenaria obtusata (Pursh) Rich. Foot of MacDougal peak, Mrs. Clemens.

Serapias gigantea (Dougl.) A. A. Eaton, *Epipactis gigantea*, Dougl. Swan Lake at Bond's Cabin and Jeff's Cabin. First found by Miss Norton. The writer doubts the wisdom of referring this to the genus *Serapias*.

Spiranthes Romanzoffiana Cham., *Gyrostachys stricta* Rydberg. MacDougal peak, Bigfork, Yellow Bay, Wild Horse Island, Bull Island, McDonald peak, Gunsight Lake, Alta, Evaro.

Listera cordata (L.) R. Br., *L. nephrophylla* Rydberg. McDonald Lake, Mission Mts.

Listera convallarioides (Swartz) Torr. Bigfork, Swan Lake, MacDougal and McDonald peaks, Yellow Bay, from Lake McDonald to St. Mary's Lake in the Sperry Glacier region.

Salix Babylonica (L.) This grows in graveyards.

Salix cordata Muhl. Common at low elevations in all localities.

Salix Novae-Angliae And. Lima.

Salix Novae-Angliae Var. *pseudocordata* And. Alta, Lambert Valley, Blackfoot Glacier and Sperry Glacier.

Salix monticola Bebb. Evaro, Alta, Browning.

Salix Scouleriana Barratt. Common all around Flathead Lake nearly to the upper edge of the Upper Temperate life zone, Columbia Falls.

Salix glaucops var. *glabrescens* And. MacDougal peak.

Salix Tweedyi (Bebb) Jones. This is reported from Flathead Pass, (Upper Marias) by Blankenship, but diligent search there fails to reveal it though the following is common there.

Salix Barclayi And. Upper Marias Pass and Sperry to Blackfoot Glacier especially on the Atlantic slope. It is a curious fact that willows are relatively scarce on the Pacific slope but the moment we get on the other slope they form the chief mountain vegetation forming almost impenetrable thickets, even though the humidity is less than on the west.

Salix Barrattiana Hook. Specimens gotten by Williams at Columbia Falls on the high peaks seem to belong here.

Salix chlorophylla And. Gunsight Lake.

Salix polaris Wahl. Sperry Glacier.

Salix reticulata L. *S. saximontana* Rydberg. This very variable willow abounds on MacDougal to McDonald peaks, also throughout the Sperry Glacier region, Monida, Lambert Valley. Ours are the var. *nivalis* mostly.

Salix Fernaldi Blankenship. Blankenship seems to be right in making a species of the western forms of *S. vestita*. It is characterized by the ovate pods being 2 to 3 mm long only, and the leaves not retuse but rounded at tip. The other characters given amount to nothing, particularly the pubescence and reticulation of the leaves. Young leaves sometimes show little

reticulation but old ones are remarkable for it. This is frequent throughout the high peaks.

Salix desertorum Rich. Gunsight Pass.

Salix candida Fluegge. Rost Lake and Schultze's cabin.

Salix rostrata Rich. Common everywhere almost to the alpine.

Salix macrocarpa Nutt. Bigfork, Swan Lake, McDonald peak, Hot Springs, Monida, Lima.

Salix pellita And. MacDougal peak, Swan Lake, Blackfoot and Sperry Glaciers. Blankenship in his Supp. Fl. Mont. p. 46 says that *S. bella* Piper is a segregate from *S. Sitchensis* (namely is *S. pellita*), but this is an error, it is a form of *S. glaucops* with two stamens. Cusick has at last solved the relationship of *S. pellita* by finding that it always has one stamen and is therefore the inland representative of *S. Sitchensis* as suggested in my Wil- lows p. 25.

Salix nigra has been reported from this region but all specimens so referred are *S. lasiandra*. The same is true of *S. amygdaloides*.

Salix lasiandra Benth. This is common around Flathead Lake, especially on the shores, also St. Ignatius Mission, Ronan, Alta, McDonald Lake in the Mission Mts. mostly the var. *lancifolia*.

Populus trichocarpa T. & G. This seems to be the only narrow-leaved cottonwood west of the Atlantic slope. All forms so far reported as *P. balsamifera* are this species. The only characters that seem to hold are the 3-valved pod and hairy surface, but even the latter apparently does not hold in all cases. The species abounds at low elevations everywhere.

Populus deltoides Marsh. Flathead Delta, Thompson's Falls, Bonner's Ferry, Idaho. Ours is the var. *occidentalis* with smaller leaves.

Betula glandulosa Mx. In the Torrey Bulletin for August, 1909, Mr. B. T. Butler, who was at Bigfork a few weeks in 1908 and a short time in 1909, creates several species from this and *B. microphylla* out of very small amount of material and from very little field study, amounting to descriptions drawn from single trees, none of which species are tenable. His segregates from *B. glandulosa* are *B. glandulifera* Butler, *B. Elrodiana* Butler, *B. crenata* Rydberg. To these might be added *B. Hallii* Howell. *B. glandulosa* varies in size and leaves according to exposure and moisture where it grows. It abounds at the cold lakes at low elevations and on up to the alpine meadows on all the mountains from Alta in the far south to the Sperry Glacier region.

Betula microphylla Bunge. The typical form of this grows in Deer Lodge valley. The common form is var. *occidentalis* (Hooker Fl. Am. 2 155 (1839) as species). This has again been the subject of much unnecessary dissection such as *B. fontinalis* Sargent, *B. Sandbergii* Britton, *B. Utahensis* Britton, *B. Piperi* Britton. It is characterized by the chestnut-colored bark till quite old, which does not peel up in thin flakes, the cambium layer not separating from the tree readily when cut, and by the tufted habit, growing in clumps from a single root. In Utah and the drier regions it rarely reaches 20 feet high and is very slender, but in the more moist places in Montana, especially along creeks it is often 30 or rarely 40 feet high and 6-8 inches through. I have seen a few trees a foot thick in deep woods where the bark peels up tardily and simulates forms of *B. alba*. It is almost never seen except along creeks and at springs. The shape of the bracts amounts to nothing. It is common in our region and east at least as far as Helena, and south to southern Utah.

Betula alba L. Mr. Butler takes up the paper birches and recognizes every name ever applied to them but one as distinct species almost, such as *B. Alaskana* Sargent, and *B. papyrifera* Mx. The paper birches are at once recognized by growing singly from the root and forming large trees, or at least are not tufted as in the other species. The cambium layer pops off as soon as cut through carrying the rest of the bark with it. It grows indifferently along creeks, lake shores and in dark woods in wet places.

The typical form has the bark flaking up in thin and papery white sheets even in young trees. It is very common throughout the region to St. Mary's Lake on the Atlantic slope east of Blackfoot Glacier.

Betula alba var. *pendula* (Roth Fl. Ger. 1 405 (1788) as species). Mr. Butler again dissects this and makes new names out of forms such as *B. subcordata* Rydberg, *B. Montanensis* Butler, and curiously refers *B. occidentalis* Hooker to it, when the typical form of it is described as low and shrubby. (See DC. Prod. 16 2). His *B. Montanensis* is founded on a single old and partly dead tree. This shades by imperceptible degrees into the type. It is characterized by the bark peeling off more tardily and in rather thick and cardboard-like layers. This also is common in our region. This is called *B. occidentalis* by Blankenship in his Supp. Fl. Mont. 48.

Alnus incana (L.) Willd. This is very common from Alta to the Sperry Glacier region along creeks and lake shores at low elevations. The var. *virescens* Watson has been reported from Flathead Lake but diligent search fails to reveal it though it is common east and south but out of our range.

Alnus crispa (Dryand) Pursh. This is the *A. viridis* and *A. Alnabetula* of most writers. It is rather common on mountain sides in subalpine places going up to alpine meadows, from Alta to the Sperry Glacier region.

Oaks have been reported from our region but every case proves to be wrong so far.

Urtica gracilis Ait. Frequent in wet woods and along creeks under Willows from Alta to Gunsight Lake.

Urtica Breweri Wat. has been reported from our region but all specimens prove to be the above.

Arceuthobium Douglasii Eng. This grows on the red fir making the twigs spindle out and droop like the weeping willow, and in large tufts, it aborts whole limbs. The tufts are 4-6 feet wide and 2-3 feet thick. The parasite runs along under the bark and breaks out at the joints. It seems to bloom early in the spring, as next season's buds were forming in July. It is very common throughout our region but good fruit is seldom seen.

Arceuthobium Douglasii var. *Tsugensis* (Rosendahl Minn. Bot. Stud. 3 2 273 (1903) as Razoumofsky). This has not yet been found in our region but is to be expected on the hemlock.

Arceuthobium Douglasii var. *Laricis* (Piper Fl. Wash. 223 (1906) as Razoumofsky). This is also very common but is seldom seen in fruit. It acts in the same way as on the red fir as to aborting branches but the tufts are rigid and very knotty, and twigs are thickened, short and rigid and congested in small tufts 2-3 feet wide and a foot thick. The stems are thicker and longer on the parasite than in the type. McDonald Lake in the Mission Mts., Bigfork and Yellow Bay, both in flower and fruit, Aug. 12, 1908.

Arceuthobium Americanum Eng. Alta, on *Pinus Murrayana*.

Comandra umbellata var. *pallida* (DC.) Jones. Common on dry prairies and on dry mountain slopes from the Lower Missoula river to Browning.

Polygonum minimum Wat. McDonald peak and Mission Creek, also Sperry Glacier to Gunsight Pass and Lake, subalpine.

Polygonum Douglasii Greene. Common in dry and gravelly places from Alta north and east.

Polygonum polygaloides Meisner. Upper Marias Pass.

Polygonum bistortoides Pursh. Frequent on all the high peaks, also at Evaro and Mission Creek.

Polygonum viviparum L. Lambert Valley, Sperry Glacier to Gunsight Pass.

Polygonum Pennsylvanicum L. Bigfork, Echo Lake.

Polygonum Persicarioides HBK. Darby.

Polygonum Persicaria L. St. Ignatius Mission.

Polygonum punctatum Ell. Polson Swamp, St. Ignatius Mission.

Polygonum Hydropiper L. Polson Swamp.

Polygonum alpinum All. Como Peak.

- Rumex pauciflorus* Nutt. Monida, Evaro, Gunsight Pass.
Rumex occidentalis Wat. Swan Lake, Ronan, Alta, Browning.
Rumex crispus L. Common at low elevations from Alta northward.
Rumex salicifolius Weinm. Frequent along streams from Alta northward.
Rumex Persicarioides L. Frequent on the lake shores, also Hot Springs, Swan Lake, St. Ignatius Mission, Whitefish, Browning.
Eriogonum multiceps Nees. Garrison and Monida.
Eriogonum ovalifolium Nutt. This is the alpine form *E. nivale* (Canby) Small. Common on all the high peaks.
Eriogonum ovalifolium var. *proliferum*. Wat. Alta.
Eriogonum umbellatum var. *stellatum* (Bth.) Jones. Alta.
Eriogonum umbellatum var. *subalpinum* (Greene) Jones. Alta, Gunsight Pass and Blackfoot Glacier, Summit.
Eriogonum flavum Nutt. Browning.
Eriogonum flavum var. *androsaceum* (Bth.) Jones. This should include *E. Piperi* Greene. Common on all the high peaks and very variable in the stipe.
Chenopodium hybridum L. Bigfork, Ravalli.
Chenopodium album L. Common from Polson to Bigfork and Browning.
Chenopodium glaucum L. Common on dry flats from the Hot Springs to Browning.
Chenopodium Botrys L. Ravalli.
Chenopodium rubrum L. Bigfork, Alta.
Atriplex truncata (Toor.) Gray. Common on the Little Bitter Root.
Atriplex Nuttallii Wat. Hot Springs and the Little Bitter Root.
Monolepis chenopodioides (Nutt.) Moq. Bigfork, St. Ignatius Mission, Dayton, Bull Island, Ronan, Alta.
Suaeda depressa (Pursh) Ledebour. Hot Springs and Polson.
Salsola Kali L. Common in waste places throughout at low elevations.
Amarantus graecizans L. Common in fields at low elevations.
Amarantus blitoides Wat. Ronan.
Amarantus retroflexus L. Common in fields at low elevations.
Oxybaphus angustifolius Sweet. Garrison.
Sagina Linnaei Presl. Lambert Valley, Sperry Glacier.
Arenaria tenella Nutt. MacDougal and McDonald Peaks, Lambert Valley, McDonald Lake Mission Mts., Sperry and Blackfoot Glaciers.
Arenaria verna var. *rubella* (Wahl.) Hook. MacDougal Peak.
Arenaria Nuttallii Pax. Lambert Valley.
Arenaria Sajanensis Willd. McDonald Peak, Elrod Peak (Elrod), Lambert Valley, Sperry and Blackfoot Glaciers.
Arenaria Fendleri Gray. Upper Marias Pass, Alta.
Arenaria aculeata Wat. Alta. This is probably only a form of *A. congesta*.
Arenaria congesta Nutt. Wild Horse Island, Alta.
Arenaria congesta var. *subcongesta* Wat. var. *lithophila* Rydberg. Alta, also reported from MacDougal Peak by Umbach.
Arenaria capillaris Poir. MacDougal Peak, Sperry to Blackfoot Glacier, also Elrod Peak (Elrod) and Swan Lake, MacDougal Peak (Miss Norton).
Arenaria capillaris var. *ursina* Rob. MacDougal and McDonald Peaks, also by Elrod.
Arenaria lateriflora L. Missoula and Swan Lake (Elrod).
Arenaria macrophylla Hook. Alta.
Stellaria calycantha Bong. McDonald Lake in the Mission Mts.
Stellaria borealis Bigelow. Alta, also var. *corallina*. Missoula (Elrod).
Stellaria umbellata Turcz. Sperry Glacier.
Stellaria longifolia Muhl. Alta. Missoula and Swan Lake (Elrod).
Stellaria longipes Goldie. Alta. Lolo (Elrod), Columbia Falls (Williams).
Stellaria longipes var. *Edwardsii* (R. Br.) Wat. Bigfork, Alta, Upper Marias Pass.

Stellaria longipes var. *laeta* (Rich.) Wat. Common in meadows at low elevations.

Stellaria nitens Nutt. Columbia Falls (Williams).

Cerastium nutans Raf. Alta.

Cerastium alpinum L. var. *Beeringianum* Regel. Bigfork, MacDougal and McDonald Peaks, Yellow Bay, Dayton, Wild Horse and Bull Islands, Alta.

Cerastium alpinum var. *Fischerianum* T. & G. MacDougal and McDonald Peaks, Sperry to Blackfoot Glacier.

Cerastium arvense var. *Fuegianum* Hook. Sperry Glacier.

Cerastium arvense var. *oblongifolium* Hollick & Britton. Sperry Glacier, Mission Creek, Lake McDonald, Mission Mts.

Silene conubalus Wibel. Ravalli.

Silene Douglasii Hook. Common in the mountains at all elevations.

Silene Douglasii var. *viscida* Rob. MacDougal and McDonald Peaks, common.

Silene Douglasii var. *brachycalyx* Rob. Blackfoot Glacier.

Silene Scouleri Hook. Alta.

Lychnis Drummondii (Hook.) Wat. Browning.

Lychnis apetala L. Blackfoot Glacier.

Agrostemma Githago L. Bigfork.

Dianthus Armeria L. Ravalli. Perfectly established.

Portulaca oleracea L. Bigfork.

Lewisia pygmaea (Gray) Rob. Gunsight Pass, Sperry Glacier (Umbach).

Montia perfoliata (Donn) Howell. Evaro, Bigfork. The *parviflora* form Lambert Valley.

Montia parvifolia (Moc.) Greene. Lambert Valley, Sperry to Blackfoot Glacier.

Montia linearis (Dougl.) Greene. Alta, Ronan. Missoula (Elrod).

Claytonia megarrhiza (Gray) Parry. MacDougal Peak, Sperry Glacier.

Claytonia lanceolata Pursh. Lambert Valley, McDonald Lake in the Mission Mts., Missoula (Elrod).

Nymphaea polysepala (Eng.) Greene. Common in shallow lakes and near the shores of Flathead Lake from Alta northward.

Ranunculus multifidus Pursh var. *terrestris* Gray. Bigfork, Alta.

Ranunculus Purshii Rich. This is reported from our region but no valid specimens seen.

Ranunculus Flammula L. var. *intermedius*. Hook. Common on all the shores of Flathead Lake, also from Lake McDonald to St. Mary's Lake.

Ranunculus Pygmaeus Wahl. Sperry Glacier, Como Peak.

Ranunculus eximeus Greene. McDonald Lake Mission Mts. Not distinct from the following.

Ranunculus Eschscholtzii Schl. Lambert Valley, Como Peak, Blackfoot to Sperry Glacier, Elrod Peak (Elrod).

Ranunculus affinis R. Br. Bigfork (Miss Norton).

Ranunculus affinis var. *validus* Gray. The form of this with smooth seeds called *R. alpeophilus* Nelson is common on MacDougal Peak, McDonald Peak.

Ranunculus sceleratus L. *R. eremogenes* Greene. Common at low elevations, Ravalli to Upper Marias Pass.

Ranunculus Pennsylvanicus L. Polson Swamp, Bigfork, Whitefish.

Ranunculus Macounii Britton. Common on lake shores, Ravalli, Ronan, Flathead Lake, Swan Lake.

Ranunculus tenellus Nutt. Common on lake shores and in wet meadows from Alta northward.

Ranunculus tenellus var. *Lyallii* (Gray) Rob. Bigfork.

Ranunculus circinatus Sibth. Common, Flathead Lake, Ravalli, Ronan.

Ranunculus aquatilis L. Common at low elevations; the var. *capillaceus* at Bigfork; var. *trichophyllus*. Common, var. *caespitosus* at Bigfork; var. *heterophyllus* at Alta and Upper Marias Pass.

Ranunculus Cymbalaria Pursh. Darby, Browning, Upper Marias Pass, Missoula, Dayton, Hot Springs, St. Ignatius Mission.

Myosurus minimus L. Ronan.

Trautvetteria grandis Nutt. Alta.

Thalictrum sparsiflorum Turcz. Alta.

Thalictrum occidentale Gray. Common in open woods and mountain sides from Evaro northward. *T. venulosum* Trelease seems to be only a form of this.

Thalictrum purpurascens L. Ravalli, Ronan, Lolo. Gotten also at Plains by MacDougal.

Anemone parviflora Mx. MacDougal Peak, Lambert Valley, Blackfoot Glacier.

Anemone Drummondii Wat. Bt. Cal. 2 424 (1889). Drummond's *Anemone*. Elrod Peak (Elrod), and Mission Mts. (Elrod). Alpine. This little understood plant has alternately been referred to *Tetonensis* and allied species. A detailed description of it as it is may clear up some doubts. Flowers 35 mm. wide. Sepals fully 15 mm. long, oval, blue externally and white within, villous. Flowering peduncle 2.5-7.5 cm. long, 10 cm. long in fruit, stout, erect. Involucre with short and broad base, 7.5-15 cm. long, about like the leaves but large. Flowers single. Scape stout, almost none in flower, short in fruit. Plants caespitose from a thick root after the fashion of *A. Hudsoniana*. Leaves leathery, thrice ternate, with cuneate-oblancoolate lobes 9-13 mm. long and apiculate, nearly smooth. Styles filiform, 2.5 mm. long. Akenes long-woolly except in a narrow line on the back where it is short-hairy. Flowers about twice the size of *A. Hudsoniana*. Heads ovate 15 mm. long. Sperry Glacier, Lambert Valley, McDonald Lake, Mission Mts.

Anemone patens var. *Nuttalliana* (Spreng) Gray. Rexford, Garrison, Ravalli, Missoula (Elrod).

Anemone occidentalis Wat. Very common on MacDougal Peak and Blackfoot Glacier and Lambert Valley. Alpine.

Clematis hirsutissima Pursh C. *Douglasii* Hook. Evaro.

Clematis verticillaris var. *Columbiana* (Nutt.) Gray. Frequent from Alta to Blackfoot Glacier.

Coptis occidentalis (Nutt.) T. & G. Alta on rotten logs in deep shade.

Trollius laxus Salisb. Alta, McDonald Lake, Mission Mts., Sperry Glacier, abundant at Gunsight Pass and Lake.

Aquilegia flavescens Wat. Bot. King 10 (1871). Yellow Columbine. Common in open, wet and springy but well drained places and rarely on slopes, alpine and subalpine, even to the top of MacDougal Peak. Sometimes pink, but not differing otherwise. Piper, Fl. Wash, 279, states that this species freely intergrades with *A. formosa*. The writer has seen no such intergrades, but they are to be expected as this species, *A. formosa*, and *A. truncata*, are manifestly recent offshoots of *A. Canadensis*, from which they hardly deserve separation. Robinson has also fallen into the error of Watson (Bot. King 10) in the Synoptical Flora, 43, where he speaks of the "alpine smaller flowered form" as regarded as distinct by me. Watson's smaller flowered form, as shown by his own specimens, was not alpine, but was got low down in City Creek Canon near Salt Lake City, and is a well defined species which I have many times collected in the type locality. Watson's reference to its being alpine is evidently an error which Robinson has copied. The plant described by Watson looks more like a hybrid between *A. coerulea* and the "small flowered form" in Utah, where Watson got it. It is always alpine. But identically the same thing grows throughout Wyoming, Idaho and Montana in places where *A. coerulea* is not found and therefore cannot be a hybrid. This species can be instantly separated from all forms of *A. formosa* that I have seen by the short and hooked spurs, but in the north country it is sometimes with red sepals. McDonald Peak, also Columbia Falls (Williams). MacDougal Peak (Elrod, MacDougal and Umbach). Hall's

Peak (Miss Norton). Sperry Glacier (Umbach). McDonald Lake, Alta, Common. Lake McDonald to St. Mary's Lake, mostly alpine. Missoula.

Aquilegia formosa Fischer, is reported from all over the state but all forms so far seen are the above with tinged petals or sepals.

Aquilegia saximontana Rydberg. Gunsight Pass. This is nearer *A. vulgaris*, with glandular stems and pubescent fruit.

Aquilegia Jonesii Parry. Gunsight Pass.

Actaea spicata var. *rubra* Ait. Hort. Kew 2 221. *A. rubra* (Ait) Willd. This includes the var. *arguta* which cannot be separated by any valuable character. *A. eburnea* Rydberg. Berries when red are indifferently spherical to oblong in the same spike which is oblong in fruit. Occasional in deep forests and along creeks in wet and springy places. Huckleberry spring, Schultze's cabin, the bog on the road to MacDougal Peak, Yellow Bay at creek, the Hemlocks, McDonald Peak, Hot Springs. Middle Temperate life zone. A form answering to var. *arguta* with white berries grows with the other but differs in no other way. These berries are almost always round, not so large, spikes elongating in fruit, leaves usually more cleft. MacDougal Peak, in the Mission Mountains, Common from Lake McDonald to St. Mary's Lake, Summit.

Aconitum Columbianum Nutt. Libby (Bailey).

Aconitum Columbianum var. *lutescens*. (Nelson Bot. Gaz., 41 54 1906, as species). Flowers constantly cream-colored. Alta, Lambert Valley. Not seen in the Sperry Glacier region.

Delphinium pauciflorum Nutt. MacDougal Peak, McDonald Lake Mission Mts., Blackfoot Glacier. Alpine.

Papaver nudicaule L. 507. Ours is the var. *arcticum* Elkan Mon. Pap. 16 (1839). Stanton Lake, Williams. Alpine. The published description of this species is not good. Stems from a densely leaved and few branched crown, and this from a slender and branching root. Leaves all radical, 5 cm. long, with blade 15-25 mm. long, broadly ovate, pinnately lobed with oblong-obovate apiculate and veiny lobes 2-5mm. long, thick, tips all with yellow needles and some on the face. Peduncles erect from a decumbent or curved base, 10 cm. long, slender, with stiff and yellow needles (not dark). Pods obovate-oval, more densely setose as well as the elliptical sepals, pods 15 mm. long.

Corydalis aurea Willd. Alta, McDonald Lake in the Mission Mts., Bigfork, (also by Elrod and Miss Norton).

Draba alpina L. Sperry Glacier.

Draba glacialis Adams. Sperry Glacier, Gunsight Pass.

Draba nemorosa L. Evaro, Missoula (Elrod).

Draba stenoloba Ledebour. MacDougal Peak, Sperry Glacier.

Draba crassifolia Graham. MacDougal Peak, Blackfoot and Sperry Glacier.

Lesquerella alpina Wat. Garrison. Probably also at Alta.

Lepidium apetalum Willd. Fort Missoula, Ravalli, Ronan, Alta. Missoula (Elrod).

Lepidium medium Greene. Common in fields.

Thlaspi alpestre L. Alta. Material gathered at Missoula by Elrod corresponds well with Watson's *T. Californicum* except that the radical leaves are wider and the pedicels indifferently spreading.

Thlaspi arvense L. Alta.

Capsella Bursa-pastoris (L) Medic. Common around dwellings.

Camelina sativa (L.) Crantz. Bigfork, Ronan.

Brassica arvensis (L.) BSP. A frequent weed in fields throughout the region.

Sisymbrium incisum Eng. var. *Hartwegianum* B. & W. Garrison.

Sisymbrium incisum var. *filipes* Gray. Evaro, Alta.

Sisymbrium canescens Nutt. Missoula (Elrod and MacDougal); Polson (Umbach).

Sisymbrium officinale (L.) Scop. St. Ignatius Mission.

Sisymbrium altissimum L. A very common weed in fields throughout.
Erysimum cheiranthoides L. Ravalli, Evaro, McDonald Lake in the Mission Mts. Missoula (Elrod).

Erysimum asperum DG. Bigfork. Garrison.

Radicula Nasturtium (L.) Britten & Rendle. Common in springs throughout.

Radicula obtusa (Nutt.) Greene. Common at Bigfork, Ronan, Alta, Ravalli. This is hardly a good species.

Radicula curvisiliqua (Hook.) Greene. Bigfork.

Radicula palustris (L.) Moench. Bigfork, Dayton, Alta.

Barbarea vulgaris var. *stricta* (And) Gray. Missoula, Swan Lake, Evaro.

Dentaria macrocarpa Nutt. The leaves are remarkably thick and leathery. Stems spreading and much branched below. Roots white and elongated. It does not grow near water. Flowers very variable in size. McDonald Peak in talus, also crevices of rocks at Lambert Valley. Not seen in the Sperry Glacier region.

Cardamine Breweri Wat. I can see no difference between this and *C. vallicola* Nelson. Alta. Also at Missoula by Elrod, Columbia Falls by Williams, and Mission Mts. by MacDougal.

Cardamine oligosperma Nutt. Bull Island, Bigfork, Hot Springs, Alta.

Cardamine Pennsylvanica Muhl. Bigfork, Polson Swamp, Alta, Swan Lake (Elrod).

Cardamine parviflora L. Bigfork, Ravalli.

Arabis Nuttallii Rob. Lambert Valley, Mission Mts., Blackfoot Glacier.

Arabis glabra (L.) Bernh. Bigfork, Yellow Bay, MacDougal Peak, McDonald Lake in the Mission Mountains, Alta, Ravalli, Ronan, Lambert Valley, McDonald Lake.

Arabis Holboellii Hornem. Alta to the British Boundary.

Arabis Holboellii var. *patula* Wat. Upper Marias Pass. Swan Mountains (Elrod).

Arabis suffrutescens Greene. MacDougal Peak, Blackfoot Glacier.

Arabis Drummondii Gray. McDonald Lake in the Mission Mts., Sperry to Blackfoot Glacier.

Cleome serrulata Pursh. Bigfork, Hot Springs, Ravalli, Ronan. Missoula (Elrod).

Drosera rotundifolia L. Swan Lake. Rost Lake (Miss Norton).

ELROD'S STONECROP.

Sedum Elrodi n. sp. Closely related to *S. divergens*. Densely tufted from horizontal and fleshy rootstocks. Perennial. Leaves ovate, sessile, the lower 2-5 mm. long, the uppermost oblong-ovate, not over 5-12 mm. long, obtuse smooth. Stems erect from a sometimes decumbent base, closely covered with the nearly imbricated thick and closely appressed leaves, sparingly branched above, ending in 1-2 scorpioid racemes not over 2.5 cm. long and few flowered. Flowers yellow, nearly sessile. Petals lanceolate-acuminate, 7 mm. long, twice as long as the stamens and four times as long as the ovate and obtuse sepals. Follicles united below and divaricate above. At Somers on loose soil and also on rocks in open places. Middle Temperate life zone.

Sedum stenopetalum Pursh. MacDougal and McDonald Peaks, Sperry to Blackfoot Glacier. This is *S. subalpinum* Blenkinship, but his characters do not hold.

Sedum Douglasii var. *uniflora* (Howell Fl. 213 (1898) as species). Upper Marias Pass.

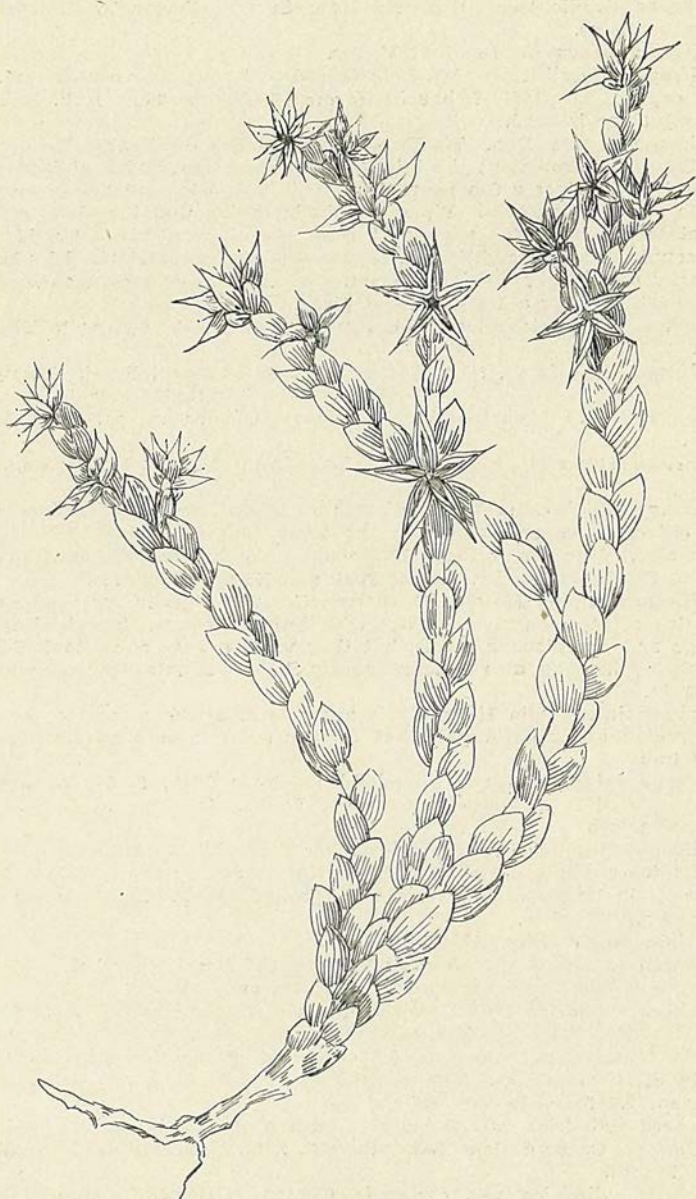
Sedum rhodanthum Gray. McDonald Peak, Sperry to Blackfoot Glacier, Lambert Valley, Upper Marias Pass. Mt. Lolo (Elrod).

Saxifraga oppositifolia L. Rare. Lambert Valley. Mission Mountains (Elrod).

Saxifraga adscendens L. MacDougal Peak.

Saxifraga chrysantha Gray. Mt. Lolo (Elrod).

PLATE IV.



SEDUM ELRODI JONES, N. S.

Saxifraga caespitosa L. Lambert Valley and Sperry Glacier.

Saxifraga rivularis L. Lambert Valley and Sperry Glacier, McDonald Lake in the Mission Mts.

Saxifraga debilis Eng. Reported from Sperry Glacier by Umbach, but may be the above.

Saxifraga cernua L. Lambert Valley.

Saxifraga Jamesii Torr. Mt. Lolo (Elrod). A very unexpected find. One would expect to find *S. heucheriforme* (Rydberg. Torr. Bull. 24 247 as *Therophon*) there instead.

Saxifraga arguta Don. MacDougal and McDonald Peaks, Yellow Bay, Alta. Common throughout the Mission and Swan Mountains at high elevations, and in the Sperry Glacier region. This is *S. odontophylla* Piper and *S. punctata* of recent authors. Piper is right in saying that the obovate-leaved *S. punctata* cannot be the same as this reniform leaved plant, but his name is preoccupied, and, in addition, *S. arguta* was well characterized by Hooker. It is easily separable from *S. Nelsoniana* by the clawed petals, as Piper has said, the latter being a Pacific Coast plant.

Saxifraga Mertensiana Bong. Darby at Como Peak, Sperry to Blackfoot Glacier.

Saxifraga stellaris L., *S. Nutkana* Moq., *S. Bongardi* Presl. There is a slight difference between this and *S. stellaris*, but that seems to be a very variable species. Common in the Sperry Glacier region. Leaves very variable.

Saxifraga reflexa Hook. McDonald Lake in the Mission Mountains, Sperry Glacier.

Saxifraga occidentalis Wat., *Micranthes Alleni* and *aequidentata* Small. Petals either entire or notched in the same flower, and either clavate or filiform also. MacDougal Peak, McDonald Lake in the Mission Mountains, Sperry to Blackfoot Glacier. Elrod Peak and Missoula (Elrod).

Saxifraga Oregana Howell., *S. Sierrae* Coville. This is the western representative of *S. Pennsylvanica* but with broader petals. The typical form has large and conspicuous petals, but they vary greatly down to *S. Sierrae*, and probably includes also *S. Montanensis* Small. It is a very robust plant. Mt. Haggin.

Saxifraga integrifolia Hook. This abounds in alpine places to the south of our region and adjoining it, but farther south passes by imperceptible degrees into

Saxifraga integrifolia var. *rhomboidea* (Green Pitt., 3. 343 as species). This is reported from Missoula and Deer Lodge. It grows at Lima. This again varies into

Saxifraga integrifolia var. *apetala* (Piper Torr. Bull. 27 393 as species).

Leptarrhena amplexifolia (Sternb.) Seringe. Sperry to Blackfoot Glacier. This grows in large patches from underground stems. Leaves waxy-green above and white below.

Boykinia major Gray. Hamilton.

Heuchera parvifolia var. *dissecta*. Leaves 5-7-lobed to or below the middle. Petals double the calyx lobes. Anaconda and Durant.

Heuchera cylindrica Dougl. Wheelock is certainly justified in putting all the variant forms into one species as there is a complete transition through all. This replaces *S. rubescens* on cliffs, which species abounds to the south in drier situations. The typical form with long red hairs on the petioles not yet found in our region.

Heuchera cylindrica var. *glabella* (T. & G.) Wheelock. Bull Island, Missoula, Bigfork, Coeur d'Alene Lake, Ravalli, Alta. Also gathered by all previous collectors.

Heuchera cylindrica var. *ovalifolia* (Nutt.) Wheelock. Lambert Valley Upper Marias Pass, Lake McDonald to St. Mary's in the Sperry Glacier region. Alpine.

Heuchera cylindrica var. *tenuifolia* Wheelock. MacDougal Peak.

Heuchera Hallii var. *grossulariifolia* (Rydberg Fl. Mont. 196 as species). Ryan's Lake and Mt. Haggin, both bordering on Deer Lodge Valley. Also at Ketchum, Idaho (Mrs. Brodhead).

Heuchera Williamsii Eaton. This both Greene and Rydberg put into *Tellima* (*Lithophragma*) because it has a turbinate calyx and racemose habit, while they ignore the far more important heucheroid leaves, roots and five stamens, which clearly place it in *Heuchera*. Lima, probably not in our region.

Mitella trifida Graham. Bigfork, Alta, McDonald Lake in the Mission Mountains. Also Missoula by Elrod and MacDougal.

Mitella trifida var. *stauropetala* (Piper Erythraea 7 161 as species.) Coeur d'Alene Lake, Deer Lake in Southern Idaho. Baker's number 263 from Mt. Hesperus, Colorado, is the same. This is a form with long and filiform lobes. Greene (Pitt. 1 32), Rydberg (Fl. Mont.), and Piper (Erythraea 7), have split this species up into several unwarranted species, based on the development of lobes in the petals, but there is every gradation in length and width from rudimentary to long and filiform lobes. Greene's species is *M. diversifolia*, Rydberg's *M. violacea*, and Piper's *M. stauropetala* and *stenopetala* and var. *Parryi*.

Mitella Breweri Gray. Common on MacDougal Peak.

Mitella pentandra Hook. Common on all the high peaks from Alta northward.

Mitella nuda L. Frequent in dark woods from McDonald Lake in the Mission Mountains to the Boundary.

Tellima tenella (Nutt.) Walp. Missoula (Elrod); Columbia Falls (Williams).

Tellima glabra (Nutt.) Steud. Bigfork (Elrod); with short pedicels. Columbia Falls (Williams) with pedicels over half an inch long.

Tellima parviflora (Nutt.) Hook. Missoula (Elrod and MacDougal), Columbia Falls (Williams).

Tiarella trifoliata L. Bigfork, very rare. It was sought constantly throughout the region from Alta to Blackfoot Glacier this year but none could be found, while *T. unifoliata* was everywhere.

Parnassia parviflora DC. Swan Lake. All forms reported as *P. palustris* from this region are of this species. The Dissection of the staminodia amounts to but little.

Ribes Hudsonianum Rich., *R. petiolare* Douglas. There is no permanency in the characters of *R. petiolare*. Its leaves are normally much larger and longer petioled, but all sorts of intergrades occur, Alta, Hamilton, Anaconda and Mt. Haggin.

Ribes Howellii Greene. Its character of drooping short and few flowered racemes seems to hold, the others do not. St. Ignatius Mission in deep and dark willow swamps.

Ribes viscosissimum Pursh. Frequent in all the mountains from Alta northward.

Ribes cereum Dougl. Common in all the mountains from Alta northward.

Ribes lacustre (Pers.) Poir. Frequent at all elevations but most common at low elevations from Alta northward to the Boundary. The typical form has black fruit, slender racemes, and only lobed leaves.

Ribes lacustre var. *parvulum* Gray. This has leaves lobed nearly to the base and smooth, rarely over an inch wide, hardly deserves varietal rank. Hamilton, Anaconda, Alta.

Ribes lacustre var. *lentum* Jones, *R. lacustre* var. *molle* Gray. This is very pubescent and glutinous all over, with small and much dissected leaves often only half an inch wide. It is strikingly different from the type and grows in alpine places only and usually has red fruit, though not always. The type and var. *parvulum* have black fruit normally but often red when immature. Alta, Como Peak.

Ribes oxyacanthoides L. The typical form does not seem to grow in the west.

Ribes oxyanthoides var. *saxosum* (Lindl.) Colville, R. *inermis* Rydberg, R. *vallicola* Greene. This is the common smooth gooseberry of the streams, growing under willows at low elevations. Missoula. The form corresponding to R. *inermis*, with long peduncle, grows at Lima and St. Ignatius Mission. The ripe fruit is very palatable. Belton, Below Gunsight Lake, Mission Creek, Monida.

Ribes setosum Lindl. Anaconda, Ravalli, Alta, McDonald Lake in the Mission Mountains.

Ribes irriguum Dougl. Fruit sometimes with a few scattered prickles and sometimes white. Probably this and R. *setosum* are not distinct. The plants that correspond to R. *setosum* are nearly smooth but with distinct cylindrical calyx, short peduncles, and sometimes is very setose, the species (R. *setosum*) is described as pubescent and very setose. What corresponds to R. *irriguum* has softly pubescent leaves and evident peduncles, and campanulate calyx. Bigfork, Yellow Bay, St. Ignatius Mission, MacDougal and McDonald Peaks, Bull Island, Dayton, Hot Springs, Missoula, Ravalli. Also Missoula (Elrod). I fail to see any good character to separate Green's R. *cognatum* or Blankinship's R. *camporum*.

Potentilla Mopseliensis L. Rexford and Whitfish, Ravalli, Upper Marias Pass. At the following places are the var. *Norvegica*, Bigfork, Daphnia Lake, Schultze's cabin.

Potentilla argentea L. Whitfish, apparently introduced.

Potentilla dissecta Pursh. MacDougal and McDonald Peaks, Lambert Valley, Sperry Glacier.

Potentilla dissecta var. *glaucophylla* (Lehm.) Wat. MacDougal Peak. Same locality by Miss Norton and Umbach.

Potentilla decurrens (Wat.) Rydberg. Blackfoot Glacier.

Potentilla gracilis Dougl. Wild Horse Island.

Potentilla Blaschkeana Turcz. Alta, Ronan, Upper Marias Pass, Swan Lake by Elrod. A doubtful species.

Potentilla Nuttallii Lehm. Also a doubtful species. Alta, Monida. Missoula and St. Ignatius Mission (Elrod).

Potentilla ctenophora Rydberg. Monida, Missoula by Elrod.

Potentilla flabellifolia Hook. Ronan.

Potentilla Pennsylvanica L. Garrison and Lima.

Potentilla Hippiana Lehm. Browning.

Potentilla Anserina L. Frequent at low elevations throughout.

Potentilla pseudoruprestis Rydberg. This probably includes *convallaria*. On all the high peaks from Alta northward. The *convallaria* form at Garrison.

Potentilla glutinosa Nutt. Alta to Bigfork on prairies and rocky hillsides at low elevations. This may include P. *Wrangeliana* which was found at Alta.

Potentilla palustris (L.) Scop. Common in swamps at low elevations from Alta northward.

Geum ciliatum Pursh. Common in meadows at low elevations from Alta northward.

Geum rivale L. Bigfork, Below Gunsight Lake. Also Missoula (Elrod) and Rost Lake (MacDougal).

Geum strictum Soland. Ravalli.

Geum macrophyllum Willd. Common from Alta northward.

Purshia tridentata (Pursh) DC. Common on the western side of Flathead Lake, also on McDonald Peak.

Dryas Drummondii Rich. This seems to be rare. McDonald Peak and Blackfoot Glacier, alpine. The other species is very common.

Cercocarpus ledifolius Nutt. Alta. This has the habit of the var. *intricatus* but the leaves are nearer typical.

Fragaria bracteata Heller. Alta, McDonald Lake in the Mission Mountains.

Fragaria platypetala Rydberg. Bigfork, McDonald Lake in the Mission Mountains. Lake McDonald to St. Mary's Lake. The species of strawberry are in a state of confusion.

Rubus pedatus Smith. Bigfork. Rost Lake by MacDougal and Miss Norton. Columbia Falls by Williams.

Rubus parviflorus Nutt., *R. Nutkanus* Moq. Very common from Alta northward.

Rubus Idaeus var. *acutissimus* Reg. & Lndl. *R. strigosus* Mx. This variety has very hispid pedicels, short-petioled leaves, coarsely serrate and wide, fruit nearly double the size of the prevailing western plant. Ravalli, McDonald Lake in the Mission Mountains.

Rubus Idaeus var. *gracilipes*. Leaves long-petioled; leaflets mostly narrowly ovate, not coarsely serrate; pedicels nearly smooth, sepals barely tailed; fruit rarely over half an inch long; flowers small. Very common from Alta northward, and throughout the west. *R. nivalis* reported by Watson from the Bitter Root Valley is almost certainly a depauperate form of this species and not the true *R. nivalis*.

Sanguisorba annua Nutt. Common on the Flathead plains, Ravalli, Ronan, Evaro.

Rosa Nutkana Presl. St. Ignatius Mission, Browning.

Rosa Nutkana var. *MacDougalii* (Holzinger Bot. Gaz. 21 36 as species). Alta, Mission Creek, common throughout the Flathead region.

Rosa pisocarpa Gray. Common in open and dry woods from Alta northward.

Prunus Americana Marsh. This has become established at Ravalli and in the Bitter Root valley.

Prunus emarginata (Dougl.) Walp. Common throughout the region from Mission Creek northward but not seen in the Sperry Glacier region though found at Belton and Upper Marias Pass.

Prunus mollis (Dougl.) Walp. Sand Point, Idaho. Libby (Bailey). Reported from Ravalli by MacDougal and Butler but diligent search fails to reveal it there. This is considered to be a variety of *P. emarginata* but I have seen no intergrades.

Prunus demissa (Nutt.) Dietr. I fail to see any ground for Nelson's *P. melanocarpa*, even though Nuttall describes his as red fruited, for we know that this species has fruit red till dead ripe when it turns black. Common everywhere at low elevations.

Spiraea Douglasii Hook. Alta, Sand Point, Idaho. Silloway Peak, MacDougal, Elrod Peak (Elrod), Lolo (Watson).

Spiraea Douglasii var. *Menzisii* (Hook.) Presl. Libby (Bailey).

Spiraea densiflora Nutt. Bigfork, MacDougal Peak, Sperry Glacier to Gunsight Lake.

Spiraea corymbosa Raf. Common from Alta northward.

Physocarpa opulifolia var. *pauciflora* (T. & G.) Piper. Very common throughout.

Crataegus Douglasii Lindl., Bot. Reg. 21 to 1810 (1836). *C. rivularis* Nutt. Douglas's Hawthorne. Fruit red till near maturity. This can always be separated from the other species by the small spines, never branched, and by the narrow and less lobed leaves, and the open and less scraggy habit. It is much infested with a fungus, *Roestelia*. Very common along creeks and on the lake shores. Fruit more juicy than the red one. The bark is all smooth and gray except on large trunks below, where it flakes up some. It is a slender and opened branched shrub 15-30° high. Fruit blue-black, oval. Common in all localities except on the mountains, also at Whitefish, Rexford and Sand Point, Idaho. Missoula (MacDougal), and Bigfork (Umbach), both as *C. brevispina*. Middle Temperate life. Belton, Ravalli, Ronan, McDonald Peak.

Crataegus Columbiana Howell, Fl. 163 (1898). Columbian Hawthorne. This has gone under the name of *C. occidentalis* Britton and *C. macracantha* Lodd. as well as *C. coccinea*, and in all probability one name is as good as the other. There is no warrant whatever for the infinitesimal subdivision of *Crataegus* as is done by Sargent, Ashe, Britton, Rydberg and others. It can end only in making a species out of almost every sheet of specimens. *Crataegus* is remarkably sensitive to soil and drainage, like *Amelanchier*, and its leaves respond at once to varying conditions by their size and the amount of dissection of the margin as well as by the thickness. Another element of confusion lies in the fruit being red when immature in both species, turning black only at the last moment in *C. Douglasii*, and if specimens are taken by the grab sample way in which most are taken there is no reliance to be placed on the color. The only safe guide seems to be in the relation of the spines and leaves to each other. When the leaves are narrow and little dissected the spines are often slender. This is particularly true of the forms in the interior to which Greene has given the name *salicifolia*. The red fruited species in our region is common along creeks in the same situations as the other, and along the lake shore. When starved the leaves are small and the fruits few, but the bushes are very scraggly and thorny with generally branched thorns twice to four times as long as in the other species. Leaves normally much wider and more cut. The upper bark is smooth and gray, the lower bark rough in flakes. Fruit often as wide as long and sometimes yellow in trees growing side by side, and nearly always shorter and wider than in the other species. It is a pretty tree in the fall with its red fruit. Polson, Bigfork, St. Ignatius Mission, Wild Horse Island, Dayton, Hot Springs, where it is more abundant than the other. Wild Horse Island (Elrod), Rost Creek (MacDougal), Polson (Umbach, as *C. occidentalis*). Middle Temperate life zone. Some trees were completely covered by the red fungus *Roestelia*. No *Crataegus* in the Sperry Glacier region.

20. AMELANCHIER. SERVICE BERRY.

Amelanchier alnifolia Nutt. Gen. 1 306 (1818), and Jour. Phil. Acad. 7 22 (1834). This is the most sensitive to climatic differences of any species in the family. The humid regions have large and thin leaves with many teeth, long petals and racemose inflorescence, and fruit often half an inch wide. The most arid and hot regions have the leaves often not over half an inch long and nearly circular, and with few teeth, very thick and leathery, short petioles and raceme often reduced to a single pedicel, but in all this variance there is not a single permanent specific character. Our forms come near to those described as *C. Cusickii* Fernald with oval and subcordate leaves and long petals nearly an inch long. Fruit either one to few in a place or racemose, small or large, juicy or not. Common in dry places. Bigfork, Yellow Bay, on all the islands, Dayton, St. Ignatius Mission, McDonald Peak, Hot Springs. Elrod Peak (Elrod) and Wild Horse Island. Missoula (MacDougal and Elrod). Mission Creek, Lake McDonald to St. Mary's Lake, but not so common because of too much humidity, Ravalli, Ronan, Alta, McDonald Lake in the Mission Mountains.

Amelanchier alnifolia var. **Utahensis** (Koehne) Jones, is reported by both Piper and Rydberg from Washington and Montana but it does not grow in either state. Its habitat is on the edge of the Tropical life zone, under wholly different climatic conditions. The type of this variety is in my own herbarium collected by myself.

Pyrus Americana (Marsh) DC. Frequent from Alta northward.

Pyrus Sitchensis (Roem.) Piper. Blackfoot Glacier, Yellow Bay. There is doubt of the validity of this species.

Lupinus sericeus Pursh. Common in open pine woods from Alta northward.

Lupinus ornatus Dougl. Bigfork, Daphnia Lake, Wild Horse Island, Ravalli, Ronan. The var. *bracteatus* collected at Missoula by MacDougal and at Wild Horse Island by Elrod.

Lupinus alpicola Hend. Common in subalpine burns. MacDougal Peak, also at Belton and Evaro. Doubtfully distinct from *L. sericeus*.

Lupinus laxiflorus Dougl. Alta, Monida. Also Missoula and Bigfork (Elrod). No lupines seen in the Sperry Glacier region.

Trifolium hybridum L. Alta.

Trifolium pratense L. Bigfork, Polson, Alta, Ronan.

Trifolium longipes Nutt., *T. Rydbergii* Greene, *T. latifolium* Greene, *T. caurinum* Piper, are forms. Evaro, Alta, McDonald Lake in the Mission Mountains. No clovers seen in the Sperry Glacier region.

Medicago Lupulina L. Ravalli.

Glycyrrhiza lepidota Nutt. Frequent along lake shores and streams from Alta northward.

Astragalus decumbens (Nutt.) Gray. This grades into a multitude of forms, according to the shade and soil in which it grows. *A. decumbens* var. *campestris* (Gray) Jones is an extreme form, with wide leaves and ascending habit. Other synonyms are *A. convallarius* Greene, *Homalobus hylophilus* Rydberg, etc. Wild Horse Island, Rexford, Alta. MacDougal Peak (Miss Norton).

Astragalus pectinatus (Hook.) Douglas. Browning.

Astragalus leptaleus Gray. Big Arm, Monida, Somers. Wild Horse Island (Elrod), MacDougal Peak (Miss Norton).

Astragalus miser (Dougl.) Gray. Garrison, Upper Marias Pass.

Astragalus Bourgouvii Gray. Common on all the peaks from Lambert Valley to the Blackfoot Glacier.

Astragalus alpinus L. Alta, Echo Lake. Reported from several other localities but probably confounded with *A. Bourgouvii*.

Astragalus elegans Hook., *A. eucosmus* Rob. Supposed to grow at Upper Marias Pass, but probably confounded with *A. Bourgouvii*.

Astragalus aboriginum var. *glabriusculus* (Gray.) Jones. Upper Marias Pass.

Astragalus Americanus (Hook.) Jones. Alta.

Astragalus Drummondii Dougl. Garrison, Missoula (MacDougal).

Astragalus agrestis Dougl. Evaro, Ronan, Missoula (MacDougal).

Astragalus nitidus Dougl. Browning.

Astragalus Canadensis var. *Mortoni* (Nutt.) Wat. Occasional from Alta northward in open woods and fields.

Astragalus Purshii Dougl. Missoula (Elrod).

Astragalus inflexus Dougl. Wild Horse Island, Missoula. Also at Missoula by Elrod and MacDougal.

Astragalus crassicaarpus Nutt., *A. prunifer* Rydberg. Garrison and Browning.

Astragalus arrectus Gray., *A. Kelseyi* Rydberg. Deer Lodge Valley.

Astragalus flexuosus Dougl. Browning.

Oxytropis deflexa DC. Blackfoot Glacier, Mt. Hagin, Browning.

Oxytropis alpicola (Rydberg Fl. Mont, 252 as *Aragallus*). Blackfoot Glacier, Mt. Haggin.

Oxytropis monticola Gray. Deer Lodge Valley, Echo Lake, MacDougal Peak (Elrod and MacDougal).

Oxytropis Lamberti var. *ochroleuca* Nelson. There is no character that separates this from *O. Lamberti* but the color of the flowers. There is no character that separates it from *O. monticola* but the appressed calyx hairs. Normally the flowers are an inch long and the pod a trifle stiffer than in *O. monticola*, and less inflated, but these characters vary greatly. No specimens of this variety have as yet been reported from our drainage but it is common eastward and southward. The low and single stemmed plant of the plains seems abundantly distinct but unfortunately it passes by imper-