

ceptible gradations into the tufted forms with purple flower and exactly like this variety except the color of the flowers.

Oxytropis gracilis (Nelson) Erythraea 7 60 as *Aragallus*. Upper Marias Pass.

Oxytropis nana Nutt. Garrison.

Oxytropis splendens Dougl. Upper Marias Pass, Browning.

Oxytropis viscidula Nutt. in T. & G. Fl. 1 341 (1850), *Aragallus viscidus* (Nutt.) Greene, *Aragallus viscidulus* Rydberg. Viscid *Oxytropis*. Rydberg's attempt to elucidate this species in the Flora of Montana has only added to the confusion, while his additional species has no foundation. He refers Nuttall's type to Oregon when it must have been collected either in Montana or Idaho. Nuttall gives it as on the "Headwaters of the Oregon," but the "Oregon" does not head in Oregon. Rydberg gives it as growing at 4000 to 8000 feet on hills when it is seldom found lower than 9000 feet, and then on rocky ridges in subalpine places. Watson's locality was 10,000 feet elevation. In his *A. viscidulus* Rydberg gives the habitat as dry hills and mountain sides when it is always high alpine or subalpine, from timberline (11,500 feet altitude in Utah) to 10,000 feet altitude on rocky ridges. His characterization of both species is equally erroneous. He says *O. viscidula* always has yellow hairs at base of stems, when they are nearly always white as in the other. He says the hairs on stem, calyx and pods are white and never black in *O. viscidula* while they are both, or in some cases wholly absent. One can always find black hairs underneath the shaggy white ones in *O. viscidula*, as the shaggy ones get less the black ones become more evident. In *O. viscidula* the pubescence varies likewise, but the black hairs are more evident and the shaggy ones only occasionally in evidence. In my specimens from Mt. Haggin in Deer Lodge Valley near timber line there is no pubescence on the calyx at all except the always present stipitate yellow glands which are very abundant, the specimens are depauperate and the old pods broadly oblong and obliquely short-apiculate, and about 1 cm. long. In my material from Ryan's Lake, same valley, near timber line the calyx is shaggy with white and black hairs intermixed. In my material from Lima, doubtless the same locality where Rydberg got his, the calyx is loosely shaggy with black hairs as well as the pods, and in specimens got close by the calyx is shaggy with white hairs, with a few black ones underneath. The pods vary from oblong-ovate and short-acuminate to lanceolate-acuminate, and from long-beaked to apiculate in pods from the same tuft, and from a half inch long to an inch long, with divergent beak. It is evident that Nuttall's original was a depauperate plant with slightly developed pods. In all my material, of which I have much, my field notes say the flowers are bright red, in drying they turn to blue, or when not quickly dried turn white, and this is probably the reason why Nuttall's specimens seem white flowered. This should grow on all our high peaks. Rydberg refers Watson's material from the East Humboldt Mts. Nevada, to *O. viscidula* and mine from the Wasatch to *O. viscidula*, while they are the same, as I have material from both localities. This plant also grows at Browning on gravelly knolls.

Hedysarum boreale Nutt., *H. Americanum* (Mx.) Britt., *H. lancifolium* Rydberg. Common on the high peaks from Como Peak to Upper Marias Pass.

Hedysarum sulphurescens Rydberg. Common on the high peaks from McDonald Peak north and east.

Linum Lewisii Pursh. Frequent on prairies and in open woods throughout.

Geranium incisum Nutt. Common from Alta northward.

Geranium Carolinianum L. Frequent in fields and waste places. Bigfork, St. Ignatius Mission, Whitefish, Ravalli.

Geranium Carolinianum var. *longipes* Wat., *G. Bicknellii* Britton. This grows with the type. Ravalli, Alta, Bigfork.

Erodium cicutarium L'Her. Missoula (MacDougal).

Euphorbia glyptosperma Eng. St. Ignatius Mission, Ravalli, Belton, Columbia Falls.

Euphorbia dictyosperma F. & M. Ravalli.

Callitriche palustris L. Bigfork, Ravalli, Alta, Darby, Browning.

Callitriche autumnalis L. Ronan, Evaro.

Rhus glabra L. Ravalli.

Rhus Toxicodendron L., *R. Rydbergii* Small. Frequent among rocks in all localities at low elevations.

Impatiens biflora Walt. Common in swamps at St. Ignatius Mission, Hot Springs, Ravalli, Sand Point (Idaho) and Bigfork, where it is in the latter place wholly cleistogamous.

Impatiens biflora var. *ecalcarata* Blankinship (Mont. Ag. Coll. Stud. 1 85 as species). This is simply a spurless form and grows along with the type. Also Swan Lake (Miss Norton).

Rhamnus Purshiana DC. Bigfork, Ravalli.

Ceanothus velutinus Dougl. MacDougal and McDonald Peaks, Upper Marias Pass.

Glossopetalon spinescens Gray. Alta.

Ampelopsis quinquefolia (L.) Mx., *Parthenocissus*—(L.) Planch, etc. Swan Lake, introduced.

Malvastrum coccineum (Pursh) Gray. Bitter Root and Deer Lodge Valleys, Browning.

Malva rotundifolia L. St. Ignatius Mission.

Sidalcea Oregana Gray. Ronan.

Hypericum Canadense var. *boreale* Britton. Polson Swamp, Bigfork.

Hypericum formosum HBK. Common from Ravalli to Blackfoot Glacier and St. Mary's Lake.

Hypericum Nortonae, n. sp. Miss Norton's St. John's Wort. Stems about 10 cm. long, erect from slender underground rootstocks, barely angled, simple. Leaves rather congested, nearly round to oval-ovate, obtuse, thick and scarcely at all black-punctate 1.5-2.2 cm. long, cordate, sessile, not clasping. Flowers 1-3, terminal, on a short, 2-bracted pedicels. Sepals ovate, obtuse, about 2.5 mm. long, greenish with purplish tips. Petals rather narrow strongly-many-nerved, yellow, 1-1.5 cm. long. Stamens many. Styles 3, long, distinct. Pods ovate, 3-lobed at tip. It is evidently allied to *H. formosum*. Alpine in moist places. McDonald Peak, Elrod Peak (Elrod). Dedicated to Miss Gertrude Norton, who has worked long on the flora of this region. Upper Marias Pass, Sperry Glacier, Lambert Valley. It shows no variation toward *H. formosum*.

Elatine Americana Arn. Common throughout the Flathead Valley.

Elatine brachysperma Gray. Alta.

Viola nephrophylla Greene. Bigfork, Swan Lake, Polson, Rost Lake, Wild Horse Island. Common.

Viola Canadensis L. Bigfork, Swan Lake, Rost Lake, McDonald Lake in the Mission Mountains, Blackfoot Glacier. Also gathered by all previous collectors.

Viola glabella Nutt. MacDougal Peak, Bigfork, Wild Horse Island.

Viola venosa (Wat.) Piper. Bigfork (Elrod).

Viola sarmentosa Dougl. McDonald Peak and Lake.

Viola sarmentosa var. *orbiculata* (Geyer) Gray. Bigfork, Yellow Bay, Belton.

Mentzelia laevicaulis (Dougl.) T. & G. Garrison.

Opuntia polyacantha Haw. Garrison, Browning.

Circaea alpina L. Common in damp and deep woods from the Mission Mountains northward.

Circaea alpina var. *Pacifica* (Asch. & Mag. Bot. Zeit. 29 392 as species). This has deeper toothed leaves and normally minute bracts on the racemes but there are all sorts of intergrades. Yellow Bay.

Gaura coccinea Pursh. Ravalli, Browning.

PLATE V.

*HYPERICUM NORTONAE* JONES, N. S.

- Oenothera biennis* L. Polson, Ravalli, Browning.
Gayophytum caesium (Nutt.) T. & G. Alta.
Gayophytum ramosissimum (Nutt.) T. & G. Alta, Garrison.
Gayophytum diffusum (Nutt.) T. & G. Hot Springs.
Gayophytum lasiospermum Greene. Darby.
Epilobium angustifolium L. Common from Alta northward.
Epilobium latifolium L. MacDougal Peak, Gunsight Pass, Blackfoot Glacier, Upper Marias Pass.
Epilobium minutum Lindl. Mission Creek.
Epilobium palustre L. Polson Swamp.
Epilobium adenocaulon Hausskn. Common from Alta northward at low elevations.
Epilobium alpinum L. MacDougal and McDonald Peaks, Upper Marias Pass.
Epilobium Hornemanni Reich. This is a very doubtful species as it seems to intergrade with *E. alpinum*. Common on all the high peaks from Alta northward.
Epilobium clavatum Trelease. A very doubtful species. MacDougal Peak (Elrod and Umbach).
Epilobium glandulosum Lehm. Swan Lake.
Hippuris vulgaris L. Common in swamps throughout.
Myriophyllum spicatum L. Dayton, Bigfork.
Myriophyllum hippuroides Nutt. Common at Bigfork.
Myriophyllum verticillatum L. Common on the shores of Flathead Lake, Swan Lake, Daphina and Rost Lakes, Dayton, Whitefish.
Cogswellia macrocarpa (Nutt.) Jones. Common on dry prairies from Missoula northward.
Cogswellia simplex (Nutt. Bot. King 129 as *Peucedanum*). Common from Alta northward.
Cogswellia Altensis, n. sp. Allied to *C. simplex*. Stems several from a fleshy, elongated, not tuberous root, dark-green, 7-15 cm. long, erect. Whole plant smooth. Leaves biternate, with short root petioles and vaginate stem ones. Leaflets nearly filiform, falcate, acute, 5-8 cm. long, entire. Peduncles slender, about 1.5 dm. long. Rays very unequal, from 1.5-5 cm. long, slender, 3-6. Involucels of few needle-like bracts. Pedicels 2.5-7.5 mm. long, slender. Fruit about 7 mm. wide and 12 mm. long, oblong-obovate, the wings as wide as the body. Oil tubes solitary and large. Ribs evident and raised. Oil tubes on commissure threadlike, one on each side of the midnerve, and with another running down half way outside of it. Seed nearly flat and with linear cross section. Wings thickest at inner edge where they are about half as thick as the body of the seed. Alta, under pines on the upper edge of the Middle Temperate life zone, on dry south slopes.
Cogswellia Sandbergii (C. & R.) Jones. Subalpine on MacDougal Peak, also at Lake Louise near Sperry Glacier. This cannot be located in Coulter and Rose's Monograph because it is placed under "glabrous throughout" in the key, while the fruit is puberulent.
Cogswellia ambigua (Nutt.) Jones. Mission Creek.
Cogswellia montana (C. & R.) Jones. Missoula (Elrod).
Angelica Roseana Hend. Mission Creek and McDonald Peak.
Leptotaenia multifida Nutt. Common in all the mountains to the alpine.
Peptotaenia multifida var. *Eatoni* (C. & R.) Jones. MacDougal Peak, Alta. This includes *L. filicina* Jones probably.
Heraclueum lanatum Mx. Common from Alta northward.
Ligusticum tenuifolium C. & R. Alta.
Ligusticum Leibergi C. & R. Alta.
Cymopterus Elrodi n. sp. Habit of *C. thapsoides*. Shortly caulescent and densely branched from a woody root. Stems ascending, stout, 5-10 cm. long. Peduncles 3 dm. long. Leaves with stout petioles longer than the blades, blades ovate to deltoid in outline, ternately and then pinnately decompound,

1 dm. long, with filiform and aculeate and rigid but smooth segments about 2.5 mm. long. Rays about 10, unequal, 1.5-5 cm. long, stout. Slender pedicels about 10 cm. long. Bractlets needle-like and short. Fruit about 9 mm. long and half as wide, elliptical, truncate at tip and slightly emarginate at base. Lateral wings not over .6 mm. wide, dorsal reduced to raised ribs and with one or two of them slightly winged. Oil tubes about 5 in the intervals and 14 on the commissure. Seed face concave. This is nearest to *C. thapsoides* but the seed is twice as long and with mostly abortive wings. Alta, Mont. In the canyon of the Bitter Root River among loose rocks and gravel on dry knolls. July 11, 1909.

Musenium Hookeri Nutt. Garrison.

Bupleurum Americanum C. & R. Browning on the plains. Blankinship's *B. purpureum* is only an alpine form. Mt. Haggin and Lima.

Zizia cordata (Walt.) Koch. Browning.

Carum Gairdneri (H. & A.) Gray. Common from Alta northward.

Cicuta bulifera L. Swan Lake in swamp on decaying logs. Lake McDonald (Williams and Umbach).

Cicuta Douglasii (DC.) C. & R., *C. vagans* Greene. Browning, Ravalli.

Cicuta Douglasii var. *occidentalis* (Greene Pitt. 2 7 as species). This is the common form of the Great Plateau, with oval to elliptical fruit about 3 mm. long. Coulter and Rose say of this group "fruit oblong" while none of them are narrower than oval or elliptical, their own figure on p. 94 being oval or elliptical. In my specimens No. 1909 from Salt Lake City referred here by them the fruit is from depressed-orbicular to orbicular-ovate, and runs about 2 mm. long. They also say of the *vagans* group "fruit orbicular, oil tubes very narrow" while in fact they are very broad as often as narrow. St. Ignatius Mission.

Berula erecta (Huds.) Coville. Common all around Flathead Lake, Ronan, St. Ignatius Mission.

Sium cicutaefolium Gmel. Common in shallow water in all localities.

Osmorhiza divaricata Nutt. Coulter and Rose in their last monograph attempt to split up the species of this genus on the constriction of the tip of the fruit. An extensive examination of material shows that this is fallacious and their species invalid. This species includes *Washingtonia Leibergi* and *brevipes*. *Leibergi* forms are from MacDougal Peak and Blackfoot Glacier in the collection under consideration. Other forms are from the East Humboldt Mountains, Nevada, and Diamond Peak, Calif. My *divaricata* forms are from Ravalli and Bigfork, my *brevipes* forms from Bigfork and MacDougal Peak along with the others and growing under the same conditions.

Osmorhiza divaricata var. *nuda* (Torr. Pac. R. R. Rep. 4 93 as species). *Washingtonia nuda* and *obtusata*. Alta and MacDougal Peak. The Alta specimens have the leaflets of *brevipes*, but more acute, pedicels and peduncles very divaricate, fruit clavate, the body 10 mm. long, triangular-acute, beak .5-2.5 mm. long, stylopodium mostly wider than high and minute, pedicels longer than the fruit, leaflets 3-4 cm. long. Nelson's No. 4997 from Wallace Creek, Wyo., has the fruit peduncles and pedicels the same but fruit narrower and beak .5 mm. long and leaflets often 5.5 cm. long. My specimens from Payette Lake, Idaho, July 24, 1899, referred by Coulter and Rose to *brevipes*, are exactly *obtusata* in every particular, with the minute stylopodium and triangular-acute beakless tip, it also has the divaricate peduncles and pedicels. My No. 5580 from Provo, Utah, referred by them to this species is too immature to tell what it is, but some of the fruit is constructed below the tip like *Leibergi*, and with the minute depressed stylopodium. My No. 5893t from Marysville, Utah, is not referred anywhere by them but is typical *obtusata*. *O. nuda* is readily recognized in California by the small leaves, broad leaflets and slender habit with elongated internodes and peduncles, but this form has both beaked and beakless fruit; when the beak is produced it is referred to *brevipes* by Coulter and Rose. The fruit is short and with

short tails, pedicels longer than the fruit, plants mostly pubescent. This is represented in the interior more by the form obtusa, with smooth foliage somewhat larger and more pointed and narrower leaflets. All the species of *Osmorhiza* have the two forms of leaves, broad and deeply serrate or lobed leaflets, and lanceolate and less lobed and shallow serrate leaflets, which occur indifferently with the varying fruit characters. In the shade the leaflets are larger and more pubescent, in the sun they are much reduced, thicker and nearly smooth. Typical *O. divaricata* is characterized by the nearly linear beaked fruit with tail from nearly equal to half the body, pedicels nearly as long as the fruit (the central one often 1-2 inches long), large and acuminate leaflets, stylopodium longer than wide, plants nearly smooth.

Sanicula Marilandica L. Common from Evaro and Mission Creek to Sperry Glacier and Gunsight Lake.

Cornus Baileyi Evans. Is reported from our region, but the characters do not hold.

Pyrola minor L. Blackfoot Glacier.

Pyrola secunda L. Frequent from Alta northward.

Pyrola aphylla Smith. Yellow Bay and MacDougal Peak.

Pyrola chlorantha Swz. Yellow Bay and Bigfork.

Pyrola picta Smith. Como Peak.

Pyrola rotundifolia L. Common, Alta to Sperry Glacier.

Pyrola rotundifolia var. *bracteata* (Hook.) Gray. Belton, Gunsight Lake.

Pyrola rotundifolia var. *uliginosa* (Torr.) Gray. From MacDonald Lake in the Mission Mountains northward by Umbach, Miss Norton, MacDougal and Vreeland.

Pyrola rotundifolia var. *incarnata* DC. Mission Creek to St. Mary's Lake in the Sperry Glacier region.

Kalmia glauca var. *microphylla* Hook. MacDougal Peak. Common on all the peaks of the Sperry Glacier region.

Phyllodoce empetriformis (Smith) D. Don. Como Peak, common on all the peaks of the Sperry Glacier region, also Mission Creek. *P. intermedia* (Hook.) Rydberg.

Phyllodoce glanduliflorus (Hook.) Coville. Como Peak, Mission Creek. Common on all the peaks of the Sperry Glacier region. *P. hybrida* Rydberg.

Ledum glandulosum Nutt. Como Peak, Mission Creek, Alta, Belton.

Rhododendron albiglorum Hook. McDonald Peak and Mission Creek, Como Peak. This answers almost exactly to *Cladanthamnus*.

Arctostaphylos Uva-ursi (L.) Spreng. Common everywhere on the mountains.

Vaccinium membranaceum Dougl., *V. globulare* Rydberg. Common at middle elevations from Alta northward.

Vaccinium caespitosum Mx. Upper Marias Pass.

Vaccinium myrtilloides var. *microphyllum* Hook. Common from Alta northward.

Vaccinium Canadense Kalm. Belton, Alta.

Centunculus minimus L. Ronan.

Douglasia montana Gray. Garrison. Missoula (Elrod).

Androsace septentrionalis L. Upper Marias Pass, Sperry to Blackfoot Glacier.

Androsace filiformis Retz. Alta.

Primula Parryi Gray. Como Peak.

Dodecatheon pauciflorum (Durand) Greene. Common from Alta northward.

Dodecatheon Meadia var. *lancifolium* Gray. Alta.

Dodecatheon Meadia var. *alpinum* Gray. Upper Marias Pass.

Frasera speciosa Dougl. Bitter Root Mountains.

Frasera albicaulis Griseb. Alta.

Gentiana Amarella L. Common from Alta northward.

Gentiana glauca Pall. Sperry Glacier. Also by Umbach.

- Gentiana affinis* Griseb. Polson Swamp, Big Arm.
Apocynum androsaemifolium L. Darby to Upper Marias Pass.
Apocynum cannabinum L. Yellow Bay, Dayton, Polson, Ravalli.
Convolvulus arvensis L. Bigfork, Belton, St. Ignatius Mission.
Phlox Douglasii Hook. Como Peak, Lambert Valley. Missoula (Elrod).
Gilia debilis Wat. McDonold Peak (Elrod).
Gilia aggregata (Pursh) Spreng. Alta, Mission Creek. Missoula (Elrod).
Gilia linearis (Nutt.) Gray. Common from Alta to Lake McDonald.
Gilia gracilis (Dougl.) Hook. Ravalli, Jocko Creek, MacDougal.
Gilia minutiflora Bth. Alta.
Gilia pharnaceoides Bth. Alta to Upper Marias Pass.
Polemonium micranthum Bth. Hot Springs.
Polemonium coeruleum L. Alta.
Polemonium humile R. & S. Alta to Blackfoot Glacier.
Polemonium humile var. *pulchellum* (Bunge) Gray. MacDougal Peak and Mission Creek.
Polemonium confertum Gray. Gunsight Peak.
Phacelia Franklinii Gray. Alta, Evaro.
Phacelia heterophylla Pursh. Alta to Sperry Glacier region.
Nemophila breviflora Gray. Garrison.
Hydrophyllum capitatum Dougl. Bigfork, McDonald Lake in the Mission Mountains.
Lithospermum ruderales Dougl., *L. lanceolatum* Rydberg. Common, Alta to Upper Marias Pass.
Lithospermum arvense L. Bigfork.
Mertensia oblongifolia G. Don. Mission Creek, Upper Marias Pass. Columbia Falls (Williams), Missoula (MacDougal and Elrod).
Lappula Redowskii (Hornem.) Greene. Common Alta to Bigfork.
Lappula Redowskii var. *cupulata* (Gray Bot. Cal. 1 530 as *Echinospermum* Red. var.). This grows with the other and grades into it.
Lappula floribunda (Lehm.) Greene. Alta and northward.
Krynitzkia canescens Gray. Upper Marias Pass and Browning.
Krynitzkia Californica Gray. Alta, Evaro, Browning.
Krynitzkia Watsoni Gray. Darby.
Krynitzkia affinis Gray. Evaro, Alta.
Krynitzkia crassi Gray. Garrison.
Krynitzkia crassiseppala Gray. Garrison.
Verbena bracteosa Mx. Ravalli to Browning.
Verbena stricta Vent. Hot Springs.
Monarda fistulosa L. Common. Evaro to Belton.
Lycopus uniflorus Mx. Rost Lake, Swan Lake, Schultze's cabin.
Lycopus Virginicus L. Bigfork and Swan Lake.
Lycopus Americanus Muhl. Bigfork, Jordan Lakes, Hot Springs.
Mentha arvensis var. *Canadensis* (L.) Briquet., *M. rubella* Rydberg. Bigfork, Missoula (Elrod).
Mentha arvensis var. *glabrata* (Bth.) Fernald. Common all around Flathead Lake, Swan Lake, Hot Springs, St. Ignatius Mission.
Stachys palustris L. Common, Evaro and Ravalli to Whitfish and Rexford.
Physostegia parviflora Gray. Common all around Flathead Lake, Missoula (Elrod).
Prunella vulgaris L. Alta and northward.
Agastache urticifolia (Bth.) Rydberg. Evaro. Missoula (Elrod).
Nepeta Cataria L. Bigfork, Mission Creek.
Dracocephalum parviflorum Nutt. Ravalli, Evaro, Alta. Jocko Creek (MacDougal).
Scutellaria galericulata L. Common in swamps at Bigfork, Hot Springs, Swan Lake, Evaro, and around Flathead Lake.
Solanum triflorum Nutt. Evaro.

Physalis pubescens L. Bigfork.

Pedicularis bracteosa var. *Montanensis* (Rydberg Torr. Bull. 24 293 as species). This does not differ in anything but the purple flowers. The low altitude forms have spikes a foot long. Lambert Valley, Mission Creek, McDonald Lake, Bigfork, MacDougal Peak and Lake McDonald to St. Mary's.

Pedicularis Canbyi Gray, was again found on McDonald Peak. Also got on Silloway Peak by MacDougal.

Pedicularis Groenlandica Retz., *Elephantella* Rydberg. Frequent in the high mountains from Alta northward. All the other species of *Pedicularis* reported from this region were found.

Orthocarpus luteus Nutt. Upper Marias Pass, Bull and Wild Horse Islands.

Castilleja miniata Dougl. It is very variable in the pubescence and length of galea, very common from Alta northward.

Castilleja angustifolia (Nutt.) G. Don. Bigfork.

Castilleja pallida HBK. This is a very doubtful species. Common from Evaro and Ravalli northward.

Castilleja pallida var. *lutescens* Greenman. Wild Horse Island, Bigfork, Upper Marias Pass, MacDougal Peak (Miss Norton).

Castilleja parviflora. This has been reported from various parts of our region, but all seem to be forms of *angustifolia* or *miniata*. I can make nothing out of the species proposed by Rydberg.

Castilleja pallescens (Gray) Greenman. Ravalli, Ronan, Evaro, Missoula (MacDougal).

Veronica Americana Schw. Common from Alta northward.

Veronica alpina L., *V. Wormskjoldii* R. & S. Mission Creek to Blackfoot Glacier.

Veronica serpyllifolia L. Alta to Blackfoot Glacier.

Veronica serpyllifolia L. Alta to Blackfoot Glacier.

Synthyris rubra (Hook.) Bth. Mission Creek, Evaro, Ravalli, Ronan, Missoula (Elrod).

Gratiola Virginiana L. Bigfork, Wild Horse and Bull Islands, Polson (also by Miss Norton). Rost Lake (MacDougal).

Mimulus caespitosus Greene. Lambert Valley, Sperry to Blackfoot Glacier.

Mimulus Breweri (Greene) Rydberg. Alta.

Mimulus Langsdorfii Donn. Common Alta to Bigfork and MacDougal Peak.

Mimulus moschatus Dougl. Alta, Mission Creek, Evaro, Trail Creek (MacDougal).

Scrophularia nodosa var. *Marylandica* (L.) Gray. Ravalli, St. Ignatius Mission.

Pentstemon acuminatus Dougl. Alta, Deer Lodge Valley.

Pentstemon eriantherus Pursh., *P. cristatus* Nutt. Deer Lodge Valley, Missoula (Elrod).

Pentstemon attenuatus Dougl. Prairies on Wild Horse Island, Ravalli, Garrison, Ronan, Evaro.

Pentstemon procerus Dougl. Missoula, McDonald Lake in the Mission Mountains, Upper Marias Pass.

Pentstemon procerus var. *micrantus* (Nutt. Jour. Phil. Acad. 7 45 as species). Alta, Missoula (Elrod), Columbia Falls (Williams).

Pentstemon ovatus Dougl. Wild Horse Island, MacDougal Peak. Mission Mountains (MacDougal) as *P. pinetorum*.

Pentstemon Richardsonii Dougl. Alta, Como Peak, Missoula, Evaro.

Pentstemon Menziesii Hook. This is a very variable species and has received many names, but the forms all intergrade. Common on all the peaks from Como Peak northward.

Verbascum Thapsus L. Bigfork, Ravalli, Columbia Falls.

Verbascum Blattaria L. St. Ignatius plains.

Utricularia vulgaris L. Bigfork. Also found previously by Elrod and Miss Norton.

Orobanche fasciculata Nutt. Bigfork, Wild Horse Island, Browning, Wild Horse Island (Elrod).

Orobanche comosa Hook. Hot Springs.

Plantago major L. Swan Lake, and all the settlements around Flathead Lake.

Plantago Tweedyi Gray. Deer Lodge Valley, Browning.

Plantago Purshii R. & S. Common on the low lands throughout.

Plantago Purshii var. *aristata* (Mx. Fl. 1 95 as species). Ravalli.

Galium Aparine L. Missoula, Ravalli.

Galium Aparine var. *Vaillantii* (DC.) Koch. Reported from McDonald Lake in the Mission Mountains by MacDougal.

Galium trifidum Mx. Common from Alta northward.

Galium aspernum Gray. Alta, Darby.

Galium triflorum Mx. Common from Alta northward.

Galium boreale L. Common from Alta northward.

Sambucus pubens L. MacDougal Peak, Alta.

Sambucus melanocarpa Gray. Common from Alta northward.

Sambucus glauca Nutt. Bigfork and Yellow Bay.

Sambucus decipiens n. sp. This is what has passed for *S. Canadensis* throughout the Rocky Mountain region and has been called *S. glauca* by many because of the remarkably glaucous fruit. It differs from that species in the regular elderberry habit, namely, tufted and short-lived stems and very large leaves, and differs conspicuously from *S. Canadensis* in always having white-glaucous fruit. Berries 5-6 mm. wide. Joints of stems very prominent. Leaflets oblong-lanceolate, acuminate, smooth. Corymbs with 5-7 stout branches, the whole often 4.5 dm. wide and very heavy. Fruit almost black, pleasant. It grows in open clumps normally about 3.5 m. high, but is stouter than the eastern *S. Canadensis*, has larger leaves, and larger corymbs and fruit which is always glaucous. The type is from my specimens from St. Ignatius Mission, others are from the Hot Springs. Other all my material distributed from the West except my Californian material as *S. glauca*. Middle Temperate life zone. Ravalli, Alta, Mission Creek, Ravalli. Not *S. Neo-Mexicana* Wootton which is apparently *S. Mexicana*.

Linnaea borealis L. Everywhere in the woods.

Symphoricarpos racemosus Mx. Common in all localities.

Symphoricarpos rotundifolius Gray. *S. vaccinioides* Rydberg. Alta, Ronan, Ravalli, Evaro.

Lonicera Utahensis Wat. Frequent from Alta northward.

Lonicera involucrata Banks. Common from Alta northward.

Valeriana sylvatica Banks., *V. septentrionalis* Rydberg, *V. occidentalis* Heller. From Alta northward. Common.

Valeriana Sitchensis Bong. This is well marked in the extreme forms but seems to vary into the above. From Mission Creek to Blackfoot Glacier.

Echinocystis lobata (Mx.) T. & G. Bigfork and Ravalli. Cult.

Specularia perfoliata (L.) A. DC. Ravalli, Ronan, McDonald Lake, MacDougal.

Campanula rotundifolia L. Everywhere.

Heterocodon rariflorum Nutt. Ronan.

Lobelia Kalmii L. Rost Lake, Polson Swamp. Also by previous collectors.

Tragopogon porrifolius L. Bigfork.

Microseris nutans (Geyer) Sch. Mission Creek, Columbia Falls (Williams).

Hieracium gracile Hook. McDonald and MacDougal Peaks and through the Sperry Glacier region.

Hieracium cynoglossoides Arvet-Touv. Wild Horse Island, Ravalli, Evaro. This is a very doubtful species.

Hieracium Scouleri Hook. *H. griseum* Rydberg. Rydberg in making his untenable species goes directly in the face of the statement of Gray in the Synoptical Flora page 427 that Scouler distributed specimens of *H. cynoglossoides* as *H. Scouleri*, and in the face of Hooker's original description. Common from Alta northward.

Crepis glauca (Nutt.) T. & G. Deer Lodge Valley.

Crepis runcinata (James) T. & G. Bigfork, Ronan.

Crepis acuminata Nutt. Frequent from Alta northward.

Crepis intermedia Gray. A very poor species. Alta to Bigfork.

Crepis occidentalis Nutt. Garrison.

Prenanthes hastata var. *sagittata* (Gray Syn. Fl. 1 2 435 as *alata* var.). Frequent from Alta northward to Blackfoot Glacier.

Agoseris aurantiaca (Hook.) Greene. From Alta northward.

Agoseris gracilens (Gray) Greene. Published by Greene as *gracilentia*. Alta, MacDougal and McDonald Peaks. Hardly more than a variety of the above.

Agoseris grandiflora (Nutt.) Greene. Alta to Bigfork.

Taraxacum officinale Weber. Common as a noxious weed from Alta northward. The indigenous alpine variety rare in the Sperry Glacier region.

Lactuca Ludoviciana (Nutt.) DC. Bigfork and Mission Creek.

Lactuca pulchella (Pursh) DC. Common around Flathead Lake, always appearing as if an introduced plant.

Lactuca spicata (Lam.) Hitchk. Bigfork, Mission Creek, St. Ignatius Mission, Polson, Hot Springs.

Sonchus asper (L.) Hill. Bigfork, Hot Springs, Mission Creek.

Sonchus oleraceus L. Dayton.

Cirsium arvense (L.) Scop. Evaro, Deer Lodge Valley.

Cirsium Hookeriana Nutt. Alta and northward.

Cirsium Drummondii T. & G. Blackfoot Glacier.

Cirsium Hallii (Gray Proc. Am. Acad. 19 56 as *Cnicus*). Dayton, Hot Springs, Yellow Bay, St. Ignatius Mission.

Cirsium undulatum (Nutt.) Spreng. Ravalli to Bigfork, rather common.

Gnaphalium decurrens Ives. Darby, Columbia Falls (Williams), Swan Lake (Umbach).

Gnaphalium palustre Nutt. Frequent from Alta to Browning.

Antennaria luzuloides T. & G. Bigfork (Elrod), Columbia Falls (Williams).

Antennaria pulcherrima (Hook.) Greene. Ravalli.

Antennaria anaphaloides Rydberg. Evaro, McDonald Lake in the Mission Mountains, Upper Marias Pass.

Antennaria racemosa Hook. Alta to Blackfoot Glacier.

Antennaria Howellii Greene. Evaro.

Antennaria parvifolia Nutt. Garrison.

Antennaria rosea (Eaton) Greene. A very doubtful species. Bigfork, Alta, Evaro.

Antennaria Hendersoni Piper. Bigfork, Alta, Evaro, McDonald Peak.

Antennaria microphylla Rydberg. Somers, Missoula and Bigfork (MacDougal).

Antennaria media Greene. MacDougal Peak, Sperry to Blackfoot Glacier.

Antennaria umbrinella Rydberg. There is a striking difference in the bracts between this and the above but they do not seem to be distinct, in addition the clavellate pappus does not seem to hold. Darby to Blackfoot Glacier.

Antennaria flavescens Rydberg. Missoula (Elrod). This material named by Rydberg differs materially from his description and is not at all flavescent and seems to be *A. parvifolia*. Alta, Evaro.

Adenocaulon bicolor Hook. Everywhere in the mountains to Gunsight Lake from Ravalli northward.

Artemisia dracunculoides Pursh. Kalispell, Dayton, Wild Horse Island, Elrod Peak (Elrod).

Artemisia frigida Willd. Hot Springs to Browning.

Artemisia biennis Willd. Whitefish, Browning.

Artemisia Ludoviciana Nutt. Common from Alta northward.

Artemisia Ludoviciana var. *atomifera* (Piper Fl. Wash. 588 as species). McDonald Peak.

Artemisia discolor Dougl. Blackfoot Glacier, Upper Marias Pass.

Artemisia discolor var. *incompta* (Nutt.) Gray. Gunsight Pass.

Artemisia tridentata Nutt. Alta, Little Bitter Root.

Artemisia rigida (Nutt.) Gray. Wild Horse Island, also by Elrod.

Artemisia absinthium L. Bigfork.

Matricaria discoidea DC. Common Alta and northward.

Chrysanthemum leucanthemum L. Ravalli as a bad weed.

Achillea Millefolium L. Alta and northward. The var. *rosea* also occurs.

Anthemis arvensis L. St. Ignatius Mission.

Senecio vulgaris L. Bigfork, Columbia Falls, Belton.

Senecio negacephalus Nutt. From McDonald Peak to Gunsight Pass.

Senecio integerrimus Nutt. Deer Lodge Valley, Missoula, Upper Marias Pass. Also MacDougal Peak MacDougal.

Senecio hydrophilus Nutt., *S. hydrophiloides* Rydberg. Evaro.

Senecio triangularis Hook., *S. saliens* Rydberg. Alta to Blackfoot Glacier. *S. variifolius* Rydberg is a more robust form.

Senecio hydrophilus Nutt., *S. hydrophiloides* Rydberg. Evaro.

Senecio lugens Rich. Alta.

Senecio Fremonti T. & G. MacDougal Peak to Blackfoot Glacier.

Senecio canus Hook. Missoula to Gunsight Pass.

Senecio subnudus DC. Mission Creek, Sperry to Blackfoot Glacier.

Senecio ovinus Greene. Sperry Glacier. Probably only a form of the above.

Senecio Balsamitae Muhl. Monida.

Senecio cymbalarioides Nutt. Lima and Monida, Stanton Lake (Williams), MacDougal and Silloway Peak (MacDougal).

Arnica Parryi Gray. MacDougal and McDonald Peaks.

Arnica longifolia Eaton. Alta to Blackfoot Glacier.

Arnica amplexicaulis Nutt. Whitefish. Mrs. Kennedy's specimen quoted by Rydberg as this species is *A. foliosa*.

Arnica foliosa Nutt. Bigfork and Swan Lake, Lambert Valley.

Arnica pedunculata Rydberg., *A. monocephala* Rydberg. Evaro.

Arnica betonicaefolia Greene. McDonald Peak, Lambert Valley, Blackfoot Glacier.

Arnica betonicaefolia var. *gracilis* (Rydberg Torr. Bull. 24 297 as species). *A. multiflora* Greene. McDonald Peak and Lake. Throughout the Sperry Glacier region.

Brichellia grandiflora Nutt. McDonald Peak and Lake, Lincoln Pass at Sperry Glacier.

Liatris punctata Hook. Browning.

Gutierrezia Sarothrae (Pursh) Britton. Deer Lodge Valley.

Grindelia nana Nutt. Ravalli, Flathead plains to Hot Springs.

Chrysopsis villosa (Pursh) Nutt. Ravalli and Garrison to Bigfork.

Bigelowia viscidiflora (Hook.) DC. Wild Horse Island, Polson.

Bigelowia nauseosa (Pall.) Jones. Alta to Browning, not common.

Solidago humilis Pursh. Browning. Elrod Peak (Elrod), Silloway Peak, (MacDougal).

Solidago confertiflora. Somers.

Solidago Tolmieana Gray. Elrod Peak (Elrod), Bigfork (MacDougal).

Solidago Guiradonis Gray. Bull Island.

- Solidago Missouriensis* Nutt. Alta to Browning.
- Solidago serotina* Ait. Swan Lake (also Miss Norton and Umbach), Ravalli.
- Solidago elongata* Nutt. Bigfork, Rost Lake (MacDougal).
- Solidago Canadensis* L., *S. caurina* Piper. Alta to Browning.
- Solidago Canadensis* var. *salebrosa* (Piper Fl. Palouse 185 as species). This is a marked form intergrading with the type and differs in the heads being twice the size of those of the species. Without the intergrades it would be placed with *S. serotina*. Wild Horse Island, Mission Creek.
- Solidago nemoralis* Ait. Deer Lodge Valley.
- Solidago occidentalis* (Nutt.) T. & G. Bull Island, Echo Lake, Ravalli, Missoula (Elrod).
- Hoorebekia acaulis* (Nutt. Jour. Phil. Acad. 7, 33 as *Chrysopsis*). Ours is the var. *caespitosa* (Nutt. same cit. as *Chrysopsis*). Bigfork (Miss Norton).
- Hoorebekia lanceolata* (Hook. Fl. Bor. Am. 2 25 as *Donia*). Not yet reported.
- Hoorebekia uniflora* (Hook. l. c. as *Donia*). Browning.
- Hoorebekia integrifolia* (Porter Proc. Am. Acad. 16 79 as *Aplopappus*). Deer Lodge Valley, Upper Marias Pass.
- Aster scopulorum* Gray. Deer Lodge Valley.
- Aster stenomerus* Gray. Deer Lodge Valley and Big Hole country.
- Aster Hallii* Gray. Dayton.
- Aster Fremonti* (T. & G.) Gray. Swan Lake, St. Ignatius Mission.
- Aster occidentalis* Nutt. Bigfork and around Flathead Lake.
- Aster foliaceus* Lindl. Alta to Blackfoot Glacier.
- Aster foliaceus* var. *Eatonii* Gray. Bigfork, Wild Horse Island.
- Aster Cusickii* Gray. McDonald Peak.
- Aster laevis* L. Alta to Belton. The var. *Geyeri* at Alta.
- Aster oblongifolius* var. *rigidus* Gray. Upper Marias Pass.
- Aster modestus* Lindl. St. Ignatius Mission, Alta.
- Aster radulinus* Gray. Elrod Peak (Elrod).
- Aster Sibiricus* L. Blackfoot Glacier, Upper Marias Pass. Elrod Peak (Elrod).
- Aster canescens* Pursh. Deer Lodge Valley.
- Erigeron armeriaefolius* Turcz. Ledebour describes the two forms that Rydberg tries to separate. Alta.
- Erigeron acris* L. Bigfork.
- Erigeron acris* var. *draebachensis* (Mueller) Blytt. Lambert Valley and McDonald Lake.
- Erigeron acris* var. *debilis* Gray. Alta.
- Erigeron alpinus* L. Blackfoot Glacier. This is a well marked species.
- Erigeron ramosus* (Walt.) BSP. Bigfork, Ravalli, Garrison.
- Erigeron divergens* T. & G. Bigfork, Wild Horse Island, Ronan, Ravalli, Missoula.
- Erigeron corymbosus* Nutt. Bigfork, Wild Horse Island, Lima.
- Erigeron glabellus* Nutt. This is *E. oblancoelatus* Rydberg which may be distinct. Ravalli, Alta, Lambert Valley.
- Erigeron speciosus* DC. Alta and northward. Common.
- Erigeron macranthus* Nutt. Mission Creek, Blackfoot to Sperry Glacier. These two species are too close together.
- Erigeron uniflorus* L. Gunsight Pass, Elrod Peak (Elrod).
- Erigeron grandiflorus* Hook. Sperry to Blackfoot Glacier.
- Erigeron concinnus* (H. & A.) T. & G. Ravalli, Missoula, Wild Horse Island. Also by former collectors.
- Erigeron filifolius* Nutt. Columbia Falls (Williams), Polson (Umbach).
- Townsendia Parryi* Gray. Garrison.
- Iva axillaris* Pursh. Ronan to Browning.

Iva xanthiifolia Nutt. Belton, Hot Springs, St. Ignatius Mission. It acts like an introduced plant.

Xanthium Canadense Mill. Hot Springs, St. Ignatius Mission, Browning.

Rudbeckia occidentalis Nutt. Ravalli, Evaro.

Lepachys columnaris Sims. Ft. Missoula. Evidently introduced but well established.

Balsamorhiza Hookeri Nutt. Deer Lodge Valley.

Helianthus annuus L. Common.

Helianthus rigidus Desf. Dayton, Columbia Falls, Belton.

Helianthus Nuttallii T. & G. Dayton, Ravalli, Kalispell, Hot Springs.

Helianthus Californicus var. *Utahensis* Eaton. St. Ignatius Mission.

Coreopsis Atkinsoniana Lindl. Sand Point, Idaho, Whitefish.

Bidens cernua L. Ronan, Whitefish, Swan Lake, St. Ignatius Mission.

Madia exigua (Smith) Greene. Bigfork.

Madia glomerata Hook. Bigfork, St. Ignatius Mission, Hot Springs, Columbia Falls, Darby, Upper Marias Pass, Browning.

MOSSES.

Considerable attention has been given the moss flora, though the knowledge of the flora is not by any means complete.

In 1898 Professor John M. Holzinger devoted a season to the mosses of the Sperry Glacier region. In 1901 W. P. Harris devoted a season to the mosses of the vicinity of Flathead Lake. This material was identified by Carolyn M. Harris. In 1908 I also collected the more common mosses of the Lake and adjacent mountains, though no attempt was made to make it thorough, as my time was devoted to the higher plants chiefly.

All my material was identified by Mr. Holzinger, and the Harris material was examined by Mrs. Britton.

Fortunately Mr. Holzinger had prepared a manuscript of his Sperry Glacier mosses which I have prevailed on him to permit me to print in this report. It is so much more complete than the Harris or my list that it is given as prepared. I have added to it the localities and few additional species found on the Harris list and my own, always adding the name of Harris or Jones to all species collected by us, so that all other localities and notes may be known as those of Mr. Holzinger.

In July, 1898, the writer, J. M. Holzinger, in company with Mr. James Blake, made a vacation trip into Northwest Montana, during which they collected the Mosses and Hepatics herewith published. The region visited is reached by the Great Northern railway, which we left at Belton, thirty miles east of Kalispell, striking some twenty miles north, to the north end of Lake McDonald. There we pitched our permanent camp. The country is very rugged and secluded. It is especially interesting because of the several glaciers which nestle among the precipitous mountain peaks. We visited only one of these, Sperry Glacier.

During our brief stay we made the following excursions: To Holzinger's Basin, eight miles east of camp, July 16 to 19; to McCrimmin Falls, on the McDonald Creek, near the upper end of the lake, July 20; to Mt. Trilby, four miles northwest of camp, July 21; to Sperry Glacier, twelve miles northeast of camp by way of Holzinger's Basin and the Rim, July 24 to 26; and to Avalanche Basin, below Sperry Glacier, 10 miles northeast of camp. A more detailed account of this interesting region may be found in the September number, 1900, of the Bulletin of the American Bureau of Geography.

The determination of the collection has been delayed for various reasons. Dr. R. H. True has determined most of the *Dicrana*; Dr. H. J. Grout, the *Eurhynchia* and *Brachythecia*, and several other species; Dr. G. N. Best, the *Prendoleskear*, etc.; Dr. C. Warnstork the *Sphagna*; Mr. Renaud, the *Harpidia*; Mrs. Britton has determined the *Orthotricha*, and has critically exam-

ined a considerable number of species submitted, especially Grimmiads and Mniums. Messrs. Cardot and Theriot have generously examined and determined a promiscuous lot of things. Dr. A. W. Evans has determined all the Hepaticae. To all these persons I herewith express my gratitude for their generous and ever cordial assistance. Since I have been able to do comparatively little toward determining this collection, the credit for the work is due the more largely to my biological friends.

"The numbers in this report refer to a set of mosses from this collection which were distributed in 1899."

From manuscript by Professor J. M. Holzinger.

In the Botanical Gazette of Aug., 1900, were published 13 species and varieties of mosses from this collection, being either new or new to North America. They are again inserted in the general list herewith submitted.

Sphagnum acutifolium var. *viride* W., form *pusillum*. W. Base of Sperry Glacier.

Sphagnum acutifolium var. *versicolor* form *pusillum* W. Base of Sperry Glacier.

Sphagnum molle Sull. Base of Sperry Glacier.

Sphagnum molle, form *squarrosulum* Gravet. Base of Sperry Glacier.

Sphagnum robustum Roell. Forms *Fibrosus* and *pallido-flavescens* Roell. (Identified by Dr. Julius Roell). "Interesting by reason of the numerous fibers, and the single pores in the branch leaves, by its pale cortex and low stature, all high altitude characters." This grew in the cold water at the camping place below the rim, Sperry Glacier, alpine.

Andreaea petrophila Ehrh. Banks of McDonald Creek near McCrimmin Falls, Sperry Glacier region.

Andreaea alpestris Sch. Mt. Trilby and Mt. Stanton.

Dicranoweisia cirrhata Lindb. Mt. Trilby and Mt. Stanton.

Dicranoweisia contermina Ren. & Card. Holzinger Basin, Mt. Trilby.

Dicranoweisia subcompacta Card. & Ther. in Bot. Gaz. 29 122 (1900). Along the trail from Holzinger Basin to the Rim, which is the highest ledge of rock in the ascent from Holzinger Basin to Sperry Glacier.

Dicranoweisia cirrhata Lindb. Sperry Glacier and Darby (Jones).

Cynodontium polycarpum B. S. Holzinger Basin.

Cynodontium polycarpum var. *strumiferum* B. S. McCrimmin Falls, head of Lake McDonald, Sperry Glacier region. Also by Jones at Swan Lake.

Cynodontium virens B. S. Sperry Glacier (Jones).

Dicranum undulatum Ehrh. Belton (Jones).

Dichodontium pellucidum Sch. a form. Holzinger Basin.

Dicranum Bonjeani De Not. Avalanche Basin. Also by Harris at McDonald Lake in the Mission Mountains, and by Jones at foot of MacDougal Peak, Bigfork and Yellow Bay. Alta and McDonald Lake in the Mission Mountains.

Dicranum fragilifolium Lindb. Holzinger Basin, Mt. Trilby. Also by Harris at Mud Creek and McDonald Lake in the Mission Mountains, and by Jones at Bigfork and Somers.

Dicranum falcatum Hedw. Avalanche Basin, Sperry Glacier, Holzinger Basin.

Dicranum fuscescens Turn. Mt. Stanton and Mt. Trilby. Also at Bigfork (Jones).

Dicranum fuscescens var. *Eatonii* Ren. & Card. Base of Sperry Glacier.

Dicranum fuscescens Turn. a form approaching *D. trachyphyllum* Ren. & Card. Mts. Stanton and Trilby.

Dicranum Howellii Ren. & Card. Mt. Trilby.

Dicranum longifolium Hedw. Avalanche Trail. McCrimmin Falls.

Dicranum neglectum Juratz. McCrimmin Falls at the north end of Lake McDonald, and along the trail to the river.

Dicranum scopariiforme Kindb. Mt. Trilby, Avalanche Basin.

Dicranum scoparium Hedw. Avalanche Basin.

Dicranum Starkei Web. & Mohr. Holzinger Basin and from there to the Rim and Sperry Glacier.

Dicranum strictum Schleich. O'Keefe canon, Harris. Also Bigfork and Somers, Jones. Lake McDonald and Swan Lake (Jones).

Dicranella squarrosa (Schrader) W. P. Sch (Fide Dr. Best). Blackfoot Glacier (Jones).

Fissidens bryoides var. *gynandrus* (Buse) R. Ruthe. Shores of Lake McDonald and Avalanche trail, Sperry Glacier region.

Ceratodon purpureus (L.) Brid. Common everywhere in Sperry Glacier region. Mud Creek, Harris; Bigfork and Belton (Jones).

Distichium capillaceum B. S. Mts. Stanton and Trilby. McDonald Peak in the Mission Mountains, Big fork and Sperry Glacier (Jones). Subalpine (Jones).

Barbula ruralis Hedw. a form. Mts. Stanton and Trilby. O'Keefe canon and McDonald Lake in the Mission Mountains (Harris).

Barbula Mulleri (Br.) B. S. Wild Horse, Bigfork, Alta and Somers (Jones).

Schistidium alpicola (Sw.) Limpr. Mts. Stanton and Trilby.

Barbula aciphylla B. S. Base of Sperry Glacier.

Barbula rufipila Card. & Ther. Bot. Gaz. 29 123 (1900). Avalanche Basin and Holzinger Basin.

Barbula ruralis Hedw. (?) Sperry Glacier (Jones).

Scouleria aquatica Hook. In the Creek through Holzinger Basin, Avalanche Creek.

Schistidium alpicola (Sw.) Limpr. Mts. Stanton and Trilby.

Schistidium confertum (Funck) B. S. Base of Sperry Glacier.

Schistidium gracile (Schleich.) Limpr. Holzinger Basin and Mts. Stanton and Trilby.

Schistidium alpicola var. *rivulare* (Brid.) Wahl. Avalanche Basin, near the Rim at the base of Sperry Glacier.

Grimmia alpestris Schleich. Holzinger Basin, Avalanche Basin, Sperry Glacier.

Grimmia commutata Hub. Mts. Stanton and Trilby.

Grimmia Doniana Sm. Mts. Stanton and Trilby.

Grimmia Holzingeri Card. & Ther. Bot. Gaz. 29 123 (1900). Base of Sperry Glacier and Mt. Trilby.

Grimmia mollis B. S. Base of Sperry Glacier.

Grimmia subsulcata Limpr. in Rabenh. Crypt. Fl. Laubm. 757. Mt. Trilby.

Grimmia montana B. S. Bigfork, Harris; Wild Horse Island (Jones).

Grimmia calyptrata Hook. Missoula (Harris).

Grimmia tenerrima Ren. & Card. Mt. Trilby, Sperry Glacier, Avalanche Basin.

Grimmia torquata Grev. Mts. Stanton and Trilby.

Grimmia sphaerica Sch. Sperry Glacier (Jones).

Racomitrium canescens Brid. Mts. Stanton and Trilby. Bigfork (Harris).

Racomitrium canescens var. *ericoides* Brid. Holzinger Basin.

Racomitrium heterostichum Brid. Holzinger Basin.

Racomitrium aciculare Brid. Sperry Glacier.

Racomitrium patens Hub. Holzinger Basin.

Racomitrium Sudeticum B. S. Holzinger Basin. Sperry Glacier, McDonald Peak at 5500° alt. (Jones).

Encalypta contorta (Wulf.) Lindb. McDonald Peak at 5500° alt. (Jones).

Encalypta Macounii Aust. McDonald Lake in the Mission Mountains (Harris).

Encalypta rhabdocarpa Schwaegr. Bigfork (Jones).

Hedwigia ciliata (Dicks) Ehrh. Mts. Stanton and Trilby. Bigfork (Jones).

- Orthotrichum obtusifolium* Schrad. On Cottonwoods along Avalanche Trail.
- Orthotrichum Schlotthaueri* Vent. Mts. Stanton and Trilby.
- Orthotrichum speciosum* Nees. Shores of Lake McDonald, Sperry Glacier region. Lake McDonald in the Mission Mountains (Harris). Alta (Jones).
- Orthotrichum Kingeanum* Lesq. Wild Horse Island (Jones).
- Orthotrichum rupestre* Schleich. McDonald Lake in the Mission Mountains (Harris).
- Orthotrichum affine* Schrad. Sperry Glacier (Jones).
- Orthotrichum speciosum* Nees. (Fide Dr. Best). Sperry Glacier and Swan Lake (Jones).
- Orthothecium chryseum* Sch. Sperry Glacier (Jones).
- Amphidium Californicum* L. & J. Mt. Stanton.
- Amphidium Papponicum* Sch. Base of Sperry Glacier, Mt. Trilby.
- Amphidium Mougeottii* Sch. On trail from Holzinger Basin to the Rim.
- Tetraphis pellucida* Hedw. Avalanche Basin and Trail. Bigfork, Yellow Bay and Somers (Jones).
- Splachnum luteum* L. Bigfork (Jones).
- Schistotega osmundacea* Web. & Mohr. Trail to Holzinger Basin.
- Tayloria serrata* B. S. Avalanche Basin.
- Funaria hygrometrica* (L.) Hedw. Shores of Lake McDonald near McCrimmin Falls. Bigfork and Sperry Glacier (Jones).
- Bartramia ithyphylla* Brid. Mt. Trilby.
- Bartramia Oederi* (Gunn.) Schwaegr. Bigfork and McDonald Peak (Jones).
- Bartramia pomiformis* Hedw. Holzinger Basin. Bigfork (Jones).
- Conostomum boreale* Sm. Base of Sperry Glacier.
- Philonotis fontana* var. *pumila* (Turn.) Dix. Mt. Trilby, Avalanche Basin.
- Philonotis fontana* Brid. a form heterophylla. On the way to the Rim. A plant from Mt. Edwards near the Rim Mr. Dixon determined as an alpine form of *P. fontana* approaching *P. adpressa* Fergus.
- Philonotis fontana* var. *alpine* Brd. Blackfoot Glacier (Jones).
- Philonotis seriata* Mitt. Sperry Glacier.
- Philonotis glabriuscula* Kindb. Sperry Glacier (Jones).
- Webera albicans* Sch. a form. Base of Sperry Glacier. Blackfoot Glacier (Jones).
- Webera carinata* (Brid.) (W. cucullata var. *carinata* Hurnot). New to North America. Base of Sperry Glacier.
- Webera commutata* Sch. This approaches close to *Bryum filum* Sch. which is only a form of *W. commutata* according to Carnot. Base of Sperry Glacier.
- Webera crudis* (L.) Sch. Avalanche Basin where it is quite abundant. Bigfork, Blackfoot Glacier and Lamber Valley (Jones).
- Webera nutans* Hedw. Holzinger Basin and Trail, Mt. Trilby, Avalanche Trail. Also O'Keefe canon (Harris) and Sinyaleamin Lake, Sperry Glacier (Jones).
- Leptobryum pyriforme* Sch. O'Keefe canon (Harris). Sperry Glacier (Jones).
- Bryum alpinum* var. *denticulatum* Card. & Ther. Bot. Gaz. 29 123 (1900). On the way from Holzinger Basin to the Rim.
- Bryum pallescens* Schleich. Mts. Stanton and Trilby.
- Bryum pallens* Sw. (*B. distantifolium* R. & C.). (Fide Dr. Best). Swan Lake and Sperry Glacier (Jones).
- Bryum lucidum* Britton. Shores of Lake McDonald, Sperry Glacier region, near the lower end.
- Bryum Duvalli* Voit. On the trail to the Rim on Mt. Edwards.
- Bryum barbatum* Wils. The same (?) as *B. Stertoni* Sch. Plants very close to this species but not fully agreeing with it. Base of Sperry Glacier.

Bryum Atwateriae C. Mull. The plants distributed as this species do not fully agree with it and may prove distinct. Mts. Stanton and Trilby.

Bryum caespitium L. Bigfork (Jones).

Bryum cirrhatum H. & H. Sperry Glacier (Jones).

Bryum purpurascens B. S. Sperry Glacier (Jones).

Bryum Duvalii var. *latodecurrans* C. M. et Kindb. Swan Lake (Jones).

Bryum three species too old for determination. Bigfork and Swan Lake (Jones).

Meesia Albertini B. S. (Fide Dr. Best). Blackfoot Glacier (Jones).

Mnium nudum Williams. Avalanche Basin.

Mnium punctatum var. *elatum* B. S. Avalanche Basin. McDonald Lake in the Mission Mountains (Harris).

Mnium spinulosum B. S. Avalanche Basin, McDonald Lake in the Mission Mountains (Harris), Bigfork, MacDougal Peak, Lake McDonald and Swan Lake (Jones).

Mnium venustum Mitt. Mts. Trilby and Stanton. The plants appear to be dioecious. McDonald Lake in the Mission Mountains (Harris).

Mnium insigne Mitt. McDonald Lake in the Mission Mountains (Harris).

Mnium orthorhynchum B. S. McDonald Lake in the Mission Mountains (Harris), Lake McDonald (Jones).

Mnium affina Bland. McDonald Lake in the Mission Mountains (Harris), Somers (Jones).

Mnium Blyttii B. S. Sperry Glacier (Jones).

Aulacomnium palustre Schew. Holzinger Basin.

Aulacomnium androgynum Schw. Holzinger Basin, Mt. Trilby. McDonald Lake in the Mission Mountains (Harris), Bigfork, Alta and Browning (Jones).

Timmia austriaca Hedw. Holzinger Basin.

Timmia austriaca var. *brevifolia* Ren. & Card. Trail to Holzinger Basin.

Timmia megapolitana Hedw. Mud Creek and McDonald Lake in the Mission Mountains (Harris).

Catharinaea Selwyni (Aust.) Kindb. Avalanche Trail, O'Keefe canon (Harris), Bigfork (Jones).

Tortula ruralis Ehrh. O'Keefe canon and McDonald Lake in the Mission Mountains (Harris).

Pogonatum alpinum Roehl. Avalanche Basin below Little Matterhorn.

Pogonatum alpinum var. *arcticum* Brd. Blackfoot and Sperry Glaciers and McDonald Lake, Mission Mts. (Jones).

Pogonatum alpinum var. *simplex* Sch. Sperry Glacier (Jones).

Pogonatum alpinum Roehl. (?) Forms with nearly entire leaves. Sperry Glacier (Jones).

Polytrichum juniperinum (Hedw.) Willd. Avalanche Basin, (Also Umbach), Bigfork, Alta, Belton, Blackfoot Glacier, Lake McDonald, McDonald Lake in the Mission Mountains (Jones).

Polytrichum angustidens Lindb. fil. (See Bryologist for March, 1905, Vol. 8, p. 30. Note). Leaf section and calyptra are distinctive for this species. The author did not refer to the calyptra, the type specimens, collected by Dr. Sandberg in Idaho in 1891, being old. These specimens of Jones show the calyptra very short, covering hardly more than the operculum an important additional character.—J. M. H. MacDougal Peak, alpine (Jones).

Polytrichum piliferum Schreb. Base of Sperry Glacier, Mt. Trilby, Holzinger Basin. O'Keefe canyon (Harris).

Polytrichum sexangulare Floerke. Base of Sperry Glacier. Blackfoot Glacier (Jones).

Polytrichum strictum Menz. Base of Sperry Glacier. (Also Umbach). Sperry Glacier and McDonald Lake in the Mission Mountains (Jones).

Polytrichum formosum Hedw. Alta (Jones).

Neckera Menziesii Hook. Mts. Stanton and Trilby and McCrimmin Falls. Bigfork (Jones).

Neckera Douglasii Hook. McDonald Lake in the Mission Mountains (Harris).

Climacium Americanum Bird. Bigfork and Lake McDonald (Jones).

Climacium dendroideum (L.) Web. & Mohr. McDonald Lake in the Mission Mountains (Harris), Bigfork, Swan Lake and Mission Creek (Jones).

Fontinalis antiphyretica L. alpine form. Avalanche Trail, Mud Creek (Harris), Hot Springs (Jones).

Dichelyma uncinatum Mitt. Trail to Mt. Stanton.

Pterigynandrum filiforme Hedw. Mts. Stanton and Trilby, Avalanche Trail. Bigfork and McDonald Lake in the Mission Mountains (Jones).

Homalothecium Nevadaense Ren. & Cardot. Mts. Stanton and Trilby.

Homalothecium Nevadaense var. *subulatum* Ren. & Cardot. Mt. Trilby.

Pseudoleskea radicata (Mitt.) Lesq. & James. Trail to Holzinger Basin.

Pseudoleskea rigescens Lindb. Holzinger Basin, Mt. Trilby.

Pseudoleskea denudata var. *Holzingeri* Best, in Torr. Bull. 27 229 (1900). Avalanche Basin, Holzinger Basin, Mt. Trilby.

Pseudoleskea atricha Kindb. (Fide Dr. Best). Blackfoot Glacier, Sperry Glacier (Jones).

Pseudoleskea congesta (Wils.) Bry. Eur. (Fide Dr. Best). Blackfoot Glacier (Jones).

Pseudoleskea atrovirens Sch. Blackfoot Glacier (Jones).

Heterocladium procurrens L. & J. Mt. Stanton and Mt. Trilby.

Claopodium Bolanderi Best. Mts. Stanton and Trilby.

Camptothecium lutescens (Huds.) B. S. Bigfork and Wild Horse Island and Alta (Jones).

Camptothecium aeneum (Mitt.) Jacq. Old Stage Station on east side of Flathead Lake on *Pinus ponderosa* (Harris).

Camptothecium Nuttallii Sch. Alta.

Brachythecium collinum B. S. Mts. Stanton and Trilby.

Brachythecium Leibergii Grout. Holzinger Basin.

Brachythecium rivulare Sch. Avalanche Basin.

Brachythecium salebrosum Sch. Avalanche Basin.

Brachythecium Starkei Sch. Holzinger Basin.

Brachythecium rutabulum var. *flavescens* (Brid.) B. S. Bigfork (Jones). Det. by Dr. J. Grout.

Eurhynchium strigosum B. S. McDonald Lake in the Mission Mountains (Harris). Lake McDonald (Jones).

Eurhynchium strigosum var. *fallax* Ren. & Cardot. Common on trail to Holzinger Basin.

Thamnum Neckeroides Sch. Trail to Holzinger Basin.

Plagiothecium denticulatum Sch. Holzinger Basin, Mt. Trilby.

Plagiothecium denticulatum var. *microcarpum* Ren. & Card. Avalanche Basin and Trail.

Plagiothecium filiferum Sch. Holzinger Basin, Mt. Trilby, Avalanche Trail.

Plagiothecium olegans Sch. McDonald Lake in the Mission Mountains (Harris).

Plagiothecium sylvaticum Sch., ? Holzinger Basin, Avalanche Trail.

Plagiothecium Sullivantii Sch. Lake McDonald (Jones).

Plagiothecium Millerianum Sch. Lake McDonald (Jones).

Plagiothecium Millerianum Hook. f. (Fide Dr. Best). Lake McDonald (Jones).

Amblystegium varium (Hedw.) Lindb. Mud Creek (Harris), Bigfork (Jones).

Amblystegium varium var. *orthocladon* (L. & J.) form *alpinum*. Base of Sperry Glacier. (This has been published as new, A. Montanum Bryhn Bryologist, March, 1902, p. 26).

Amblystegium serpens (Hedw.) B. S. Bigfork (Jones).

Hypnum aduncum Hedw. Bigfork and Sperry Glacier (Jones).

Hypnum aduncum group *Kneiffii*. Base of Sperry Glacier.

Hypnum Bestii Ren. & Bryhn in Bryologist Jan. 1901 p. 112, also April 1901 p. 21, 22. In water, along Avalanche Trail.

Hypnum Cardoti Ther. in Bot. Gaz. Aug. 1900 Vol. 29 p. 124. Avalanche Basin.

Hypnum fluitans L. Daphnia Lake (Harris, also Jones), Sperry Glacier (Jones).

Hypnum fluitans var. *brachydictyon* Ren. in Hurnot Mus. Gall. form Holzingeri Ren. in Bot. Gaz. Aug. 1900 Vol. 29 p. 124. Base of Sperry Glacier.

Hypnum callichroum Brid. Yellow Bay (Jones).

Hypnum giganteum Sch. Mud Creek (Harris), Polson Swamp (Jones).

Hypnum molle Dicks. In water along trail to Holzinger Basin, base of Sperry Glacier.

Hypnum molle var. *Schimperianum* Lortz. In water near the top of Mt. Trilby.

Hypnum ochraceum Turn. Holzinger Basin.

Hypnum ochraceum form *tenue*. On the way to the Rim at the base of Sperry Glacier.

Hypnum ochraceum var. *uncinatum* Milde. A European moss new to North America. Holzinger Basin.

Hypnum subimponens Lesq. Bigfork (Jones).

Hypnum hamulosum B. S. Bigfork (Jones).

Hypnum polygamum Wils. Bigfork and Somers (Jones).

Hypnum reptile Mx. Bigfork (Jones).

Hypnum uncinatum Hedw. Holzinger Basin and Trail, Mt. Trilby, McDonald Lake in the Mission Mountains (Harris), Somers (Jones).

Hypnum uncinatum form *plumosum*. Mt. Trilby.

Hypnum uncinatum var. *subjulaceum* Sch. form Holzingeri Ren. in Bot. Gaz. 29 p. 125 (1900). Base of Sperry Glacier.

Hypnum uncinatum var. *plumulosum* B. S. Bigfork (Jones).

Hypnum cuspidatum L. Mud Creek (Harris).

Hypnum Schreberi Willd. Holzinger Basin. Somers, Yellow Bay and Bigfork (Jones).

Hypnum stellatum var. *protensum* Sch. Avalanche Basin.

Hypnum symmetricum Ren. & Card. McCrimmin Falls at upper end of McDonald Lake, Sperry Glacier region.

Hypnum crista-castrensis L. Bigfork and Lake McDonald (Jones).

Hypnum circinale Hook. McDonald Lake Mission Mts. (Jones).

Hypnum filicinum. Blackfoot Glacier (Jones).

Hypnum pratense Koch. Sperry Glacier (Jones).

Hylacomium proliferum (L.) Lindb. Avalanche Trail, McDonald Lake in the Mission Mountains (Harris), Yellow Bay (Jones).

Hylacomium robustum Kindb. Shores of Lake McDonald, Sperry Glacier region, Bigfork and McDonald Lake in the Mission Mountains (Jones).

Hylacomium apendens Sch. Avalanche Trail. Lake McDonald (Jones).

Hylacomium squarrosum Sch. Avalanche Basin.

Hylacomium triquetrum Sch. Avalanche Basin, Yellow Bay and Bigfork, Belton and Lake McDonald (Jones).

Limnobium bestii Ren. & Bryhn. Blackfoot Glacier (Jones).

"*Dicranoweisia subcompacta* Card. et. Ther., sp. nova.—Dense pulvinato-caespitosa. Caulis simplex vel parcissime ramosus, 6-8 mm. altus dense foliosus. Folia madida suberecta, sicca crispata, 1-1.5 mm longa, oblongo lanceolata, acuminata, subacuta vel obtusiuscula, superne, canaliculata, nervo basi attenuato usque ad apicem producto vel paululum infra evanido, marginibus inferne planis, superne inflexis, integerrimis, cellulis, irregulariter quadratis vel subrectangularibus, inferioribus laxioribus, juxta costam linearibus, alaribus distinctis, subinflatis, fuscis. Caetera ignota.

"Very nearly allied to the European *D. compacta* (Sch.), from which it differs by the leaves being more narrowly acuminate and generally subacute, the cells of the areolation larger and with thinner walls, and chiefly by the costa

narrower, attenuate below (16 to 25 u broad; it is 55 u in *D. compacta*). Along the trail from Holzinger's Basin to the Rim.

"*Barbula rufipila* Card. et Ther., sp. nova.— *B. aciphyllae* habitu et foliorum forma omnino similis, differt tantum cellulis duplo majoribus et plicae saepius minus denticulata interdum integro. Specimina sterilia magis distinctis (superioribus 20-30 u in *B. rufipila*, 12-15 u in *B. aciphylla*) Avalanche Basin, Holzinger's Basin.

"*Fissidens bryoides gymnandrus* (Buse) R. Ruthe. New to North America. Cardot det. Shores of Lake McDonald, Avalanche Trail.

"*Grimmia Holzingeri* Card. et Ther., sp. nova. Minima, tenella, pulvinatula, obscure viridis, inferne fusca. Caulis erectus, 4-6 mm. altus, parce ramosus, ramis interdum attenuatis, subflagellaceis. Folia conferta, minima, 0.50-0.70 mm. longa, 0.20-0.35 lata, madida erecta, sicca appressa, breviter ovato-oblonga, concava, omnia mutica obtuse acuminata, marginibus planis integris, costa canaliculata, usque ad apicem producta, basi 28 u lata, cellulis superioribus bistratis, quadrato-subrotundatis; inferioribus unisthatis majoribus, lutescentibus, infimis oblongis vel sublinearibus, omnibus incrassatis. Caetera ignota. This very minute species, resembling in habit the small form of *Andreaea jetrophila*, is quite distinct from all the European and North American species of *Grimmia* with muticous leaves by the small size, and the shape and areolation of the leaves. Base of Sperry Glacier, Mt. Trilby.

"*Grimmia mollis* B. S. This European alpine moss is reported from Greenland, and should be found at intermediate stations in Canada. Base of Sperry Glacier. No. 17.

"*Grimmia subsulcata* Limpr. in Rabenh. Cryptog. Fl., Laubm., 747. New to North America. Cardot det. Mt. Trilby.

"*Webera carinata* (Brid.) (W. cuclata carinata) Husnot; *Bryum naviculare* Cardot. New to North America. Cardot det. Base of Sperry Glacier.

Bryum alpinum L., var. *denticulatum* Card. et Ther., n. var. A forme typica differt habitu graciliore, foliis ovato-acuminatis, brevioribus, marginibus parum revolutis, superne distincte sinuato-denticulatis, costaque longe ab apice dissoluta. On the way from Holzinger's Basin to the Rim.

"*Pseudoleskea radicata* (Müll.) Lesq. & James. This species was distributed as *P. regiscens* Lindb.: it is the *P. atrovirens* of European authors. Best det. Holzinger's Basin; Mt. Trilby. No. 46.

"*Pseudoleskea denudata Holzingeri* Best. in Bull. Torr. Bot. Club 27:229, May 1900. Holzinger's Basin, Mt. Trilby, Avalanche Basin.

"*Hypnum Cardoti* Ther., sp. nova. Polygamum, olivaceo-viride, molle, laxiuscule depresso-caespitosum. Caulis procumbens vel ascendens, irregulariter ramosus, 2-4 cm. longus. Folia remotiuscula, patulosquarrosa, interdum subsecunda, e basi constricta anguste decurrente late ovate-deltoides, subito in acumen angustum breviusculum recurvum protracta, circa 1.5 mm. longa et 0.75 lata, marginibus planis fere undique sinuato-denticulatis, costa simplici-bifurcata vel gemella, crure longiore ad medium producto, cellulis laxiusculis linearibus subflexuosis, basilaribus brevioribus et latioribus, alaribus laxis majoribus subhyalinis. Folia perichaetialia externa ovato-lanceolata, breviter acuminata, subintegra, enervia, intima plicata, costata. Capsula in pedicello rubente valde flexuoso, circa 18 mm. longo, subhorizontalis, arcuata, operculo convexo apiculato. This species is near *H. stellatum* Schreb. and *H. polygamum* Sch. From the first it is at once distinguished by the polygamous inflorescence and the softer leaves with a shorter acumen and a looser areolation. The shape of the stem leaves and of the perichaetial leaves distinguishes it from the small forms of the second species. Avalanche Basin.

"*Hypnum fluitans* L., var. *brachydictyon* Ren. in Husnot Musc. Gall., forma *Holzingeri* Ren. Voisin de la var. *brachydictyon* Renaud., n'en diffère que par le port plus grele, la nervure plus étroite, et le tissu délicat. Dioiquell. Cette var., essentiellement alpine, n'avait pas encore, je crois, été signalée

en Amerique. A cause de la brievete des cellules medianes, on pourrait confondre cette forme avec *Hypnum aduncum* Hedw.; mais le passage brusque des cellules foliaires de la base aux cellules superficielles de la tige permet d'eviter la confusion. Base of Sperry Glacier.

"*Hypnum ochraceum uncinatum* Milde. A European alpine moss, new to North America. Renauld det. Holzinger's Basin.

"*Hypnum uncinatum* Hedw., var. *subjulaceum* Sch., forma *Holzingeri* Ren. Forme voisine de la forme *orthothecioides* Lindb.; en differe par la couleur verte, les touffes compactes encombrees de terre a la base, l'acumen plus court denticule et le tissu plus delicat, non paise. Base of Sperry Glacier.

Minor extensions of range will be noted in a fuller report on this collection."—John M. Holzinger, Winona, Minn. Bot. Gaz., Aug., 1900, pp. 122-125.

HEPATICAЕ, LIVERWORTS.

This list is furnished by J. M. Holzinger of the Minnesota State Normal. Determined by Dr. A. W. Evans.

Asterella gracilis (Web.) Underwood. Sperry Glacier (Jones).

Anthelia julacea (Lightf.) Spruce. Sperry Glacier (Jones).

Blepharostoma trichophyllum (L.) Dumort. Holzinger Basin and Mt. Trilby.

Cephalozia bicuspidata (L.) Dumort. Shores of Lake McDonald, Sperry Glacier region.

Cephalozia media Lindb. Shores of Lake McDonald and Sperry Glacier region.

Chiloschypus polyanthos (L.) Corda. Mostly the var. *rivularis* Neck. Holzinger Basin and Lake McDonald, Sperry Glacier region.

Gymnomitrium obtusum (Lindb.) Pearson. This species has been reported from Greenland only in America. Mt. Trilby.

Harpanthus flutonianus Nees. A few stems only were found mixed with *Scaphania undulata*. Holzinger Basin.

Jungermannia barbata Schreb. Shores of Lake McDonald, Sperry Glacier region.

Jungermannia Floerkei Web. & Mohr. Holzinger Basin.

Jungermannia lycopodioides Wallr. Holzinger Basin and Avalanche Basin.

Jungermannia ventricosa Dicks. Very variable and common throughout the Sperry Glacier region.

Jungermannia cordifolia Hook. Blackfoot Glacier (Jones).

Lepidozia reptans (L.) Dum. Shores of Lake McDonald and Mt. Trilby.

Marsupella sphacelata (Gieske) Dum. Shores of Lake McDonald, Sperry Glacier region.

Metzgeria pubescens (Schrank) Raddi. Avalanche Basin, Holzinger Basin and Lake McDonald.

Porella rivularis (Nees) Trevis. Avalanche Basin, Mt. Trilby and shores of Lake McDonald. Also Bigfork (Jones).

Ptilidium ciliare (L.) Nees. Common at all stations.

Ptilidium Californicum (Aust.) Pearson. Mt. Trilby the easternmost station of the species.

Radula complanata (L.) Dumort. Avalanche Basin, Holzinger Basin, and shores of Lake McDonald.

Scapania nemorosa (L.) Dumort. Shores of Lake McDonald, Sperry Glacier region.

Scapania undulata (L.) Dumort. Holzinger Basin and shores of Lake McDonald.

Marchantia polymorpha L. Belton (Jones).

Pleuroclada albescens (Nees) Spruce. Sperry Glacier (Jones).

In addition to the Hepaticae given above there were found specimens of a sterile *Anthelia*, and of a sterile *Nardia* or *Aplozia*.

LICHENS.

During the past season no attempt was made to collect lichens, though a few were picked up here and there. The following list is taken mostly from Bulletin No. 19 Biological Series No. 7 of the University, published by Wilson P. Harris and Carolyn W. Harris, as a result of botanizing in this region in 1901, mostly, together with other species collected by Prof. M. J. Elrod. Plants of the Middle Temperate life zones if not otherwise stated.

- Acolium tympanellum* (Ach.) De Not. Bigfork, Rost and Echo Lakes.
Alectoria jubata (L.) 9815 Jones. Swan Lake.
Alectoria jubata var. *chalybeiformis* Ach. O'Keefe canon.
Alectoria ochroleuca (Ehrh.) var. *rigida* Fr. O'Keefe canon.
Alectoria ochroleuca var. *sarmentosa* Nyl. Rost Lake, Sinyaleamin Lake.
 Craig Mt. where it is subalpine. MacDougal Peak Elrod, Jones also.
Alectoria Fremontii Tuck. Sinyaleamin Lake, Missoula (Elrod). This is the common black moss, which is particularly abundant on forests at high elevation.
Baeomyces aeruginosus (Scop.) DC. Wolf Creek and Craig Mt. The latter alpine.
Biatora Paddensis Tuck. O'Keefe canon and Rost Lake.
Biatora decipiens (Ehrh.) Fr. Mission Mts.
Biatora rufonigra Tuck. Silloway Peak, alpine.
Buellia petraea (Flot. Koerb) Tuck. var. *Montagnoei* Tuck. On rocks. Missoula (Elrod).
Buellia geographica (L.) Tuck. McDonald Lake in the Mission Mountains.
Buellia oidalea Tuck. Rost Lake.
Calicium quercinum Pers. Echo Lake.
Cetraria platyphylla Tuck. O'Keefe canon, Sinyaleamin Lake, Lolo Hot Springs (Elrod). First two localities Middle Temperate.
Cetraria ciliaris (Ach.) Tuck. Lolo Hot Springs (Elrod).
Cetraria glauca (L.) Ach. O'Keefe canon, McDonald Lake in the Mission Mountains, Mud Creek, Swan Lake, Sinyaleamin Lake. Also Lolo Hot Springs (Elrod), (9817 Jones) Swan Lake.
Cetraria Juniperina (L.) Ach. Sinyaleamin Lake, Swan Lake. Also Lolo Hot Springs (Elrod).
Cladonia amaurocraea (L.) Schaer. McDonald Lake Mission Mountains.
Cladonia caespiticia (Pers.) Fl. Silloway Peak, alpine.
Cladonia amaurocraea (L.) Schaer. McDonald Lake Mission Mountanns.
Cladonia crispata var. *infundibulifera* (Schaer.) Wahl. McDonald Lake in Mission Mountains.
Cladonia coccifera var. *pleurota* (Flk.) Willd. McDonald Lake, Mission Mts.
Cladonia cornuta (L.) Fr. McDonald Lake, Mission Mountains.
Cladonia deformis (L.) Hoffm. Sinyaleamin Lake.
Cladonia digitata (L.) Hoffm. Flathead Lake.
Cladonia fimbriata (L.) Fr. Flathead Lake and Lolo Hot Springs (Elrod) on decaying logs. Swan Lake, Jones.
Cladonia fimbriata var. *radiata* Fr. Missoula (Elrod).
Cladonia fimbriata var. *tubaeformis* Mud Creek.
Cladonia gracilis var. *verticillata* Fr. Sinyaleamin Lake.
Cladonia gracilis var. *symphyrcarpia* Tuck. Sinyaleamin Lake, McDonald Lake, Mission Mountains. Also Missoula (Elrod).
Cladonia gracilescens (Rab.) Walmo. Rare in N. A.
Cladonia pyxidata (L.) Fr. State Station on Flathead Lake eastern side Bigfork, McDonald Lake. Also Flathead Lake and Missoula (Elrod). Sperry Glacier, Lake McDonald, Jones.
Cladonia turgida var. *conspicua* (Schaer) Nyl. Lolo Hot Springs (Elrod).
Cladonia rangifera var. *sylvatica* L. Sinyaleamin Lake, and McDonald Lake. Also Flathead Lake (Elrod).
Cladonia sylvatica (L.) Hoffm. McDonald Lake in the Mission Mountains, Jones.

- Endocarpon miniatum* Ach. Sentinel Mt.
Evernia vulpina (L.) Ach. Sentinel Mt. and Sinyaleamin Lake. Also Flathead Lake (Elrod). This is a very common and beautiful yellow lichen. Also (7911 Jones) MacDougal Peak, subalpine.
Lecanora atrata (Huds.) Ach. Flathead Lake and Rost Lake.
Lecanora cervina var. *cinerevella* Fink. Craig Mountain. Alpine.
Lecanora pallescens (L.) Ach. Missoula, growing on mosses.
Lecanora chlorophana (Wahl.) Ach. Craig Mountain. Alpine.
Lecanora punicea Ach. Rost Lake.
Lecanora rubina (Vill.) Ach. Mt. Sentinel. Also Missoula (Elrod).
Lecanora subfusca (L.) Ach. Flathead Lake and Post Creek.
Lecanora xanthophana var. *dealbata* Tuck. Craig Mountain. Alpine.
Leptogium sp. Missoula (Elrod).
Parmelia conspersa (Ehrh.) Ach. Post Creek and McDonald Lake in the Mission Mountains. Also Missoula (Elrod).
Parmelia olivacea (L.) Ach. Mt. Sentinel, St. Ignatius Mission and Post Creek.
Parmelia physodes (L.) Ach. Lolo Hot Springs (Elrod).
Parmelia physodes var. *vittata* Ach. Mt. Sentinel, Sinyaleamin Lake. Also Lolo Hot Springs (Elrod).
Parmelia physodes var. *enteromorpha* Tuck. Lolo Hot Springs (Elrod).
Parmelia saxatilis (L.) Fr. Sinyaleamin Lake. Also Flathead Lake (Elrod).
Parmelia saxatilis var. *sulcata* Nyl. O'Keefe canon and McDonald Lake. Also Lolo Hot Springs (Elrod).
Peltigera aphthosa (L.) Hoffm. Sinyaleamin Lake. Also Missoula, Lolo Hot Springs and Flathead Lake (Elrod). Also (7914 Jones) Bigfork.
Peltigera canina (L.) Hoffm. Sinyaleamin Lake, O'Keefe canon and McDonald Lake in the Mission Mountains. Also Flathead Lake and Missoula (Elrod). Alta.
Peltigera venosa (L.) Hoffm. Bigfork.
Placodium elegans (Link) De. McDonald Lake. Also Missoula and Elrod Peak (Elrod). Sperry Glacier, Jones.
Physcia stellaris (L.) Tuck. St. Ignatius Mission.
Physcia stellaris var. *aipolia* Nyl. Flathead Lake.
Rinodina oreina (Ach.) Mass. Missoula (Elrod).
Ramalina calicaris var. *fastigiata* Flathead Lake.
Solorina crocea (L.) Sch. Sperry Glacier, Jones.
Stereocaulum alpinum Th. Fr. Sperry Glacier. Rare in North America. Jones.
Sticta pulmonaris (L.) Ach. Mud Creek and McDonald Lake in the Mission Mountains.
Theloschistes Lychnens (Nyl.) Tuck. Bigfork. Also Missoula (Elrod).
Umbilicaria hyperborea Hoffm. McDonald Lake, Mission Mts.
Umbilicaria phaea Tuck. McDonald Lake, Mission Mts.
Umbilicaria vellea (L.) Nyl. McDonald Lake, Mission Mountains. Also Lolo Hot Springs (Elrod).
Usnea barbata (L.) Fr. Mt. Sentinel and Mud Creek. Also Flathead Lake (Elrod).
Usnea barbata var. *hirta* Mt. Sentinel
Usnea cavernosa Tuck. McDonald Lake, Mission Mts.
 All my species of lichens have been identified by Prof. Bruce Fink, and are given as collected by myself. Those without collectors' names, were gathered by Harris

ALGAE.

- Ricciocarpus natans*. Jeff's Cabin, Swan River, Jones. Identified by Prof. Setchell.

FUNGI.

So far as can be learned there have been but two attempts to collect the fungi on living leaves in our region. No attempt having been made so far to get the immense number growing on dead stems and the ground. A few of these have been picked up incidentally only.

Prin. T. A. Bonser now of the Spokane High School, seems to have made the first collections during his work at the Biological Station. His plants were identified by Prof. Farlow. His list covers 50 species and is embraced in this report.

During the past season I attempted to get all the Fungi on living leaves in the Flathead region. Some were missed doubtless but most of them were found. My list embraces considerably over 100 species. All my plants were identified by Chas. Peck, Esq., of Albany, New York, and Prof. J. C. Arthur of Purdue University, the latter identifications being rusts mostly.

In the descriptions of dimensions of spores "m" stands for thousands of a millimeter (in the absence of the proper sign).

Actinomena Rosae (Li.) Fr. On *Rosa gymnocarpa*. Dayton.

Aecidium abundans Peck. On *Symphoricarpos oreophilus*. Lima.

Aecidium Alleni Clint. On *Shepherdia Canadensis*. Wild Horse Island. Also on the same host by Bonser in Swan river valley. On *Elaeagnus argenteus* near Dayton. It is very rarely found on this host.

Aecidium Berberidis Pers. Wild Horse Island and Yellow Bay. On *Berberis repens*.

Aecidium Ranunculacearum DC. On *Ranunculus glaberrimus*. Lima.

Aecidium Thalictri Grev. On *Thalictrum occidentale*. MacDougal Peak (Bonser). Also by Jones on MacDougal Peak.

Aecidium cornutum. On *Amelanchier alnifolia*. Bigfork (Bonser).

Aecidium cornutum. On *Amelanchier alnifolia*. Bigfork (Bonser).

Agyrium elongatum (E. & E.). On dead stems of *Valeriana*, MacDougal Peak (Bonser).

Albugo candida (Pers.) Kuntze. On *Capsella Bursa-pastoris*. Bigfork.

Albugo Bliti (Biv.) Kuntze. On *Amarantus blitoides*. Bigfork.

Albugo. On *Pentstemon confertus*. Whitewater.

Ascochyta colorata Peck. On *Fragaria vesca*. Bigfork.

Caeoma. On *Rubus Nutkana*. Bigfork (Bonser).

Calyptospora columnaris (A. & S.) Kuhn. On *Vaccinium Myrtillus* var. *microphyllum* MacDougal Peak. Alpine.

Cronartium Comandrae Peck. On *Comandra pallida* at Wild Horse Island and Yellow Bay. Also by Elrod.

Chrysomixa Pyrolae (DC.) Rostr. On *Pyrola rotundifolia*. Swan river valley (Bonser).

Coleosporium Asteris. On *Aster*. Swan river valley (Bonser).

Coleosporium Solidaginis (Schw.) Thun. Probably includes *C. Asteris*. On *Aster* leaves at Wild Horse Island, Big Arm, Bigfork and MacDougal Peak. Also on *Solidago*, Swan river valley (Bonser).

Cylindrosporium simile Peck, n. sp. *Maculae* parvae, paucae sparsaeque vel numerosae et saepe confluentes, angulares, pallidae; acervuli in macula quavis unus multive, plerumque epiphylli, pulvinati vel plerumque nucleatae, brunnei; sporae filiformes, curvatae, continuae, hyalinae, plerumque nucleatae, 40-80 x 4 m. (.0016-.0032 unciae longae, .00016 unciae latae). On living leaves of *Ceanothus sanguineus*. Bigfork and MacDougal Peak, Flathead Lake, Montana, August, Jones. Allied to *C. Ceanothi* E. & E., from which it differs in the color of the spots and in the longer continuous spores.

Cylindrosporium simile var. *Pruninum* Peck, n. var. *Maculae* minores, saepe coloratiores; sporae breviores, 30-60 m; basidia longior 15-25 m. In foliis *Pruni emarginatae*. Yellow Bay on Flathead Lake at 4000° alt. on the slope of the Mission Mts. Some bushes of *Prunus emarginata* were almost covered with the fungus.

Cystopus candidus (Pers.) Lev. On *Cardamine hirsuta*. McDonald Lake in the Mission Mountains.

Dimerosporium Collinsii (Schew.) Thum. On *Amelanchier alnifolia* at Bigfork. This is very abundant and seems to be affecting the fruit trees very injuriously.

Doassansia Sagittariae (West) Fisch. On *Sagittaria arifolia* at Swan Lake.

Doassansia Alismatis (Nees) Corn. On *Alisma Plantago* at Swan Lake.

Dothidea Pteridis, *Phyllachora*, *Cryptomyces*, all stages of the same fungus. On *Pteris aquilina*. Bigfork (Bonser). Probably the same as *Uredinopsis Pteridis* Diet. & Holway which I also got at the foot of MacDougal Peak on the same host.

Ereunetum. This was once supposed to be a fungus but now is regarded as a disease caused by mites. On *Acer glabrum* at Bigfork. Common.

Erysiphe Polygoni DC. On *Polygonum aviculare* at Wild Horse Island.

Erysiphe Polygoni var. On *Lupinus* at Bigfork (Bonser).

Gymnosporangium Nelsoni Arthur. On *Amelanchier alnifolia* at Yellow Bay.

Hydnum. The coral fungus. This was scarce but very beautiful. Polson.

Linospora Brunellae E. & E. On *Brunella vulgaris* at Swan Lake.

Marssonia Potentillae (Desm.) Fisch. On *Potentilla* on Nigger Prairie Trail. Bonser.

Melampsora Medusae Thum. This is the same as *Uredo Medusae* (Thum.) Arthur. On *Populus trichocarpa* at Bigfork by Bonser, and by myself on *Populus tremuloides* at Bigfork.

Melampsora Bigelovii. On *Salix* at Bigfork by Bonser.

Melampsorium Betulae (Schum.) Arthur. On *Betula glandulosa* at MacDougal Peak. Also on *B. alba* at Dayton.

Melampsoropsis Pyrolae (D.C.) Arth. On *Pyrola rotundifolia* at Bigfork. This is probably the same as *Chrysomixa* reported above by Bonser.

Microsphaeria Alni (Wallr.) On *Vicia Americana* at Bigfork by Bonser.

Microsphaeria Alni var. *ludens*. Salm. On *Vicia Americana* at Big Arm.

Microsphaeria Alni var. *divaricata*. On *Ceanothus sanguineus* at Bigfork by Bonser.

Microsphaeria diffusa C. & P. On *Symphoricarpos racemosus* at Bigfork. Also on the same host and locality by Bonser.

Peridermium Balsameum Peck. On *Abies grandis* at Swan Lake and MacDougal Peak and Yellow Bay.

Peridermium pseudo-balsameum (Holway). On *Abies grandis* at Bigfork by Bonser.

Peridermium ornamentale Arthur. On *Abies lasiocarpa* at MacDougal Peak, alpine.

Peridermium Pini. On *Pinus ponderosa* at Bigfork by Bonser.

Phragmidium affine Sydow. On *Potentilla flabelliformis* at Monida.

Phragmidium occidentale Arthur. On *Rubus Nutkana* at MacDougal Peak and Bigfork.

Phragmidium "tuberculatum." On *Rosa* at Bigfork by Bonser.

Phragmidium montivagum Arth. On *Rosa gymnocarpa* at Bigfork.

Phoma Lupini. On *Lupinus* on the MacDougal Peak trail, Bonser.

Phoma. On *Arctostaphylos Uva-Ursi* at Bigfork by Bonser.

Phyllosticta Angelicae Sacc. On *Angelica Lyallii* at Swan Lake.

Phyllosticta Arnicae Fekl. On *Arnica cordifolia*. Evaro.

Physoderma vagans Schroet. On *Sium cicutaefolium* at Bigfork.

Podosphaeria oxyacanthae (DC.) DeBary. On *Prunus demissa*. Ravalli.

Polythelis Thalictri (Chev.) Arthur. This is the same as *Puccinia Thalictri* Chev. On *Thalictrum occidentale* on slopes of MacDougal Peak.

Puccinia Absinthii (DC.) On *Artemisia Ludoviciana* at Polson by Bonser.

Puccinia acuminata Pp. On *Cornus Canadensis* on Swan river (Bonser).

- Puccinia Agropyri* E. & E. On *Agropyron divergens* at Bigfork.
- Puccinia arnicalis* Peck. On *Arnica cordifolia* at Bigfork.
- Puccinia Asteris*. On *Aster* at Bigfork by Bonser.
- Puccinia Arabis* (probably the same as *P. Holboellii*). On *Arabis* on Swan river by Bonser.
- Puccinia Balsamorhizae* Peck. On *Balsamorhiza sagittata* at Wild Horse Island and Bigfork. Also on the same host at Polson by Bonser.
- Puccinia Circaeae* Pers. On *Circaea Pacifica* at Swan Lake and on *Circaea alpina* at Bigfork. Also on *C. Pacifica* on Swan river by Bonser.
- Puccinia Clarkiae*. On *Clarkia pulchella* at Bigfork (Bonser). Ronan, Jones.
- Puccinia Dayi* Clint. Not before reported west of the Mississippi Valley. On *Steironema ciliatum* at Wild Horse Island.
- Puccinia Gentianae* (Strauss.) Link. On *Gentiana affinis* at Big Arm.
- Puccinia gigantospora* Bubak. On *Anemone multifida* at Monida.
- Puccinia graminis*. On "grass" at Echo Lake (Bonser).
- Puccinia hemispherica* (Peck.) E. & E. On *Lactuca pulchella* at Whitefish.
- Puccinia Heucherae* (Schew.) Dietr. On *Mitella nuda* at Bigfork and MacDougal Peak, and on *Tiarella unifoliata* at Swan Lake. Also on *Saxifraga* on Swan river by Bonser.
- Puccinia Hieracii* (Schum.) Mart. On *Hieracium Canadense* at Bigfork. Also by Bonser on same host and at same locality.
- Puccinia Holboellii* (Hornem.) Rostr. On *Arabis Holboellii* at MacDougal Peak in the Upper Temperate life zone.
- Puccinia intricata* var. *Eriogoni*. On *Eriogonum* at Flathead Lake by Bonser.
- Puccinia Menthae* Pers. On *Monarda fistulosa* at Big Arm, Bigfork and Wild Horse Island, also *Mentha Canadensis* at Whitefish and Bigfork. Also on *Mentha* on Swan river by Bonser.
- Puccinia melanocoides*. On *Dodecathron* at Monida.
- Puccinia mesomegala* B. & C. On *Clintonia uniflora* at Bigfork and MacDougal Peak. Also at Nigger Prairie on same host by Bonser.
- Puccinia Physostegiae* P. & C. On *Physostegia parviflora*. Not heretofore known west of Indiana.
- Puccinia Polygoni-amphibii*. On *Polygonum* at Swan Lake by Bonser.
- Puccinia pulverulenta* Crev. On *Epilobium adenocaulon* at St. Ignatius Mission.
- Puccinia punctata*. On *Galium boreale* at Bigfork by Bonser.
- Puccinia recedens* Syd. On *Senecio balsamitae* at Swan Lake.
- Puccinia subnitens* Diet. On *Distichlis spicata* at the Hot Springs.
- Puccinia Symphoricarpi* Hark. On *Symphoricarpos racemosus* at MacDougal Peak and Swan Lake. Also by Bonser at Bigfork on same host.
- Puccinia Troximontis* Peck. On *Troximon grandiflorum* at Wild Horse Island.
- Puccinia Violae* (Schum.) DC. On *Viola Canadensis* at Dayton and Bigfork and on *V. canina* at MacDougal Peak.
- Puccinia*. On *berberis repens* at Yellow Bay and Wild Horse Island. See *Aecidium*.
- Puccinia*. On *Thalictrum occidentale* at MacDougal Peak. See *Aecidium*.
- Puccinia Jonesii* Peck. On *Leptotaenia filicina*. McDonald Lake in the Mission Mountains.
- Puccinia Gayophyti* Peck. On *Gayophytum diffusum*. Darby.
- Pucciniastrum Myrtilli* (Schum.) Arthur. On *Vaccinium myrtilloides* at Yellow Bay and Bigfork. On *Vaccinium Myrtillus* var. *microphyllum* at MacDougal Peak, where it is subalpine. Also on *Vaccinium* on Hall's Peak by Bonser.
- Pucciniastrum pustulatum* (Pers.) Diet. On *Epilobium spicatum* at Bigfork on *Epilobium adenocaulon* at Bigfork. Also on *Epilobium* at Echo Lake by Bonser.

Pucciniastrum Pyrolae (Pers.) Diet. On *Pyrola secunda* at Yellow Bay. Also on *Pyrola* on Swan river by Bonser.

Pyrenophora fenestrata Peck. On Dead stems of *Astragalus Bourgovii*, MacDougal Peak.

Rhytisma Arbuti Phill. On *Menziesia glabella* at Hall's Peak, Bonser. Also by Jones on same host at MacDougal Peak and Bigfork.

Roestelia tubulata Kern n. sp.

Pycnitis epiphyllis, numerosis, in greges irregulares dense confertis, maculis decoloratis insidentibus, cylindraceis. 2-3.5 mm. altis, 0-0.4 mm. diam., apice persistentes cohaerentibus; peridio firmo; cellulis peridiis fusoides-oblongis, 17-25 m x 48-80 m, rugoso; aeciosporis globosis vel subglobosis, 18-22 m x 21-28 m; episporio castaneo-brunneo, 1.5-2.5 m. crasso, subtiliter verruculoso; poris germinantibus 6-8, sine ordine dispersis.

Habitat in foliis *Crataegi Douglasii* Lindley. Polson prope Flathead Lake in Montana Americae bor. 840 m. alt. Aug. 19 1908. Coll. Marcus E. Jones.

This species is characterized by its firm tube-like peridium which does not rupture at the apex but by longitudinal slits in the lower part. In its firmness and in its tendency to maintain its tubular form without becoming lacerate above it has a resemblance to *Roestelia cornuta* (Pers.) Fries on *Sorbus*. It differs from that species, however, in its more slender peridia, and in the size and surface-marking of the peridial cells. The peridial cells have a considerable resemblance to those of *Roestelia globosa* Farl. but it is very much unlike that species in the size of the peridia and in their manner of rupturing.

Roestelia Nelsoni Arthur. On *Amelanchier alnifolia* at Bigfork.

Roestelia tubulata Kern. On *Crataegus* allied to *coccineus* at Polson. On *Crataegus Douglasii* at Bigfork.

Roestelia cornuta Ellis. On *Pyrus* "Sitchensis" at Hall's Peak.

Septoria saccharina var. *occidentalis* E. & E. On *Acer glabrum* at Yellow Bay, Bigfork and MacDougal Peak.

Septoria sorbi Lasch. On *Pyrus sambucifolia* at Yellow Bay and Bigfork. On P. "Americana" at MacDougal Peak, alpine.

Septoria salicifoliae. On *Spiraea* at Bigfork by Bonser.

Septoria Streptopidis Peck n. sp. Maculae subangulares, 2-8 mm. (x 1-4 mm.) latae saepe confluentes flavidae, brunneae vel rubrobrunneae; perithecia amphigena, membranacea, inaequalia, atra, in macula quavis unum multave; sporae numerosae, elongatae, cylindraceae vel subfiliformes, curvatae, plurinucleatae, 30-89 x 4-5 m., ex perithecia exudantes et massam albidam formantes. On living leaves of *Streptopus roseus* and *Prosartes trachycarpa* at Yellow Bay, Swan Lake, MacDougal Peak and Bigfork.

Sphaerella Chimaphilae (E. & E.). On *Chimaphila umbellata* at Bigfork by Bonser.

Sphaerotheca Humuli (DC.) Burr. On *Sium cicutaefolium* at Bigfork.

Triphragmium clavellum. On *Aralia* at Swan Lake by Bonser.

Thecaspora deformans Dur. & Mort. On *Rubus Idaeus*. Whitefish. On *Astragalus flexuosus*, Browning.

Uncinula Salicis. On *Salix* at Flathead Lake by Bonser.

Uredo confluens Pers. On *Salix Scouleriana* at Bigfork.

Uredo Lini Schum. On *Linum Lewisii* at Wild Horse Island.

Uredo Medusae (Thum.) Arthur. On *Populus tremuloides* at Bigfork.

Uredo Bigelovii (Thum.) Arth. On *Vaccinium*. Sperry Glacier, Alta.

Uredo Polypodii DC. On *Cystopteris fragilis*. Blackfoot Glacier.

Uromyces albus D. & H. On *Vicia Americana* at MacDougal Peak.

Uromyces Aristidae E. & E. On *Plantago Tweedyi* in Deer Lodge Valley.

Uromyces Astragali (Opiz.) Schroet. On *Oxytropis albiflorus* at Wild Horse Island.

Uromyces Erythronii (DC.) Lev. On *Erythronium grandiflorum* var. minus at MacDougal Peak, alpine.

Uromyces Euphorbiae C. & P. On *Euphorbia serpyllifolia* at St. Ignatius Mission.

Uromyces fabae (P.) Schroet. On *Lathyrus "parvifolius"* at Echo Lake by Bonser.

Uromyces Glycyrrhizae Magn. On *Glycyrrhiza lepidota* at Dayton and Wild Horse Island.

Uromyces Hedysari-obscuri. On *Hedysarum flavescens* at MacDougal Peak by Elrod.

Uromyces unites Peck. On *Lewisia rediviva* at Missoula.

Uromyces borealis Peck. On *Hedysarum sulphurescens*. Como Peak, Browning, Blackfoot Glacier.

Uromyces Astragali (Opiz.) Sacc. On *Astragalus alpinus*. Bigfork.

Ustilago Mulfordiana. On *Festuca tenella* at Kalispell by Bonser.

Ustilago bromivora (Tul.) Fisch. On *Bromus secalinus* at Wild Horse Island. On *Bromus Pumpellianus* at Bigfork. On *Stipa comata* at Bigfork.

Ustilago. On *Carex nardina*. Sperry Glacier, also *Carex atrofusca* in the Mission Mountains.

Uredinopsis Pteridis Diet. & Holway. On *Pteris aquilina* at MacDougal Peak.

Uredinopsis Struthiopteridis Storm. On *Aspidium Filix-Mas* at MacDougal Peak. "This gives a new host for the species, and also greatly extends the range. Heretofore has been known only from Vermont and Newfoundland." Arthur.

Uropyxis sanguinea (Peck) Arthur. On *Berberis repens* at Yellow Bay, Wild Horse Island and MacDougal Peak.

Besides the above fungi the following were gathered but not in determinable condition.

On *Prosartes rosea*. Bigfork.

On *Echinosperrum*. MacDougal Peak.

On *Saxifraga punctata*. McDonald Peak.

On *Ribes lacustre*. Bigfork.

On *Parnassia fimbriata*. Bigfork.

On *Poterium*. St. Ignatius Mission.

On *Smilacina sessilifolia*. Bigfork.

On *Petasites*. Whitefish.

On *Galium boreale*. Wild Horse Island.

On *Leptotaenia filicina*. Wild Horse Island.

On *Spiraea*. Bigfork.

On *Hedysarum flavescens*. MacDougal Peak.

On *Vicia Americana*. Whitefish.

On *Astragalus leptaleus*. Big Arm.

On *Anemone nemorosa*. MacDougal Peak.

On *Poa alpina* dead leaves. MacDougal Peak.

On *Habenaria dilatata*. Yellow Bay.

On *Juncus Balticus*. Monida.

On *Juncus Mertensianus*. MacDougal Peak.

LOCALITIES.

Alta, a station at the head of Bitter Root Valley.

Avalanche Basin, below Sperry Glacier.

Bigfork, the location of the University of Montana Biological Station, at the outlet of Swan River into Flathead Lake.

Blackfoot Glacier, on the north slope of Blackfoot and the south and east slopes of Jackson Mountains main range of the Rockies, the drainage into St. Mary's Lake, and the Hudson Bay drainage.

Belton, on the Great Northern railway, on the Middle Fork of Flathead River.

Bull Island, one of the chain of islands in the lower portion of Flathead Lake.

Browning, on the Great Northern railway, Blackfoot Indian Reservation.

Big Arm, the large western projection of Flathead Lake.

Como Peak, in the Bitter Root Mountains, opposite the postoffice Como. Colville.

Darby, a town in the upper Bitter Root valley.

Dayton, postoffice at the Big Arm of Flathead Lake.

Daphnia Pond, at Bigfork, upper end of Flathead Lake.

Durant, railroad junction 15 miles east of Anaconda.

Elrod Peak, between the South and Middle Forks of Flathead River, one of a series of bald crags of yellow argillite, the waters from the north glacier flowing into Stanton Lake, from the west, forming creek which flows into the South Fork. Elevation 9,500 feet.

Evano, station on the Northern Pacific railroad, summit or pass in the Cabinet Mountains, 16 miles from Missoula.

Echo Lake, a small lake in the wooded valley west of the Swan Range, near Bigfork.

Edwards, Mt., touching Sperry Glacier on the southwest.

Flathead Delta, upper or northern end of Flathead Lake, where Flathead River enters. The delta is formed by the old and present channels of the river.

Gunsight Pass, over the main Rockies between Gunsight and Jackson Mountains.

Gunsight Lake, between Gunsight and Jackson Mountains, on the Hudson Bay side, along the trail over Gunsight Pass.

Garrison, town on the Northern Pacific railroad, junction of Deer Lodge and Little Blackfoot Rivers.

Hot Springs, on Flathead Reservation, 35 miles west of Polson, and 25 miles from Plains, the former at the foot of Flathead Lake, the latter on the Northern Pacific railroad.

Haggin, Mount, south of Anaconda, continental divide.

Holzinger Basin, at an elevation of about 6,500 feet, along the trail from McDonald Lake to Sperry Glacier up Snyder Creek.

Jordan Lakes, two small lakes on the southwestern slope of McDonald Peak in the Mission Mountains, not far from Mission Valley proper.

Lambert Valley. A small valley at higher elevation (7,000 feet) in the Mission Mountains, on the south side of Mission Creek, back of (east of) the high unnamed peak next to Mission Valley.

Little Bitter Root, river and valley, in Flathead Indian Reservation. The valley is the old river valley which was the former outlet of Flathead Lake.

Lincoln Pass, on the trail from Lake McDonald to Gunsight, pass between Gunsight and Lincoln Peaks.

Little Matterhorn, a sharp point of rocks at foot of Sperry Glacier, jutting out from Edwards.

Lake McDonald, a few miles from Belton on the Great Northern railroad, 12 miles long and about two miles wide; not to be confused with McDonald Lake in the Mission Mountains, 80 or 90 miles further south.

Lake Louise, between Gunsight and Jackson Mountains, along Gunsight trail. Elevation about 6,000 feet.

Lo Lo Mountains, southwest of Missoula, 9,500 feet elevation.

MacDougal Peak, in the Swan Range, over the shoulder of which the old Aeneas trail leads. Elevation 7,600 feet.

Mission Creek, in the Mission Mountains, heading in immense snowfields, flowing westward past St. Ignatius, emptying into the Pend d'Oreille River.

McDonald Peak, Mission Mountains, elevation 10,100 feet.

Monida, on the summit between Montana and Idaho, on the O. R. and N. railway.

Mud Creek, heading in the Mission Mountains, flowing westward across Mission Valley in Flathead Indian Reservation.

Nigger Prairie, an opening in the woods east of Bigfork, some new mines.

O'Keefe Canyon, about eight miles northwest of Missoula.

Polson, a town at the foot of Flathead Lake.

Polson Swamp, near Polson.

Ravalli, on the Northern Pacific railroad, Flathead Indian Reservation, 37 miles from Missoula.

Ronan, town on Flathead Reservation, in Mission Valley.

Rost Lake, a small lake a mile in diameter, in the timber at the foot of MacDougal Peak, Swan Range, Flathead Valley.

Ryan's Lake, on the slopes of Mt. Powell, Deer Lodge valley.

Rexford, a station on the Great Northern near the Canadian line, west of Whitefish.

Rim, the, rock cliff at the end of trail up Snyder Creek, at the southern edge of ice of Sperry Glacier.

Sperry Glacier, resting on the western slope of the main Rockies in a depression between Gunsight and Edwards Peaks, reached by trail from Lake McDonald either from the south side, easily, or with more difficulty by trail up Avalanche Basin.

Silloway Peak, in the Swan Range, a few miles south and a little east of MacDougal Peak, with triple summit, the highest 7,600 feet.

Swan Lake, between Mission and Swan Ranges, twelve miles long, an expansion of Swan River.

St. Ignatius, on Flathead Reservation, in Mission Valley.

Stanton Lake, three miles west of Great Northern railway, near Nyack.

Silver Bow, railway junction near Butte.

Somers, town on the northwest corner Flathead Lake.

Schultze's Cabin, a point on the Aeneas trail from Flathead Lake across Swan Range, the farthest point to which wagons may be taken.

Stanton, Mt., at upper end of Lake McDonald, northwest of the lake.

Sentinel, Mt., also called University Mountain, just east of the University of Montana campus at Missoula.

Thompson Falls, a town in Western Montana, near the state line, on the Northern Pacific railroad.

Trail Creek, a creek on the eastern face of the Swan Range, just north of MacDougal Peak, flowing into the South Fork of Flathead River..

Wild Horse Island, large island in the western or Big Arm of Flathead Lake.

Whitefish, on the Great Northern railroad, near Kalispell.

Whitewater.

Yellow Bay, on the eastern side of Flathead Lake, midway.

ADDENDA.

Since the preceding was set in type the following notes on species and descriptions of new species have been prepared, and are inserted.

The following notes may help to clear up the relationships of two sedges in our region. William Boott first separated one species and Bailey the other. Boott in his description of *C. luzulaefolia* confounded the two species, as they grow together in the Sierras. This is shown by the names he gave to my material. Mackenzie has also tried to separate the Nevada form of *ablata* which verges toward *C. luzulaefolia*, but it is not distinct.

Common characters are Upper spikelets sessile or nearly so, not linear, the lower mostly clavate, on elongated and filiform peduncles. Perigynia green or rusty with age, slightly inflated, the lanceolate, body nearly filled by the seed, with triangular and substipitate base, and tapering into a flat triangular beak which is scabrous and papillose and deeply 2-toothed and purple-striped down the middle, the upper half empty, a little inflated, papery, strongly nerved on the sides and faintly nerved on the face, green till mature, not less than 4 mm. long, a little longer than the scale, spreading. Bracts green and leaf-like, shorter or little longer than the blade, not as long as its sheath which is light colored and with rusty ring at tip. Sheaths widening a little above. Leaves many, broad and flat, 3-9 mm. wide, shortly acuminate, yellowish, smooth, rarely more than 1-2 dm. long, gradually reduced above along the stems to bracts, the central sheaths often 1 dm. long, the upper bracteal ones barely less than 2 cm. long. Stems at base clothed with coarse leaf fibers, often 8 mm. thick, gradually tapering at tip to almost filiform, about 3 feet high and erect, few together from very shortly stoloniferous rootstocks often 1 cm. thick. Plants of dry meadows at high elevations.

Luzulaefolia W. Boott Bot. Cal. 2 250 (1880), in part. *C. fissuricola* Mackenzie, (*Luzula*-leaved Sedge.) Spikelets 2-3 mm. long, 6-9 mm. wide, the upper ones clustered and nearly sessile. Perigynia 6 mm. long and 2 mm. wide, punctate and slightly granulated above, straight, beak about half the whole, green or rusty only. Scales dark-brown with light center, scarious margin hardly any and strong midrib going to the tip or projecting as a short awn or mucro. Leaves 4-9 mm. wide, shortly acuminate, quickly reduced to scales at base of stems. Wasatch mountains, Utah, westward and northward.

Oblata Bailey. Bot. Gaz. 13 82 (1888) (oblate Sedge). Spikelets 1-2 cm. long, the sterile 7-15 mm. long and often compound, 2-8 mm. wide, sometimes fertile in the middle, mostly clavate; fertile ones club-shaped, 1-2 cm. long, 3-6 mm. wide, only the uppermost one sessile, the rest on variously elongated peduncles, dark-brown. Perigynia with beak about $\frac{1}{2}$ the whole, smooth, about 3 mm. long, and 2 mm. wide, with recurved tip. Scales purple with light center, ovate to oblong, obtuse, ovate to oblong, with broad hyaline and white and lacerate margins and tip, the midrib not reaching the tip. Leaves about 3 mm. wide, long-acuminate, rarely at all reduced below. Rather common in the Sierras. This probably includes *C. herbariorum*. First published as *ablata*, but intended for *oblata*. The Utah forms referred here are better placed in *luzulaefolia*. Kuenthal is probably right in placing this as a variety of *luzulaefolia*, since the Utah and Nevada material has sharp scales and less hyaline and longer perigynia.

Two other sedges on which our field work throws much light are *Montanensis* and *Tolmiei*. They belong to the same group as those above but verging toward the *atrata* group in the flattening of the perigynia and the reduction of the beak.

Common characters are: Spikelets purple, from almost black to chestnut colored, small, short, oblanceolate to ovate, compactly flowered, contiguous (or amounting to that by the elongation of the lower peduncles), the stami-

nate single. Perigynia oval-ovate, about 3 mm. long by 2 mm. wide, nearly flat above and triquetrous below, thin and papery, fully twice as large as the smooth seed and empty above, finely punctate when young and granulated when ripe, white when young and nearly black, at least at tip, when old, with two lateral nerves and faint green lines abruptly contracted into the face when young but appearing nerveless, spreading at about 45° angle, sessile, with cylindrical beak about twice as long as wide. Scales very dark with narrow green midrib. Bracts broad and leaf-like, nearly as wide as the leaves with subulate tip, many times longer than the very short sheaths, but not overtopping the stems. Leaves very dark-green, mostly 1-2 dm. long, quickly reduced to chestnut-colored scales below, shortly acuminate, flat and smooth, leathery without fibrillose sheaths. Stems tapering from base to slender tip, 1-1.5 feet high, growing in large clumps from shortly stoloniferous rootstocks which are densely clothed with coarse leaf fibers and appearing as if abruptly decumbent at base, leafy only on the lower third, sharply 3-angled. Plants of alpine meadows, not in wet places.

Carex Tolmiei Boott in Hook. Fl. Bor. Am. 2 224 (1840). (Tolmie's Sedge). All but the lower spikelets sessile and mostly overlapping, mostly oblong-oblancheolate, rarely oval and then very small, the upper ones conspicuously smaller, the staminate one a little longer and wider than the rest, erect or nearly so. Scales lanceolate, acute, fully as long but a little narrower than the perigynia. Bracts with black auricles, but some of them with very short sheaths. Leaves 3-4 mm. wide. Mt. Powell and Sperry Glacier region. This has all the appearance of a hybrid between *C. atrata* and *C. Montanensis* with which it grows.

Carex Montanensis Bailey Bot. Gaz. 17 152 (1892). (Montana Sedge). All Spikelets but perhaps occasionally the uppermost fertile one on capillary and drooping peduncles from half to four times the length of the spikelets, fully developed ones about 2 cm. long and 5 mm. wide, narrowly oblong, the staminate one smaller and oblanceolate to obovate, all the fertile ones about the same length though the uppermost one when sessile is often minute and very few flowered. Scales mostly ovate and barely acute, sometimes lanceolate and acute from half to nearly as long as the perigynia, often entirely purple. Bracts with chestnut-colored auricles and the lowest with sheaths about 1 cm. long. Leaves 2.5-3 mm. wide. Stems mostly densely clustered as if caespitose but the crowns are distinctly separate. This is the most common sedge, having the habit of *C. limosa*, in all the alpine meadows of northwestern Montana, and if not the same as *C. atrofusca* is at least very near it.

Carex aboriginum n. sp. Stems shortly stoloniferous, rigid, erect, smooth, obtusely 3-angled, finely papillose, about 3 feet high, leafy on the lower third, slender. Leaf sheaths hyaline and not fibrillose. All the leaves about half the stems, not reduced below, flat, 3 mm. wide, long-acuminate, smooth, light-green, bases light colored. Bracts green and subulate pointed, the lower 2-3 dm. long. Spikelets all peduncled, the upper fertile ones very shortly so, the single terminal and staminate one on a filiform peduncle nearly its own length and oblanceolate, about 2 cm. long and 3 mm. wide, fertile spikelets 2-3, nearly contiguous, oval, about 15 mm. long and 12 mm. wide, compactly flowered, the upper flowers spreading and the lower mostly reflexed at maturity by the crowding of the perigynia, about 25-30 flowered, fuscous with age. Perigynia about 6 mm. long and 3 mm. wide, ovate, decidedly inflated, papery, whitish and becoming fuscous when ripe. Somewhat flattened above, triquetrous but with only 2 strong lateral nerves and about 5 finer ones on the faces, finely punctate all over, which becomes almost papillose with age, half filled by the spherical seed, minutely and abruptly stipitate; beak flattened, serrate, papillose, purple, deeply notched and 2-toothed, scarcely more than a triangular prolongation of the perigynia and about as long as wide below. Scales lanceolate, acuminate purplish, with a light center, nearly as long as the perigynia but much narrower, scabrous on the midrib. Stigmas 3.

This grows on dry gumbo soil which is wet in the spring. It has the habit of *C. Gmelini* and is nearest related to *Raynoldsii*, though having fruit characters between that and *ablata*. Indian Valley, Southern Idaho, near Salubria, July 12, 1899. Middle Temperate life zone.



Carex aboriginum, 1, 2, 3.

Carex nardina (from Britton, x9) 4.

Carex stantonensis, 5, 6, 7, 8.

***Carex Elrodi* n. sp.** Spikelets 3-5, the terminal one all staminate or with a few fertile flowers at tip, not over 2.5 cm. long, about 2 mm. wide, sessile, the rest fertile, sessile (the lower short-peduncled and rarely on a long and filiform radical peduncle), shorter, all linear except the very short subterminal ones, 3 mm. wide, chestnut-colored, contiguous, appressed, compactly flowered. Perigynia oval, plano-convex with sharp sides, papillose, abruptly contracted at base to a short stipe and at tip to a short bidentate beak not

over $\frac{1}{4}$ the whole, or reduced to a rudiment, lateral ribs prominent, faintly 1-2-ribbed on the face, mostly green, sometimes purplish above, closely appressed, 2 mm. long. Scales very broadly ovate, barely acute to cuspidate, dark-chestnut colored with broad and white hyaline edges, as long as the perigynia. Bracts very short and scale-like except the lowest which has a subulate and green tip 1-3 cm. long, sheathing with purple arricles, at least



Carex Parryana var. *Statoni*, 1, 2, 3.

Same, smaller specimen, 4, 5.

Carex Goodenovii var. *dolia*, 7, 8, 9, 10.

the lowest ones. Leaves all basal or nearly so, rarely 1 dm. long, 3-5 mm. wide, feeling smooth, but finely papillose, subulate acuminate, stiff, flat, splitting up into coarse chestnut-colored fibers below, sheaths slightly fibrillose, green. Stems obtusely angled, erect .5-1.5 ft. high, smooth, widely stoloniferous, narrow. This grows in dry meadows along with *C. Parryana*. *Monida*, Montana. Middle Temperate life zone. This comes in the 3-stigma group with sessile perigynia and granular, and is related to *C. Richardsoni*. Dedicated to Prof. M. J. Elrod. Figured on P. 19 as *Parryana* var. *Hallii*.

Carex Parryana var. *Statoni* Jones n. var. Spikelets 3-4, all sessile, congested into an ovate to oblong head, rusty, the terminal one 1.5-2 cm. long, the rest somewhat smaller to a third as long, all oblong, densely flowered, 3-6 mm. wide, appressed, the terminal one thickest. All wholly pistillate or with a few staminate at tip. Perigynia trigonous, rhomboidal obovate, the base with a substipitate spongy thickening, the tip triangularly contracted into narrow tip or beak not much longer than high, which is oblique, hyaline and notched, strongly 3-nerved with two on the sides and one on the inner face and all rounded and thickened, with 6-8 fine nerves on the outer face, granulated, 2 mm. long and 1 mm. wide and about half as thick, rusty colored. Scales ovate, acute, a little longer than the perigynia, rusty. Stigmas mostly two though frequently 3-stigma flowers are intermixed. Bracts all brown and scale-like, sheathing. Stems sharply-triangular, about 6 dm. high, erect but slender, leafy only near the base, stoloniferous, granulated but seeming smooth. Leaves 2-3 mm. wide, revolute, acuminate, about a third as long as the stems, papillose, with fibrillose sheaths, light-green. Growing in dry meadows. Deer Lodge Valley, Montana. The type collected at Ryan's ranch, Aug. 3rd, 1905. Dedicated to W. C. Staton of Anaconda. I also refer to this material got in the same valley in July, which is only 2 dm. high, with smaller spikes and scales, hardly as long as the perigynia, though having the same rusty color, with the light center and very narrow white edges of the type and the perigynia fully 2-3 times as thick as wide and like the type filled by the seed. This would seem to come near to *C. Idahoa* Bailey.

Carex Goodenovii var. *dolia* Jones n. var. Spikelets all on filiform peduncles, 2-10 mm. long, clustered in a deltoid head, 3-5, 5-15 mm. long and about 3 mm. wide, densely flowered, broadly linear, nearly black and with green perigynia, the terminal one with a few staminate flowers at the base and then clavate, or rarely at both tip and base. Perigynia broadly ovate, granulated, nerveless except the two lateral ones at the tip, plano-convex, 2 mm. long, green or flecked with purple above, sessile and with a spongy ring at base, filled by the seed, with a minute cylindrical beak not longer than high, appressed. Scales oblong, rounded and obtuse, black with light center, nearly as long as the perigynia. Bracts setaceous, green, with black auricles, the lower often 1 dm. long, sheathless. Stems filiform, 1.5-2 dm. high, nodding, obtusely angled, papillose as well as the leaves, densely caespitose, leafless except at very base. Leaves dark-green, 2-3 mm. wide, involute, shortly acuminate, about half as long as the stems, with hyaline non-fibrillose sheaths. Growing in dense mats above timber line at Sperry Glacier, Montana, in moist meadows. This evidently belongs in the *C. Goodenovii* group with two stigmas, and is nearest *C. Goodenovii* var. *limnophila* (Holm. as *vulgaris* var., Proc. Am. Acad. 17 307), but differs from that in the spongy base of the perigynia, nerveless, not sessile spikelets and narrower. It also differs from the var. *lipocarpa* (Holm. Proc. Am. Acad. 17 308 as *vulgaris* var.) in the not stipitate and nerveless perigynia, granulated, clustered and short spikelets, etc. It differs still more from the var. *hydrophila* (Holm. l. c. as *vulgaris* var.) in the caespitose stems, granulated and not stipitate perigynia.

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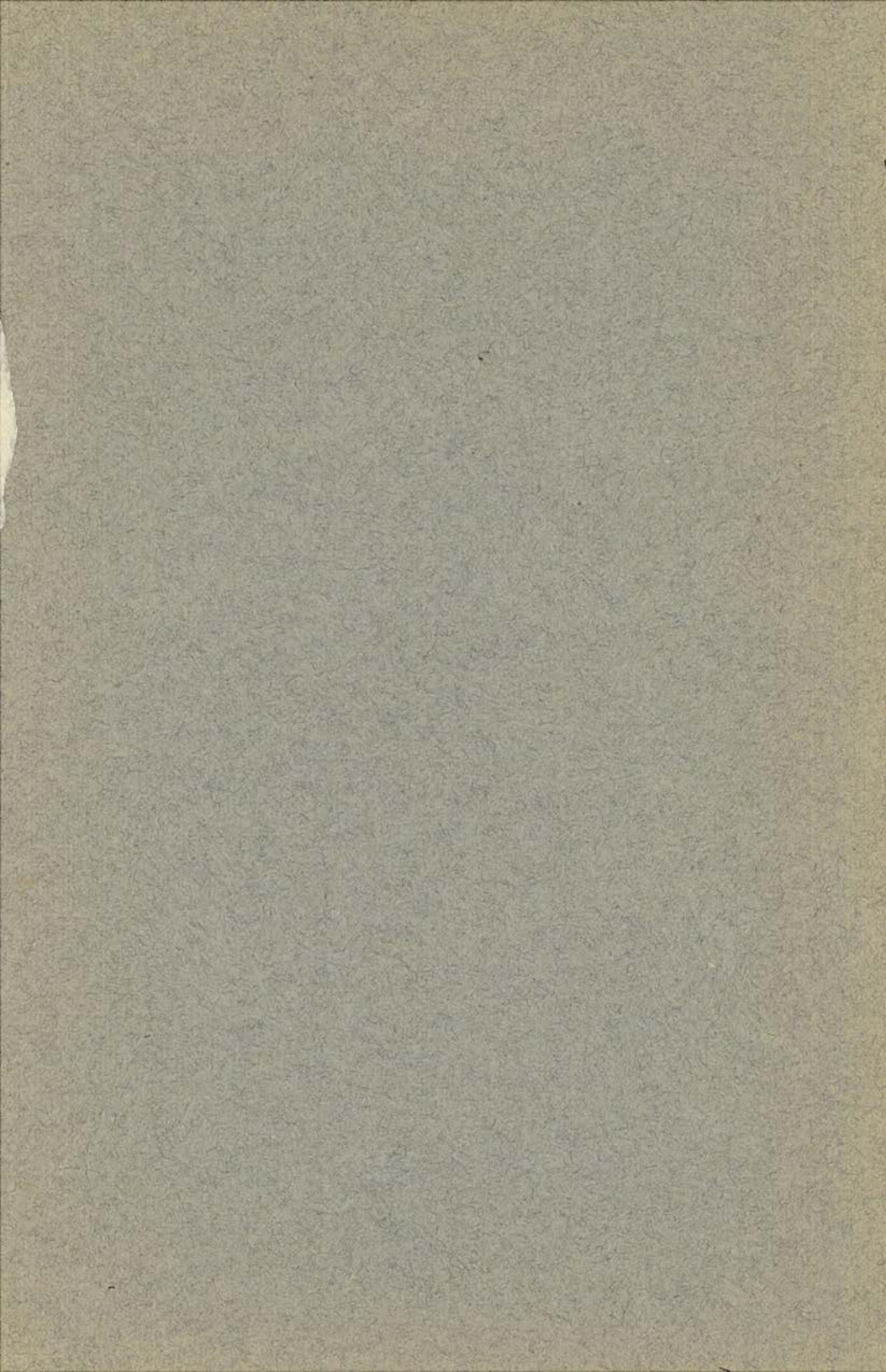
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