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A CENTURY OF BOTANICAL EXPLORATION IN MONTANA, 1805--1905: COLLECTORS, HERBARIA AND BIBLIOGRAPHY.

BY J. W. BLANKINSHIP, PH. D.,
PROFESSOR OF BOTANY.

BOZEMAN, MONTANA.
PUBLISHED BY THE COLLEGE
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ANNOUNCEMENT.

These Science Studies of the Montana Agricultural College are intended to afford a medium for the publication of papers dealing especially with pure science and general education, and are co-ordinate with the bulletins of the Agricultural Experiment Station, which consider the subject of science only in its economic aspect. The two phases of pure and applied science are so closely interwoven that any careful work in one usually necessitates the accumulation of more or less data in the other, for the publication of which these two parallel series are necessary.

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Montana

THE BITTERROOT (LEWISIA REDIVIVA, PURSH).
THE STATE FLOWER OF MONTANA.

MONTANA AGRICULTURAL COLLEGE SCIENCE STUDIES.

Vol. 1, No. 1. November 1, 1904.

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A CENTURY OF BOTANICAL EXPLORATION IN MONTANA.

Collectors, Herbaria and Bibliography.

BY J. W. BLANKINSHIP.

PREFACE.

In the study of the flora of a region it is very desirable, and indeed necessary for scientific accuracy, to know what collections have been previously made in that region, where these are deposited and what publications based upon them have been issued, so as to determine range of species, consult types and avoid unnecessary duplication, while having at hand the conclusions of previous botanists in the case of the many doubtful forms found in a flora relatively new and unworked. The present paper is an attempted summation of the first century of botanical effort in Montana and, while the lists published can hardly claim to be complete and errors of reference perhaps unavoidable at a point remote from the larger botanical libraries, it is hoped that the data here assembled may prove of value to others concerned with the botany of this region and encourage the study of one of the most interesting and unique floras in the United States

It appears that four out of the ten collections made previous to 1862 went to Europe along with the publication of the species contained and that all the others, for the first three quarters of the century, remained in the Eastern United States, but, since 1880, a large part of the collections made have remained, in duplicate at least, in this state, principally at the Agricultural College, Bozeman. These latter now include the private herbaria of R. S. Williams. W. T. Shaw, Mrs. E. W. Scheuber, Peter Koch, Mrs. I. M. Kennedy, J. W. Blankinship, F. A. Spragg, Mrs. J. E. Light and the World's Fair Collection of 1893, and duplicates of the collections made by F. D. Kelsey, E. N. Brandegee, Mrs. G. R. Finlay, Mrs. H. F. Henshall, Rydberg & Bessey, L. M. Umbach, M. J. Elrod, W. W. Jones

and others, so that hereafter no one can hope to do special work in the flora of this state without having previously consulted these local herbaria, which increase in size and value every year.

Owing to the fact that all the early collections made in Montana are found in the Eastern herbaria under the names of other states, as the word "Montana" was not applied to this region till 1864, it will be found helpful for other students of our flora at these herbaria to know the names by which it was called previous to that date.

MONTANA.

WEST OF CONTINENTAL DIVIDE.	EAST OF CONTINENTAL DIVIDE.
Oregon Country, 1790-1846.	Louisiana (France) till 1762.
(In dispute between Great Britian and the United States).	Louisiana (Spain), 1762-1800.
	Province of Louisiana (France), 1800-3.
	District of Louisiana (U. S.), 1803-5.
	Territory of Louisiana, 1805-12.
Oregon Country, (U. S.), 1846-48.	Territory of Missouri, 1812-21.
Territory of Oregon, 1848-53.	The Indian Country or Northwest Territory, or specially the "Mandan District," (1849), 1821-54.
	Territory of Nebraska, 1854-61.
Territory of Washington, 1853-1863.	Territory of Dakota, 1861-1863.

Territory of Idaho, 1863-1864.
Territory of Montana, 1864-1889.
State of Montana, 1889—.

It is intented to include, as far as practicable, the names of all those who have made botanical collections of any importance within the present bounds of Montana, to indicate the routes they pursued, as an aid in the determination of "type localities," to specify the place where their collections are now deposited, as far as known, and to mention the title and place of publication of all works dealing wholly or largely with the flora of this state.

As far as known, notice is made of all collections numbering 100 or more specimens, deposited in some accessible herbarium, or which may be of special interest from their early date or from reference to them in botanical publications, following the order of historical sequence up to 1905. It is hoped that any errors or omissions found will be communicated to the author and in particular it is desired to know the place of deposit of all Montana collections not here noted or information of other publications based upon them.

MONTANA AGRICULTURAL COLLEGE,
Bozeman, Montana, Nov. 1, 1904.

I.—BOTANICAL COLLECTIONS MADE IN MONTANA.

Meriwether Lewis of the Lewis and Clark expedition, made the first collections within the present state of Montana. The route of this expedition was up the Missouri, Jefferson and Beaverhead rivers, down the Bitterroot and across through the Lolo Pass (Apr. 28 to Sept. 3, 1805), returning (the Lewis party) by way of the Big Blackfoot, the Lewis & Clark pass, down Sun river, up the Marias to its head-waters and down the Missouri (June 29 to Aug. 7, 1806), all the Montana specimens except one or two being collected on the return. Some 33 of the specimens brought back were from Montana and of these about two-thirds were new to science. These were published in Pursh's "Flora" and enumerated again by Meehan (Proc. Acad. Philà. Jan. 1898: 12-49), while the collection itself is in the herbarium of the Philadelphia Academy of Natural Sciences.

[**Thomas Nuttall** seems never to have been within the bounds of the present state of Montana, although authors have mistakenly referred many of his specimens collected in Wyoming and Idaho to this state. He ascended the Missouri river with John Bradbury in 1810 as far as the eastern part of Mercer county, North Dakota* and accompanied the Wyeth Second Expedition** of 1834-6, which passed far south and west of this state.]

David Douglas, an English horticulturist and botanical explorer, may possibly have reached the extreme western limits of the state about 1826, though his own account (Comp. Bot. Mag. 2: 82-177 and Trans. Hort. Soc. London, 7: 513) does not make this at all certain.

Alexander Philipp Maximilian, Prince of Neuweid, travelled up the Missouri River as far as the Gate of the Mountains, 1832-34, the botany of the expedition, published as an appendix to his "Travels",*** being elaborated by Nees von Essenbeck.

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*Bradbury's Travels in the Interior of America, 1809-1811. Early Western Travels by R. G. Thwaites. Cleveland, O. 1904.

**Townsend, J. K.: "Narrative of a Journey Across the Rocky Mountains to the Columbia River and a Visit to the Sandwich Islands, Chili, Etc., with a scientific appendix." Philadelphia. 1839.

***Reise in das innere Nordamerica in den Jahren 1832-1834, 2 vols. Coblenz, 1841. French edition, Paris, 1843; English edition, London, 1843.

Nathaniel J. Wyeth, a Boston fur-trader, on his return from his first expedition, appears to have ascended the Clark's Fork (called by him the Flathead) to its junction with the Missoula, thence up that stream and the Bitter Root through the Big Hole Basin to the Salmon River in Idaho and eastward to the Big Horn River, following down this and the Yellowstone to the Missouri (April to August, 1833).* His collections were described by Nuttall and are in the Academy of Sciences at Philadelphia, a duplicate set being at the New York Botanical Garden.

Charles A. Geyer, a German botanist, collected in Montana in 1844. His route appears to have been up the Clark's Fork to the Flathead mission and from there up the Bitter Root and down the Jefferson and Yellowstone in the path Clark marked out. His plants were taken to Europe, determined by Hooker, and distributed to various herbaria, Kew or the British Museum and the Gray Herbarium securing the more important sets. Geyer himself gives a general account of the country (London Jour. Bot. vols. 4 and 5) and Hooker describes his plants (London Jour. Bot. vol. 6 and Hooker's Jour. Bot. vols. 3, 5, 7 and 8).

T. A. Culbertson in 1850 collected along the Missouri as far as the mouth of Milk River, but principally about the mouth of the Yellowstone.** His collection is probably in Porter's private herbarium and more or less of his specimens in the older herbaria. The results of his work were published by T. C. Porter (5th Ann. Rep. Smith Inst. pp. 133-136).

J. G. Cooper, a physician attached to the Stevens Expedition of 1853-4, appears to have made collections in the state from Ft. Benton to Helena and westward, though they appear to have been few and fragmentary. Sets of these plants are at the Gray Herbarium, the New York Botanical Garden and the National Museum. He issued a single paper on the trees of the state (Am. Nat. 3:405-422. 1870).

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*"The Correspondence and Journals of Captain Nathaniel J. Wyeth, 1831-36" in "Sources of the History of Oregon," Vol. 1, Pts. 3-6. Eugene, Ore., 1899. Oregon Historical Society.

**Culbertson, T. A. "Journal of an expedition to the Manvaises Terres and the Upper Missouri in 1850."

F. V. Hayden, the geologist of the "Hayden Survey", collected somewhat in botany on the Lower Yellowstone and the Big Horn in 1853-4, and with the Warren Expedition of 1855-57, which ascended the Yellowstone to the mouth of the Big Horn and thence across to Ft. Benton. He also made collections with the Raynolds Expedition of 1860, which ascended to the headwaters of the Missouri and the Yellowstone. The plants of this latter expedition were determined and the results published by Dr. George Engelmann (Trans. Am. Phil. Soc. 12: 182-212. Phila. 1862), which is largely a reprint from a previous paper by Hayden (Rep. Sec. War for 1858. 2:726-747).

George Suckley, a physician, who accompanied the Stevens Expedition of 1853-4, collected along the Missouri and Milk rivers as far as Ft. Benton, his plants being determined and the results published by Dr. Gray (Pac. Ry. Surv. 12, Pt. 2: 40-49. 1860). His type collection is probably at the Gray Herbarium with duplicates at the National Herbarium, Washington, and the New York Botanical Garden.

John Pearsall accompanied the Mullan Expedition of 1858-62, which followed the route up the Prickly Pear from Ft. Benton to Helena and thence westward along the line now marked by the Northern Pacific railway and the Coeur d'Alene branch into Idaho. He probably collected fewer than a hundred specimens in the state and these appear to be now in the Gray Herb. and the N. Y. Bot. Garden.

David Lyall, an English Naturalist of the North American Boundary Commission ("Oregon Boundary Commission"), collected a number of species in 1861, in northwestern Montana or near the Canadian line, then being established, west of the Continental Divide. His type collection is at Kew, but a number of his specimens are at the Gray Herb. He published his results in London in 1863 (Jour. Linnæan Soc. 7: 124-144).

Winslow J. Howard seems to have collected somewhat in the "Rocky Mountains of Montana" about 1866, as a number of his specimens are found in the Gray Herbarium and at least one species (*Omphalodes Howardii, Gray*) was named for him.

Robert Adams and **G. N. Allen** were here with the Hayden Survey

in 1871, collecting along the Upper Yellowstone, Gallatin, Madison and Jefferson rivers, their plants being determined and results published by Porter in the Hayden Survey for 1871 (pp. 477-498). Their collections are with the Porter Herbarium at Lafayette College, Easton, Pa. and a duplicate set at the N. Y. Bot. Gard.

John M. Coulter, now Professor of Botany in the University of Chicago and whose "Manual of Rocky Mountain Botany" still remains our text-book on the flora of the state, was here with the Hayden Survey in 1872-3, but collected only along the Upper Yellowstone and mainly within the present limits of the Park. His determinations appear in the Hayden Survey for 1873 (pp. 747-792), while his specimens are probably in the National Herbarium at Washington and at the University of Chicago.

J. A. Allen, Naturalist of the North Pacific Railroad Expedition of 1873, ascended the Yellowstone to Pompey's Pillar, thence across to and down the Musselshell to the Big Bend and back down the Yellowstone. His plants were determined by Dr. George Vasey and a set is doubtless in the National Herbarium. He published his report, which contains a considerable list of Montana species, in Boston (Proc. Boston Soc. Nat. Hist. 17: 70-86. 1874).

C. C. Parry accompanied the Jones Expedition to the Yellowstone Park in 1873 and some of his collections are probably from the Up-the Yellowstone in Montana. All his private herbarium extant is at the Iowa State University, Iowa City, Iowa, but there are duplicate sets in the older herbaria. His "Botanical Observations" was published (Amer. Nat. 8: 9, 102, 175, 211, with a reprint) at Salem, Mass. in 1874.

Elliott Coues, then connected with the army as surgeon and naturalist on the United States Northern Boundary Commission, in conjunction with the Canadian naturalist, George M. Dawson made collections along the northern boundary of the state in 1874, the species being determined and published by Chickering (Bull. U. S. Geol. and Geogr. Survey, 4: 801-830. Washington, 1878).

V. Havard, an army surgeon, took part in a reconnoissance in 1877 up the Yellowstone to Pompey's Pillar and thence northward across the Musselshell and Judith Basin to the Missouri and again, in 1879, up the Missouri and Milk rivers to Ft. Assinniboine and on

to Great Falls. A report of his collections was published in Ann. Rep. Chief of Engineers, U. S. A. for 1878, App. QQ, pp. 1681-1687, and in that for 1880, App. SS, pp. 1-20. His collections should be in the National Herbarium and there appears to be a set at the Gray Herbarium.

Sereno Watson of the Gray Herbarium made a trip into western Montana in 1880, collecting data in regard to the forestry of the region for the 10th census. His route was from Garrison to Dillon and westward throught the Big Hole Basin and down the Bitter Root to Missoula and out by way of the Lo Lo pass. He made a considerable collection, now at the Gray Herbarium, while his report is published by Sargent (10th Census. 9: 564-566. Washington, 1884).

Robert S. Williams, while engaged in other business, made extensive collections extending over some 19 years (1880-1899), including Lichens and Mosses, as well as flowering plants. His plants came mainly from the Little Belt and Highwood mountains, Great Falls (1880-1891), Columbia Falls and adjacent Rockies (1892-99) and Teton county (1897). His private collection is at the Montana Agricultural College, Bozeman, Montana, but duplicate sets of his plants have been distributed at the Nat. Herb., N. Y. Bot. Gard., Gray Herb., Mo. Bot. Gard., Univ. of Mont., and other herbaria, and he has published several papers dealing with our flora.

Frank Tweedy, a topographer in the U. S. Geological Survey, while working in southern Montana and the Yellowstone Park, made extensive collections in this state, which are mainly in his private herbarium at Washington, with partial sets at the N. Y. Bot. Gard., Coll. of Pharmacy, N. Y., Nat. Herb., Gray Herb., and at Mont. Agr. Coll. He collected during the years 1881-2 and 1886-91 within the Crow Reservation and the counties of Carbon, Sweet Grass, Park, Gallatin, Madison, Beaver Head, Silver Bow, and Jefferson. He published a Flora of the Yellowstone National Park (Washington 1886).

William M. Canby, a banker of Wilmington, Del., was here in 1882-83 with the Northern Transcontinental Survey along with **Charles S. Sargent,** who was studying the forestry of the state. The collections of the former are now at the College of Pharmacy, New York City and those of the latter at the Arnold Arboretum,

Jamaica Plains, Mass., of which he is Director. Their route extended from Helena to the Flathead Agency, past the Flathead Lake and up the N. Fk. of the Flathead River, over the Cutbank Pass and back over the Lewis and Clark Pass.

F. W. Anderson, son of an English minister of Great Falls, collected about Great Falls, Ft. Benton, Little Belt and Highwood Mountains, Helena and Sheridan (1883-88). Most of his personal collections are in the herbarium of the College of Montana at Deer Lodge, but his Fungi and Algae appear to have been secured by the New York Botanical Garden with the herbarium of J. B. Ellis. He published a number of papers on the flora of the state, mainly on the Fungi and Algae in connection with Kelsey.

E. W. Hilgard, now Director of the California Agricultural Experiment Station at Berkeley, was engaged in making a soil survey of the state in 1883 in connection with the Northern Transcontinental Survey and collected a series of plants in the plains region, chiefly along the Milk river, Judith Basin, Musselshell and the Yellowstone, but most of this collection was destroyed by fire, the remainder being at the University of California.

J. B. Leiberg, while in the service of the Northern Pacific Railway in the interest of tree-culture, made collections as far west as Glendive and later published his notes on the botany of the region (Bot. Gaz. 9: 103-107, 126-129. 1884). He also worked up the forestry of the Bitter Root Forest Reserve in 1898 in the employ of the U. S. Geological Survey which published his report (19th Ann. Rep. U. S. Geol. Surv. 5: 253-282).

J. S. Newberry collected along the Northern Pacific Railway in 1884, publishing a brief note on the botany (Ann. N. Y. Acad. Sci. 3: 242-270. 1884).

F. Lamson Scribner was here in 1883 with the Northern Transcontinental Survey under W. M. Canby and devoted his attention particularly to studying the grasses. He made collections at Lima, Dillon, Garrison, Helena and Bozeman and made a trip from Townsend to White Sulphur Springs, Monarch and Ft. Benton. His own private collection was destroyed by fire but there is a duplicate set at the College of Pharmacy, New York. He published a paper

on the agricultural grasses of the state (4th and 5th Proc. Soc. Prom. Agr. Science, pp. 87-93. Newburg, N. Y. 1885).

A. B. Seymour, now connected with the Cryptogamic Herbarium of Harvard University, made a trip through the state in 1884 along the line of the Northern Pacific Railway collecting parasitic fungi. He stopped at Billings, Livingston, Bozeman, Helena, and Thompson Falls. Sets of this collection are in his private herbarium, at the Univ. of Illinois, in whose interest he made the excursion, and at Harvard University. A list of the plants collected was published in Boston in 1889 (Proc. Bost. Soc. Nat. Hist. 4: 182-191).

F. D. Kelsey, a Congregational minister at Helena, took up botany as a recreation and did much to arouse interest in this science over the state. He collected mainly in Lewis and Clarke, but also in Deer Lodge, Ravalli and Jefferson counties and as far east as Billings, his work extending from 1885 to 1892. It was under his direction that the World's Fair collection of 1893 was made and this is now in the herb. of Mont. Agr. College, but all his private herbarium is at Oberlin College, Oberlin, Ohio, where he was professor of botany after leaving Montana. In conjunction with Anderson he published a number of papers on the flora.

W. T. Shaw made a small collection of plants about Bozeman in 1892 and previously at Deer Lodge; these are now in the herb. Montana Agricultural College.

F. W. Traphagen, while connected with the College of Montana at Deer Lodge was largely instrumental in building up the herbarium of that institution. His collections (1887-1890) were mainly from that vicinity and are deposited with that institution, a duplicate set being at the N. Y. Bot. Garden.

Mrs. Emma W. Scheuber of Livingston (Miss Emma J. Ware), then a teacher, collected in Deer Lodge county and on the Big Blackfoot, at Philipsburg, Beartown, Granite (1888-1892) and later about Livingston. She donated her collections to the Agricultural College, Bozeman.

Georg Dieck of Zoeschen bei Merseburg, Germany, collected in Central Montana (Deer Lodge) in August, 1888 the plants being determined and results published by J. Freyn (Deutsch Bot. Monats.

8: 73-79, 176-182. 1891). Collection here apparently unimportant.

Peter Koch, a banker of Bozeman, made extensive collections in Gallatin county (1888-1894) and about Cooke City and the Granite Range (1897 and 1899). He donated his entire collection to the Montana Agricultural College.

M. A. Carleton, now connected with the Department of Agriculture at Washington, took part in the Garfield University (now Friend's University at Wichita, Kansas) Expedition, which was in Montana in August, 1889, collecting along the Oregon Short Line, at Helena and the Gate of the Mountains, the chief set of plants remaining at that institution, but duplicates are in his private herbarium at Washington and at the University of Chicago. The plants were named by Prof. J. M. Coulter and the results published by Carleton (Kans. Acad. Sci. 13: 50-57. Topeka, 1893). Relatively few species are from Montana.

Mrs. Irene M. Kennedy of Columbia Falls made collections about Belt and Great Falls (1884-89), in the Flathead region (1892-1900), and at Midvale and Columbia Falls (1890-1898) and has donated them to the Agricultural College, Bozeman.

J. W. Blankinship, Professor of Botany in Montana Agricultural College, collected on the Big Horn river near Custer Station in 1890 and later over nearly every part of the state (1898-1904), flowering plants mainly, but also largely of parasitic fungi and other Cryptogams. The collections are in the Agricultural College, Bozeman and a number of papers chiefly of an economic nature, have been published. Various sets of this collection have been distributed to the principal herbaria.

F. N. Notestein, who succeeded Dr. Traphagen at the College of Montana, did more or less collecting in the vicinity of Deer Lodge (1890-1895) and his specimens are with that institution.

Mrs. Mary L. Alderson, collected about Bozeman (1889-92) and later about Bald Butte, where she now resides. A part of her collection is in the herbarium Montana Agricultural College.

E. N. Brandegee, now President of the State Board of Horticulture, has a large private herbarium, mainly from Lewis and Clark county (1892-1900) with duplicates in the herb. Mont. Agr. Coll.

Mrs. G. R. Finlay of Bozeman has done more or less botanical work in that vicinity (1893-1903) and donated many specimens to the Montana Agricultural College.

Mrs. Laura A. Fitch made collections about Sheridan and Virginia City (1892?) some of which are at the Mont. Agr. Coll., but her private herbarium is at the Univ. of Mont., Missoula.

J. H. Sandberg, assisted by **D. T. MacDougal** and **A. A. Heller**, made a small collection of plants at Thompson Falls, Bonner and Glendive in 1892 (Cont. U. S. Nat. Herb. 3: 204-287. Washington, 1895) for the National Herbarium and Dr. MacDougal collected about Flathead Lake, the Mission Mountains and McDonald Lake in the summer of 1901, the specimens going to the N. Y. Bot. Gard.

Mrs. J. E. Light sent a collection of nearly 100 specimens collected in 1892 in Custer county to the World's Fair collection of 1903. These are at the Montana Agricultural College. The Montana Ladies' World's Fair Collection of 1893 was made up by the ladies all over the state, for besides **Mrs. Scheuber** (Miss Emma Ware), **Mrs. Alderson, Mrs. Finlay, Mrs. Fitch, Mrs. Kennedy** and **Mrs. Light**, already mentioned, there were also **Mrs. Jennie Moore** of Butte, **Mrs. Ida Christie** of Silver Bow Co., **Mrs. McNulty** of Madison Co., **Mrs. E. Muth** of Lewis and Clark Co., **Mrs. Hodgeman** and others who took part in the work. This collection is now a part of the herbarium of the Montana Agricultural College.

P. A. Rydberg, now Curator of the herbarium of the New York Botanical Garden, was here with **C. L. Shear** in 1895 in the employ of the Division of Agrostology at Washington, collecting mainly forage plants. Their route was from Dillon, to Deer Lodge, Helena, Bozeman and return. Their plants are in the Div. of Agrost. at Washington and the N. Y. Bot. Garden. Dr. Rydberg returned under the same auspices in 1896 accompanied by **J. H. Flodman** of Wahoo, Neb. and collected from Bozeman, the Spanish Peaks and Bridger Range, to Monarch and the Judith Basin, returning along the Crazy Mountains to Livingston. Their collections were distributed as before. The next summer Dr. Rydberg returned in the interest of the New York Botanical Garden and had as his assistant this time **E. A. Bessey** of the University of Nebraska. Their route extended from Bozeman via the Spanish Peaks, and the Madison Valley to the Park and return by way of the Yellowstone. The

type collections are at the N. Y. Bot. Gard., but duplicates have been widely distributed, the Gray Herb. and the Mont. Agr. College, among others, receiving sets. Based mainly upon these collections Dr. Rydberg issued his "Flora of Montana and the Yellowstone National Park" (New York, 1900) and numerous other papers on our flora.

H. S. Jennings, Professor of Botany in the Montana Agricultural College, made a small collection about Bozeman in 1897 and this is in the herbarium of this institution.

E. V. Wilcox made collections in the Absaroka Mountains in 1897 and in various parts of the state in 1900, for the Department of Agriculture at Washington and these specimens are in the Nat. Herb. and Dept. of Agr. at Washington and in the N. Y. Bot. Gard.

David Griffiths in the employ of the Division of Agrostology at Washington and **T. A. Williams**, Professor of Botany at the Agr. Coll. of S. Dakota made a tour through the state in 1898, stopping at Billings, Red Lodge, Missoula and the Bitter Root Valley. Dr. Griffiths came again in 1890 with **E. F. Lange**, a teacher of Superior Neb., stopping at Billings, Selish, Flathead Lake and various points along the Great Northern to Great Falls. The collections are in the U. S. Nat. Herb.

Mrs. Hester F. Henshall has done more or less collecting about Mt. Bridger and the U. S. Fish Station near Bozeman (1898-1903) and many of her specimens are in the herbarium of the Montana Agricultural College.

H. B. Ayres, worked up the forestry of the Flathead Forest Reserve in 1898 and that of the Lewis and Clark Forest Reserve in 1899 for the Geological Survey, which published his reports (20th Ann. Rep. U. S. Geol. Surv. 5: 245-316. and 21st. 5: 27-80.)

Aven Nelson, Professor of Botany in the University of Wyoming and **Elias Nelson**, his assistant, collected across the southern part of Madison County from Monida to the Park in 1899 and their collections are at that institution and variously distributed.

Wyatt W. Jones, Burle J. Jones, Jacob Vogel, E. J. S. Moore and **Amy M. Cooke**, students in the Mont. Agr. College, made important

collections in various parts of Gallatin county (1900-1903) and sets of their specimens are in the herbarium of that institution.

Frank A. Spragg, while preparing his thesis in botany at the Mont. Agr. College, collected in 1900 and 1901 in Fergus county and region adjacent, largely grasses, which are in the herbarium of the college.

H. C. Cowles, Professor of Botany in the University of Chicago, with some 19 students spent some time collecting along the Great Northern Railway and at McDonald and Flathead Lakes in August, 1901, the chief set of the specimens going to the University of Chicago.

L. M. Umbach, Professor of Biology at Northwestern College, Naperville, Ill., made large and important collections in Montana in 1901 and 1903, principally in the Lake McDonald region, and at Big Fork and Midvale. His collections are at that institution, but there are duplicate sets at the N. Y. Bot. Gard. and Mont. Agr. Coll.

M. J. Elrod, Professor of Biology at the University of Montana, and some of his students collected about Missoula and the Flathead Lake region (1899-1904), their collections going to the University of Montana with duplicates at Mont. Agr. Coll. and the N. Y Bot. Gard.

Wilson P. Harris of Brooklyn, N. Y., collected Lichens and Mosses in western Montana, principally about Missoula and the Flathead Lake, in the summer of 1901 under the auspices of the New York Botanical Garden. The Lichens were determined by Prof. Bruce Fink and Mrs. Isaac Harris and the Mosses by Mrs. Elizabeth G. Britton. Sets of this collection are at the New York Botanical Gerden, the University of Montana and in the herbaria of Mr. Harris and his mother, while the results of his work appear in Bull. No. 19, Univ. of Mont., Missoula, 1904.

Harry N. Whitford with others from the University of Chicago worked in the same locality in 1902, paying particular attention to forestry.

T. J. Fitzpatrick of Iowa City, Iowa also made an extensive botanical collection in the Mission Mountains and Flathead Lake region in 1902.

Millie M. Smith, a teacher from Forsyth and **Arthur Lehman** from Lewistown also collected there in 1904.

Besides those in this list who have collected in Montana, there are doubtless many others whose names rightly belong here. A few of these names whose collections I have not been able to place are as follows: **Swallow**, "in the high mountains of Montana;" **R. W. Springer**, 1882; **E. Douglas**, Helena, 1894. Any information relating to the collections made by these and by others not here listed will be gratefully received.

II.—BIBLIOGRAPHY.

The following list is intended to include all publications dealing wholly or in large part with the botany of the state of Montana, arranged alphabetically by authors, with brief notes as to their nature and importance.

Allen, J. A. "Notes on the natural history of portions of Montana and Dakota." Proc. Boston Soc. Nat. Hist. 17: 1-61. Boston, 1874. An annotated list of the plants collected by the expedition, arranged by orders.

Anderson, F. W. "Pastoral Resources of Montana." Rep. Com. Agr. 1888: 311-324. Washington, 1889. A sketch of the general physical features of the state, its climate, agriculture and botany with an enumeration of some 55 of the chief forage grasses.

Anderson, F. W. "Brief Notes on a few common fungi of Montana." Jour. Mycol. 5: 30-32. Washington, 1889. Notes on 14 of the more common leaf-fungi of the state.

Anderson F. W. "Supplementary notes." Jour Mycol. 5: 82-84. 1889. Brief notes on 53 species of the fungi of Helena, Mont.

Anderson, F. W. "A preliminary list of the Erysipheæ of Montana." Jour. Mycol. 5: 188-194. 1889. Mentions 13 species with their hosts and distribution.

Anderson, F. W. "The fruit of *Ribes aureum*, Pursh". Bot. Gaz. 14: 289. Crawfordsville, Ind., 1889. A mere note on variation in color.

Anderson, F. W. "A new Fomes from Northern Montana." Bot. Gaz. 16: 114. 1891. Describes and figures *F. Ellisianus*, Anders. on *Shepherdia*.

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V. K. Chesnut, Professor of Chemistry and Geology in Montana Agricultural College, did some collecting for the U. S. Dept. of Agr. during the summers of 1900-1904. His collections are in National Herbarium at Washington with diplicates at the N. Y. Bot. Gard.

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BOTANY.

SUPPLEMENT TO THE FLORA OF MONTANA:

ADDITIONS AND CORRECTIONS.

By J. W. Blankinship, Ph. D.,

PLATES I-VI.

BOZEMAN, MONTANA.
PUBLISHED QUARTERLY BY THE COLLEGE.

NEW SPECIES AND VARIETIES DESCRIBED.

PLATES.

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SUPPLEMENT TO THE FLORA OF MONTANA: ADDITIONS AND CORRECTIONS.

BY J. W. BLANKINSHIP.

PREFACE.

The botanist in the American agricultural college must treat his subject, both in his teaching and in his scientific research, from two standpoints, that of pure science and that of its economic application, and no successful achievement can be hoped for in the latter without a foundation in the larger data and wider knowledge of a more extensive study of the subject in its general phases. The basis of any accurate work in pure or applied botany is a good herbarium and technical library as well as a general knowledge of the physical, agricultural and biological features of the region considered, and these collections and library are the more necessary at a point remote from other scientific institutions. Hence special effort has been made by the Montana Agricultural College to build up a good herbarium of both the Phanerogams and Cryptogams of the state and to secure a good botanical library for their more accurate study, while the greater part of our collections have either been named by specialists or taken to the Gray Herbarium or the New York Botanical Garden for identification.

Based largely upon these collections, Rydberg issued his "Catalogue of the Flora of Montana and the Yellowstone National Park" (1900), the only complete enumeration of our species ever attempted, but since its publication many new species have been described from this state, while the extensive collections brought together in the herbarium of the Montana Agricultural College, including in part at least nearly every private collection recently made in the state, afford many times the number of specimens heretofore available for the study of the flora of this region, thus enabling a number of errors, due to paucity of material, to be corrected, and extending by several hundred the number of species indigenous to the flora of the state or recently introduced within its bounds.

In the present list, with a few exceptions, no attempt has been

made to pass upon the validity of the various new species recently described from this state, as the idea of the limitation of species must and ever will remain, in large part, a matter of individual judgment, dependent upon the data at hand, the experience of the botanist, and the relative closeness with which he desires to draw specific lines in the case of the many intergrading species or the larger polymorphic forms. The recent tendency toward the more critical study of species and their consequent segregation should be encouraged, as the basis for a better knowledge of our flora; the more critical reconstruction of species, based upon a wider knowledge of specific variation and the physical and biological factors of isolation tending to differentiate them in their respective habitats, must be left mainly to the botanist of the future, working with larger collections and aided by the accumulated knowledge of the present explorers. Yet, there are certain causes of error in this recent tendency toward separation that may easily be avoided and the most important of these is the failure to recognize the confluence of related species. Forms intermediate in character between two other well marked species, are probably mere intergrades or hybrids between these species, particularly, if these forms be few and occur only at points of contact between them and such forms are neither species nor varieties, as frequently described. Then, single aberrant specimens confined to one or few localities in a well-explored flora, can hardly be more than evanescent sports, soon to be swamped by cross breeding, unless such variation affect the organs of reproduction, or give it peculiar strength to resist untoward influences; a "mutation" form, according to De Vries.

On the other hand, we may be greatly aided in our judgment of a species by rembering that, aside from their difference of character, upon which the botanist usually basis his judgment, there will also be found some factor of isolation tending to prevent the free intercrossing of the two species, for sexual sterility between closely related species appears to be far more rare than commonly supposed. This factor of isolation may be difference in range, or altitudinal distribution, due to climatic or geographical barriers; difference in habitat, due to adaption to different physical and chemical conditions of growth; or it may be adaption to different methods of fertilization, to different times of blooming or to some peculiar habit of growth. Cross-sterility doubtless does exist in many cases, but can not be relied upon at all in botany as a criterion of species; it is indicated by an absence of these intergrading forms or hybrids and, usually, by

marked difference of character between the species. This taxonomic-ecological branch of botanical science is destined to yield much of interest in the future and prove of the greatest aid in systematic discrimination, when this critical reconstruction of species becomes of more inportance.

This is the more necessary, because by far the greater number of species have been described from a few fragmentary specimens, called the "type," which may perchance occur anywhere in the wide gamut of the variation of the species, owing to accident of discovery, and very frequently this type and description is thus far removed from the normal type of the species represented by the vast majority of the individuals composing it, while the works on systematic botany continue to describe this bibliographical "type" long after material has accumulated for more accurate description. The tendency of recent authors to thus fix upon a type for their species, when material is at hand from which to draw a wider description, is unfortunate, unless they are sure the type selected fairly represents the normal of the species.

In the present paper the *species* I have described as new are sufficiently distinct in character to be readily recognized and there appears to be some factor of isolation tending to differentiate them from the nearest related species, while the intergrading forms appear to be relatively few, and I have described as *varieties* those forms less distinct in character, not having any marked factor of isolation and with more numerous forms connecting them with the dominant species.

I wish here to thank the management of the Gray Herbarium at Cambridge, Mass. for the facilities for comparison and bibliographical reference so kindly placed at my disposal in this work and the many local botanists of Montana, whose contributions have materially aided in elucidating the many knotty questions of specific variation and distribution. It is hoped that these studies may render possible the publication of a practical manual of the botany of the state for the use of the high school student and others interested in our native flora, as the delight of the study of our native plants is greatly marred and the labor vastly increased by the poor facilities for determination now at hand.

ORDINAL LIST OF SPECIES NEW OR WRONGLY REFERRED TO MONTANA.

In the following list the genera and species are arranged alphabetically under the orders, which follow the Engler and Prantl sequence. Species new to the state are given in **full-face type**; those wrongly referred to Montana in *Italics*. Species given on the identification of some botanist other than the author have the name of that authority in parentheses after the author of the species. The specimens cited under each species are in the herbarium of Montana Agricultural College, unless some other is given, or the localities are quoted from publication, and are collections made by the author, unless the name of some other collector is given. Species introduced in Montana are starred (*). An index to the bibliographical references will be found on pages 26-29 of the preceding number.

CONIFERÆ.

Abies amabilis, Forbes; Rydberg, Flora, 12. I find no evidence that this species occurs in Montana, or in fact east of the Cascade Mountains in Washington and Oregon.

Abies grandis, Lindl. White Fir; Silver Fir. Frequent in the forests west of the Continental Divide in Montana.

Granite Canyon, near Missoula, Aug. 5, 1880, S. Watson (Gray Herb.); Columbia Falls, Aug. 4, 1892, R. S. Williams. See also Sargent, Sylva, 12: 118; Ayres, 21st Ann. Rep. U. S. Geol. Surv. 5:41; 20th Ann. Rep. Geol. Surv. 5: 248, 285, 329; Leiberg, 19th, 5: 268.

Juniperus communis Canadensis, Loud. A low upright or spreading juniper, 6-12 dm. high with longer (10-15 mm.) leaves than the prostrate alpine form (var. *montana*, Ait.). Apparently more frequent in the mountains than the smaller variety.

Bozeman, June, 1902, Peter Koch; Belton, July 27, 1900; Philipsburg, Sept. 30, 1902, G. T. Bramble, and many other localities.

Juniperus occidentalis, Hook.; Rydberg, Flora, 13. Though careful search has been made in nearly every part of the state, there is yet no evidence that it is found here. If it occurs, it will probably be in the mountains adjacent to Idaho in the Bitter Root region. Common on dry hillsides in adjacent Idaho.

Juniperus Virginiana, L. Red Cedar. As far as the characters serve to distinguish, the eastern *J. Virginiana* seems to be fairly common in the mountainous parts of the state in the damper situations, as well as on the dry exposed rocks. It has the spire-shaped habit, annually maturing fruit and slender, elongated branchlets of that species, while the darker, blue-green, often glaucus color of its foliage distinguishes it at sight from the widely spreading habit and yellow-green foliage of the species common on the dry plains (*J. scopulorum*, Sargent). The fruit of the first is prevailingly ellipsoid, that of the second usually somewhat bilobed by the enclosed divergent seeds. Apparently intergrading forms occur.

Bozeman, Oct. 8, 1900, E. J. S. Moore; Leonia, Sept. 14, 1900; Kalispell, Sept. 9, 1899; Homestake, June 22, 1902.

Larix Lyallii, Parl. Mountain Larch. Two small areas near the head of the South Fork of the Flathead River and along the higher peaks of the Bitter Root Mountains. 21st Ann. Rep. U. S. Geol. Surv. 5: 41; 20th Ann. Rep. 5:248, 249, 335; 336 (Ayres).

Picea alba, Link.; *P. Canadensis*, B. S. P. Common in the forests west of the Divide. Called here "White Spruce".

Essex, Aug. 21, 1896, R. S. Williams, 1085; Kalispell, Sept. 9, 1899; Belton, Aug. 19, 1902; St. Ignatius, Sept. 7, 1899.

Pinus contorta, Dougl.; Rydberg, Flora, 10. There is no evidence that the true *P. contorta* occurs in Montana and it is doubtful, if the typical form is found east of the Cascade Mountains.

Tsuga heterophylla, Sargent; *T. Mertensiana*, Carriere. Common in the forests west of the Divide. Called here "Hemlock".

Columbia Falls, Oct. 27, 1894, R. S. Williams; MacDonald Lake, Aug. 31, 1892, R. S. Williams; Belton, Aug. 19, 1902; White Pine, Sept. 8, 1904.

Tsuga Mertensiana, Sargent; *T. Pattoniana*, Seneclauze. Several small areas have been noted on the higher mountains west of the Divide. 20th Ann. Rep. U. S. Geol. Surv. 5: 355 (Bitter Root Mts.); 21st Ann. Rep. 5: 40 (Beaver Cr. east of McDonald Peak); Sargent, Silva, 12: 79 (Divide between Thompson and Little Bitter Root Creeks, H. B. Ayres, 1893).

NAIADACEÆ.

Potamogeton filiformis, Pers. Gravelly Range Lake, Lewis & Clark Co., Aug. 1902, Owen Byrnes, No. 40.

Ruppia occidentalis, Wats. Gravelly Range Lake, Lewis & Clark Co., Aug. 1902, Owen Byrnes, No. 39.

ALISMACEÆ.

Sagittaria arifolia tenuor, n. var.

Scapes equaling the rather short peduncled leaves, which have the median lobes narrow and acute and basal narrow and spreading. Phyllodia not infrequent; otherwise like the type. This might be mistaken for *S. latifolia c* of Smith, except for the short, erect beaks to the akenes.

Flathead river, July 20 and 23, 1900; Flathead lake, Aug. 1897, M. J. Elrod; Three Forks, Aug. 24, 1903.

Sagittaria latifolia, Willd.; Rydberg, Flora, 19. It is still doubtful if this species occurs in the state and no specimens appear yet to have been collected within our limits, those so referred being the next, which is difficult to separate from it except in mature fruit.

Sagittaria paniculata, n. sp.

Large, 2-6 dm. high, growing in shallow water, roots tuberous; leaves thick, 10-18 cm. long, ovate with spreading basal lobes, equaling the median in length, latter gradually narrowed to an acute apex; petioles stout, exceeding the scapes: inflorescence verticillate-paniculate, 3-4 lower whorls pistillate; bracts scarious, ovate-lanceolate, 10-20 mm. long; peduncles 5-10 mm. long; flowers 18-22 mm. in diameter, filaments equaling or shorter than the anthers: fruiting heads 10-15 mm. in diameter; akene obovate-cuneate, 2.5-3 mm. long, beak minute, erect or slightly retrorse. [PLATE VI.]

S. arifolia, Nutt. differs from this in its smaller size (1-2 dm. high), smaller, thin leaves (5-10 cm. long), abruptly rounded to an obtuse apex with basal lobes shorter than the median, its slender petioles shorter than the scapes, its racemose inflorescence with shorter (5-10 mm.) bracts, its smaller (7-10 mm. diam.) fruiting heads and smaller (2 mm.) akenes.

In general habit it approaches more nearly *S. latifolia*, Willd., but differs from it in the shorter beak to the akene and short filaments, which are similar to *arifolia* with which it intergrades. It is not a hybrid between the two, for *latifolia* is not known in this region.

Found throughout the plains region of the state. Box Elder Cr., Valley Co., July 14, 1900; Three Forks, Aug. 24, 1903; Wibaux, Aug. 15, 1903; Miles City, Aug. 16, 1903; Bozeman, Aug. 31, 1898.

GRAMINEÆ.

Andropogon provincialis, Lam. In swales and lowlands in the extreme eastern part of the state.

Wibaux, Aug. 15, 1903; Upper Little Big Horn River, July 13, 1890; Crow Agency, July 14, 1901; Miles city, Aug. 16, 1903.

Aristida fasciculata Hookeri, Trin. & Rupr.

Beal, Grasses of N. Am. 2:207. "Montana, Scribner, 83."

Aristida longiseta robusta, Merrill.

Square Butte, Meagher Co., July, 16, 1901, F. A. Spragg, No. 422.

Bouteloua curtipendula, Torr. Swales and lowlands in the extreme eastern part of the state.

Arden, July 15, 1900; Wibaux, Aug. 15, 1903; Big Horn River, Aug. 10, 1890; Forsyth, July 24, 1901.

Bromus Aleutensis, Trin. Rydberg, Flora, 61. Not found in Montana. See *B. marginatus* below.

Bromis inermis, L. Smooth Brome Grass. Now generally cultivated in the state and often escaped.

East Helena, 1904, W. Passavant; Bozeman, 1902.

Bromus marginatus, Nees. B. *Aleutensis,* Rydb., Flora, 61. Common in mountain meadows. Shear, Bull. No. 23, Div. Agros., U. S. Dept. Agr. 54.

Bromus marginatus latior, Shear, l. c., p. 55 with references under "Wyoming".

Bromus marginatus seminundus, Shear, l. c. with references.

Bromus polyanthus, Scribn., Bull. Div. Agros., U. S. Dept. Agr. 23:56 with references.

Bromus Richardsoni pallidus, Shear, l. c. 34.

***Bromus tectorum,** L. Not infrequent as a weed by roadsides and in waste places.

Missoula, Aug. '98, H. C. B. Colvill; Columbia Falls, Sept. 9, 1899.

Bromus vulgaris, Shear, l. c. 44.

***Bulbilis dactyloides,** Raf. Becoming established in the low plains eastward and called the "Little Buffalo Grass" to distinguish it from the "Buffalo Grass" (*Bouteloua oligostachya,* Torr.). Introduced from eastward.

Wibaux, July 9, 1901; Forsyth, July 24, 1901; Miles City, Aug. 16, 1903.

***Cenchrus tribuloides,** L.
Columbia Falls, Mrs. J. J. Kennedy. Doubtless introduced.

Elymus Virginicus submuticus, Hook. —(F. L. Scribner).
Bozeman, Aug. 11, 1898. In low thickets.

Hordeum caespitosum, Scribn. In wet places, common.
Bozeman, Aug. 11, 1898; Denton, July 19, 1901, F. A. Spragg.

Hordeum pusillum, Nutt.
Forsyth, June 29, 1898; Great Falls, July 9, 1891, R. S. Williams; Billings, June 1898, F. W. Traphagen; Arrow Cr., Meagher Co., July 3, 1901, F. A. Spragg.

***Panicum nitidum,** Lam. Columbia Falls, Mrs. J. J. Kennedy.

***Panicum sanguinale,** L. "Crab-grass." Sparingly introduced.
Bozeman, Sept. 25, 1900. In lawns.

Panicum virgatum, L. A form found in the extreme eastern part of the state differs from the typical eastern form in its small size (3-5 dm.), shorter leaves (10 cm.), shorter panicle (3-12 cm.) and shorter divisions of the panicle, but is probably only a depauperate form here at its extreme range westward.
Wibaux, Aug. 15, 1903; Miles City, Aug. 16, 1903. A similar form also in North Dakota.

***Poa annua,** L. In dooryards and waste places, infrequent.
Bozeman, 1902; Lake McDonald, Sept. 1, 1903; St. Ignatius, Sept. 7, 1899.

Poa lepticoma, Bong. —(F. L. Scribner).
Mystic Lake, July 27, 1898.

Poa Montanensis, S. & W. —(F. L. Scribner).
Bozeman, July 1, 1898.

Poa nemoralis glauca, Beal, Grasses of N. Am. 2: 553.
"Montana, Williams."

Poa Pattersoni, Vasey. —(F. L. Scribner).
Lava Peak, Mystic Lake, Aug. 1, 1898.

***Setaria verticillata,** Beauv. Wibaux, Aug. 16, 1903.

Sitanion rigidum, J. G. S.
Square Butte, Fergus Co., July 15, 1901, F. A. Spragg; Taylor Peak, Fergus Co., Aug. 13, 1901, F. A. Spragg.

Trisetum canescens, Buckl.
Mountains near Columbia Falls, July 17, 1892, R. S. Williams.

CYPERACEAE.

Carex arcta, Boott. —(M. L. Fernald). Low meadows, Big Fork, Aug. 15, 1901, L. M. Umbach, 220 ('01).

Carex canescens subloliacea, Laestad. —(M. L. Fernald). Along sloughs, Lake McDonald, Aug. 20, 1901, L. M. Umbach, 324 ('01).

Carex limosa, L. —(M. L. Fernald).
Sloughs, Lake McDonald, Aug. 20, 1901, L. M. Umbach, 298 ('01).

Carex retrorsa, Scwein. —(M. L. Fernald).
Big Fork, Aug. 9, 1901, L. M. Umbach, 11 ('01).

Cyperus erythrorhizos, Muhl. Columbia Falls, Irene M. Kennedy, (1899?).

Eleocharis palustris glaucescens, Gray. Bozeman, July 2, 1898. A small, slender form with smaller akenes. Ours appear to have the mature akenes sulphur yellow, instead of brown and the tubercles more acute.

Eleocharis palustris vigens, Bailey, Jour. N. Y. Mic. Soc. 5: 104. "Culm stout, thick, very spongy, constricted at the summit, nearly as thick as the ovate spike", which is nearly always pale, not deeply colored as in the type. Savoy, July 18, 1900. A rather low form.

Eriophorum russeolum, Fries. In bogs about mountain ponds and lakes.
Columbia Falls, Aug. 20, 1896, R. S. Williams, 1063; Summit, July 25, 1894, R. S. Williams; Lake McDonald, Aug. 30, 1903, L. M. Umbach.

Scirpus atrovirens pallidus, Britton, Trans. N. Y. Acad. Sci. 9:14, Miles City, Aug. 16, 1903.

Scirpus fluviatilis, Gray. Common in sloughs along the Missouri in Valley Co. Box Elder Cr., July 14, 1901.

(Scirpus Nevadensis, Wats.). Found north and south of Montana and should occur in this state.

Scirpus rubrotinctus, Fernald, Rhodora, 2:20. Bozeman, July 14 1898; Mt. Bridger, Aug. 1903, Mrs. H. F. Henshall. Most of the *S. microcarpus,* Britton in Montana belongs here, though the true *S. microcarpus* has been found both north and south of this state and doubtless occurs here also.

Scirpus rubrotinctus confertus, Fernald, Rhodora, 2: 21. G. N. Ry., Teton Co., Aug. 27, 1897, R. S. Williams.

Scirpus Torreyi, Olney. Has light-brown or greenish-yellow, triquetrous akenes; otherwise resembling *S. Americanus,* Pers. Common in wet alkali places throughout the plains region eastward. Billings, Aug. 16, 1903; Townsend, Aug. 12, 1899; Miles City, Aug. 16, 1903; Malta. June 9, 1901; Steele, Aug. 24, 1901; Custer Station, Aug. 24, 1890.

LILIACEÆ.

Smilax ecirrhata, Wats.? Box Elder Cr. near Calais, July 14, 1900, in coulee thickets with *S. herbacea* and may possibly be only depauperate forms of that species, though it has the typical rounded, 5-veined, cuspidate leaf of *ecirrhata,* which is found in the parts of North Dakota adjacent. Only infertile specimens collected.

Smilax herbacea, L. Found with the last; its ultimate range westward.

Tofieldia intermedia, Rydberg, Bull. Torr. Bot. Club, 27:528. Segregated from *T. glutinosa,* Hook, and includes all the Montana specimens.

Veratrum speciosum, Rydberg, Bull. Torr. Bot. Club, 27: 531. Segregated from *V. Californicum,* Durand and includes all the Montana specimens.

Xerophyllum tenax, Nutt. See Rydberg, Bull. Torr. Bot. Club, 27: 529. Apparently confined to the Flathead region of the state, as far as our specimens here go to show, while *X. Douglasii,* Wats. is found in the higher mountains over the western part of the state. Columbia Falls, June 14, 1894, R. S. Williams; Belton, July 27, 1900, common.

Zygadenus alpinus, n. sp.

Small, 1½-2 dm. high, subacaulescent with one or two scarious, linear bracts, lowest sometimes leaf-like: leaves short (6-12 cm.) and narrow (2-4 mm.): raceme 4-6 flowered: bracts ovate, scarious, acute, purple-lined, as long as, or half shorter than the peduncle: perianth segments cream-colored, ovate, obtuse, clawed, about 6 mm. long; gland obcordate and sharply defined: ovary adherent only at the very base, 1 cm. long and 4 mm. wide, styles about 3 mm. long.

Related to *Z. elegans,* Pursh, but smaller in all its parts, nearly

acaulescent and fewer flowered, while it grows only in alpine and subalpine situations. It also grows isolated, while *elegans* in the lower valleys is found mainly in clumps.. It appears to be the northern counterpart of *Z. Coloradoensis*, Rydberg, from which it differs in its smaller size, wider and shorter bracts, different perianth segments and smaller and narrower capsule. It appears to intergrade with *Z. elegans* at intermediate situations; but its easily recognized characters and different altitude clearly separate it here.

Spanish Peaks, 9000 ft., July 20, 1901, Jacob Vogel; Sperry Glacier, 8000 ft., Sept. 1, 1903; Head of Cottonwood Cr., Tobacco Root Range, 9000 ft., Aug. 10, 1902.

Zygadenus gramineus, Rydberg, Bull. Torr. Bot. Club, 27: 535. A segregate with the next from *Z. venenosus*, Wats.

Zygadenus intermedius, Rydberg, l. c. A segregate from the next.

Zygadenus venenosus, Wats. All the Montana specimens of this species have been separated under the two species last mentioned above.

ORCHIDACEÆ.

Corallorhiza striata, Lindl.

Columbia Falls, June 21, 1894, R S. Williams, 1033; Hall's Peak, Mission Mts., June 20, 1902, M. J. Elrod; Garnet, June 15, 1901, Mrs. E. W. Scheuber.

Habenaria multiflora, (Rydb.); *Piperia multiflora*, Rydberg. Bull. Torr. Bot. Club, 28: 638. A segregate from *H. elegans*, Boland.

SALICACEÆ.

Populus acuminata, Rydberg, Bull. Torr. Bot. Club, 20:46, Leaves ovate-acuminate; petioles 3-6 cm. long: lateral nerves about 8. Owing to the frequent intergrading of the species of *Populus* and the intermediate characters of this species between *deltoides* and *angustifolia* and a related intergrade of *balsamifera* and *angustifolia*, it is doubtful if this be more than a hybrid and further study is necessary to decide.

Yellowstone, 1878, V. Havard (Gray Herb.); Big Horn Mts., Aug., 1859, F. V. Hayden (Gray Herb.); Big Timber, July 13, 1901.

Populus balsamifera candicans, Coulter, Man. R. M. Bot. 339, and others as to the Rocky Mountain species. *P. candicans,* Aiton is found in the United States only in cultivation or localities adjacent, to which it has escaped. The true *P. balsamifera,* L. has a somewhat smaller but similar leaf, quite glabrous beneath, and is common in the mountains from 4000 to 6000 ft. altitude. The "lance-leaf" cottonwood, often mistaken for *balsamifera,* is a hybrid between *balsamifera* and *angustifolia* and is found only where the other two species occur. *P. angustifolia,* James occupies a somewhat lower altitude along the eastern side of the Continental Divide intergrading above with *balsamifera* and below with *deltoides.*

Populus trichocarpa, Hook. This is the common cottonwood west of the Divide. The leaves are very similar to those of *P. balsamifera* and hence the two have been confused in this state, but the fruit is woolly, instead of glabrous, like the latter. In the typical *trichocarpa* the leaves are thicker, the veins more salient beneath and the apex more acuminate than in *balsamifera,* while they are conspicuously yellow or brownish white beneath, instead of greenish white, as in the latter. Along the Clark's Fork and its tributaries *P. trichocarpa* is frequent in the valley lands and is a tree of noble proportions with a straight trunk, branched mainly near the top and with thick, deeply furrowed, whitish bark.

Missoula, July 31, 1903; Libby Creek, July 26, 1900; Columbia Falls, July 20, 1901; Flathead Lake, July 23, 1900: Saltese, Aug. 9, 1901; Troy, July 25, 1900; Belton, July 27, 1900; St. Ignatius, Sept. 7, 1899; Deer Lodge, Sept. 5, 1899.

Salix Barrattiana Tweedyi, Bebb. —(W. W. Rowlee).
Spanish Peaks, July 20, 1901, Jacob Vogel.

Salix bella, Piper, Bull. Torr. Bot. Club, 27: 399. —(C. V. Piper). Columbia Falls, May 25, 1893, R. S. Williams, 972. This was referred to *S. Sitchensis,* Samson by Rydberg (Flora, 472), but this and several other species have since been separated from it.

Salix exigua, Nutt. —(W. W. Rowlee). Separated from *S. longifolia,* Muhl. Bozeman, June 26, 1899; Garrison, Sept. 4, 1899.

Salix exigua virens, Rowlee, Bull. Torr. Bot. Club, 27:255.

Salix Fernaldii, n. sp.

Leaves elliptical, rarely ovate, rounded at apex and base, sometimes acute at apex, 4 cm. long by two wide,

glabrous and scarcely impressed-reticulate above, sericeous and veins prominent beneath, often nearly glabrate in age; petioles 1-3 mm. long: aments 2-3 cm. long: capsules short avoid, 2-3 mm. long, sessile. A low, procumbent shrub, 3-9 dm. high in alpine and subalpine situations in the Rocky Mountains from Montana northward.

Hitherto confused with *S. vestita*, Pursh, from which it differs in its thinner, narrower, rounded or pointed leaves, which are less reticulate above and less silky pubescent below; its longer aments and smaller capsules, as well as by its difference in range. *S. vestita*, Pursh is separated from this by its thicker, broader, retuse leaves, prominently impressed reticulate above and villous sericeous below, its shorter aments and larger (4-6 mm.), more acuminate capsules, while its range appears to be restricted mainly to Quebec and Labrador. Named for M. L. Fernald of the Gray Herbarium, who first called attention to this Rocky Mountain species.

Stanton Lake, 7500 ft., Aug. 7, 1894, R. S. Williams, No. 1031; Single-shot Mountain, Teton Co., 7000 ft., July 4, 1897, R. S. Williams and three other localities in the state quoted by Rydberg (Fl. 112) under *S. vestita*.

Salix flava, Rydberg, Bull. Torr. Bot. Club, 28: 273. Near *S. lutea*, Nutt. "Boulder River, 1888, F. Tweedy, 63".

Salix lasiandra, Benth. —(W. W. Rowlee). A small or medium sized tree with rough grayish bark, but trunk very smooth and straight when young. Mountain canyons mainly.

Belgrade, May 31, 1901; Garrison, Sept. 4, 1899; Bridger Canyon, May 15, 1901; Spring Hill, May 20, 1901, W. W. Jones.

Salix lasiandra caudata, Sudw. Bull. Torr. Bot. Club, 20: 43. (W. W. Rowlee). Columbia Falls, May 27, 1897 and Oct. 3, 1893, R. S. Williams, 974.

Salix lasiandra Lyallii, Sargent.

"Thompson Falls," Holzinger, Cont. U. S. Nat. Herb. 3:251.

Salix padophylla, Rydberg, Bull. Torr. Bot. Club, 28:499. *S. padifolia*, Rydberg l. c. 28: 272. Nearest *S. Mackenziana*, Barratt. "10 miles east of Monida, 1899, A. & E. Nelson, 5427."

Salix perrostrata, Rydberg. —(W. W. Rowlee). Not hitherto found west of the Black Hills. Here a shrub 6-10 feet high.

Bozeman, May 6, 1901, W. W. Jones; St. Mary's Lakes, July 5, 1897, R. S. Williams; Square Butte, Fergus Co., July 16, 1901, F.

A. Spragg: Bridger Canon, June 26, 1899; Lower Basin of the Gallatin, July 8, 1898; Highwood Canon, June 22, 1888, R. S. Williams, 802; Columbia Falls, May 27, 1893, R. S. Williams.

Salix Sitchensis, Rydberg, Flora, 472. In the splitting of this species all the Montana specimens referred to it come under *S. bella*, Piper.

Salix subcærulea, Piper, Bull. Torr. Bot. Club, 27:490. (W. W. Rowlee). This seems to be the extreme range of the species eastward bringing it nearly to the Continental Divide.

Columbia Falls, June, 24, 1894, R. S. Williams; same June 5, 1893.

Salix vestita, Rydberg, Flora, 112, and all other authors, as to the species of the Rocky Mountains, is *S. Fernaldii* above.

Salix Wolfii, Bebb. —(W. W. Rowlee).

Near Cold Spring, Teton Co., July 16, 1897, R. S. Williams.

CUPULIFERÆ.

Betula occidentalis, Hook. See Fernald, Am. Jour. Sci. 14: 167-194. If the brown-barked canoe birch of the Northwest be separated from the white-barked *B. papyrifera*, Marsh., as suggested by several recent botanists, then this must bear the name of *B. occidentalis*, Hook. and the small tree common in the mountain canons of the state hitherto bearing that name will be known as *B. microphylla*, Bunge, (*B fontinalis*, Sargent). *B. occidentalis*, Hook. is not infrequent in the forests at Columbia Falls, Belton, White Pine and other localities in the western part of the state and though they look very different and are distinguished by the lumbermen, it is not yet certain that the two species are distinct.

Quercus macrocarpa depressa, Engelm. "Scrub Oak". Sargent (10th Census. 9: 140) says, "West to the eastern foothills of the Rocky Mountains of Montana", but no specimens seem to have been collected in the state and diligent search down the Missouri and Yellowstone to Ft. Buford has failed to reveal it. It certainly occurs on the Little Missouri in North Dakota and it probably is found on that stream as it crosses the extreme southeastern corner of the state, as has been reported by various parties acquainted with that section. It should be looked for in the coulee thickets back from that river.

URTICACEÆ.

Ulmus Americana, L. "White Elm." Frequent in the bottoms and coulee thickets along the Missouri River from Box Elder Cr. near Calais and eastward. Forms deep forests in the bottoms at Arden and is often of large size. Grown for shade in many parts of the state, but rarely hardy above 3000 feet.

***Urtica dioica**, L. Leonia, Sept. 16, 1900; Libby, July 26, 1900.

POLYGONACEÆ.

Eriogonum brevicaule, Nutt. Custer Station, June 30, 1890.

Eriogonum ovalifolium depressum, n. var.

Leaves 5 mm. long; peduncles 2-4 cm. high; heads single on the peduncle, small and few-flowered: involucres 2 mm. long, 5-flowered: pedicels 2 mm. long: sepals 1½-2 mm. long, white or purplish tinged., while in the species these characters are at least twice as large and the involucres about 20-flowered. In dense, caespitose, hemispherical clusters on dry decomposed rocks at about 10,000 feet altitude.

Doubtfully more than an alpine variety of the species, as connecting forms seem frequent in collections and the characters are alike except in size.

Black Butte, Tobacco Root Range, Aug. 11, 1902; Old Hollowtop, July 9, 1897, Rydberg & Bessey, 5338; Nyack, Aug. 25, 1902, M. J. Elrod; the last two collections not so characteristic as the first.

Polygonum acre, HBK. Flathead Lake, Aug. 1897, M. J. Elrod, 260. Rare here.

***Polygonum aviculare**, L. Yard- Grass; Goose Grass. The typical form with narrow acute leaves seems to be frequent in moister localities west of the Divide, but replaced eastward by *P. littorale*, Link. A common weed in dooryards and by roadsides.

Columbia Falls, July 20, 1900; Missoula, Sept. 6, 1899; Thompson Falls, Aug. 6, 1901.

***Polygonum erectum**, L. A common weed in many localities in the eastern part of the state. Often prostrate in hard dry ground. Malta, Sept. 9, 1900; Wibaux, July 9, 1901; Big Timber, July 13, 1901; Calais, July 14, 1900.

Polygonum jejunum, Greene, Pittonia, 5: 198.

"Spanish Peaks, Madison Range, July 14, 1896, J. H. Flodman, No. 368; Indian Creek, 1897. Rydberg & Bessey, No. 5357."

Polygonum prolificum, Robinson, Rhodora, 4: 68. In alkali places. Lake Bowdoin near Malta, Aug. 25, 1903.

Rumex confinis, Greene, Pittonia, 4: 306. —(Wm. Trelease). One of the segregates of *R. occidentalis*, Wats., differing from the true *occidentalis* in being a much larger plant with larger leaves and much larger fruit valves. Noted in but one locality in the state, growing in ditches by the railway and may have been introduced from westward, where it is more common.

Libby Creek, Flathead Co., July 6, 1900.

CHENOPODIACEÆ.

Endolepis ovata, Rydberg, Bull. Torr. Bot. Club, 30: 248. Separated from *E. Suckleyana*, Torr. "Glendive, 1892, J. H. Sandberg."

AMARANTACEÆ.

***Amaranthus chlorostachys**, Willd. A weed introduced from westward. Columbia Falls, Sept. 9, 1899; Troy, July 25, 1900.

NYTAGINACEÆ.

Abronia nudata, Rydberg, Bull. Torr. Bot. Club, 29: 683. "Colgate near Glendive, 1892, Sandberg, MacDougal & Heller, 1016."

Allionia nyctaginea, Michx. In cultivated ground apparently introduced. Calais, July 14, 1900; Wibaux, July 9, 1901.

PORTULACACEÆ.

Claytonia multicaulis, A. Nelson, Bull. Torr. Bot. Club, 27:259; *C. Virginica*, Rydberg, Flora, 138, and other authors as to the Rocky Mountain species. This species differs from *C. Virginica*, L. in its somewhat wider, sessile cauline leaves, white petals with a yellow base within and anthers pink. Nelson describes it fairly well, except the cauline leaves are not rarely above or below the middle of the stem and the petals are not "white with pinkish or purplish veins". The inflorescence is more racemiform than in *C. lanceolata*, Pursh and peduncles are nodding before and after anthesis.

Common in the mountain valleys from 4 to 7000 feet altitude and intergrading above with *C. lanceolata*, Pursh (7-9000 feet). If this prove distinct from Nelson's *C. multicaulis*, it may be called *Claytonia tricolor*.

Claytonia Virginica, L., as to Montana specimens, is *C. multicaulis*, Nels.

Lewisia triphylla, Robinson, Syn., Flora, 1:269. Occurs in alpine situations, resembling a small form of *Claytonia multicaulis*. The localities below greatly extend its range eastward.

Granite Range, Carbon Co., Aug. 1899, 11,500 ft., Peter Koch; Lake Plateau, Carbon Co., Aug. 1899, 9000 ft., Peter Koch.

Montia perfoliata, Howell. All the specimens quoted by Rydberg (Flora, 139) seem good *M. parviflora*, Howell, which is separated from *perfoliata* by its smaller sepals, petals and seeds; the latter species does not occur east of the Divide and is rare in damp, shady places west of it.

Plains, June 6, 1902; Thompson Falls, June 7, 1902.

***Portulaca oleracea**, L. A rare weed in gardens.

Craig, July 29, 1900; Bozeman, Aug. 18, 1898; Glendive, July 9, 1901.

CARYOPHYLLACEÆ.

Arenaria capillaris formosa, Regel. Alpine and subalpine situations. Flat-top Mtn., Teton Co., 7000 ft., July 5, 1897, R. S. Williams; Sperry Glacier Camp, 6000 ft., Sept. 1, 1903.

Arenaria congesta, Nutt. In alpine and subalpine situations. Mt. Bridger, 9000 ft., July 3, 1900; Mt. Hyalite, 10,000 ft., Aug. 1, 1902; Monida, 7000 ft., June 26, 1902.

Arenaria lateriflora tenuicaulis, n. var.

Like the type except in its capillary, spreading stem with longer internodes and its linear-lanceolate or linear oblong acute leaves with usually sparser pubescence.

Swan Lake, near Big Fork, Mont., July 6, 1902, Walter Lehman, 154, and I would include the nearly glabrate form from Peel's River near the mouth of the Mackenzie, N. W. T., Miss E. Taylor, instead of placing it with the variety *glabrescens*, Robinson (Syn. Flora, 1: 238). Apparently an arctic and subalpine variety, rare in Montana.

Arenaria verna, L. The typical glabrous form.

St. Mary's Lake, July 4, 1897, R. S. Williams; Single-shot Mts. Teton Co., 7000 ft., July 4, 1897, R. S. Williams; Forks of Cut-bank Cr., July 27, 1897, R. S. Williams; Divide Mtn., Teton Co., July 16,

1897, R. S. Williams; Mt. Henry, Midvale, 7500 ft., July 16, 1903, L. M. Umbach, 405.

Cerastium arvense angustifolium, Fenzl. A form with rigid narrow, fascicled leaves collected by F. A. Spragg, near Lewistown, July 26, 1901, seems best referable here.

Cerastium arvense oblongifolium, Hollick & Britton, Bull. Torr. Bot. Club, 14: 47, t. 63. "Montana, Scribner", Syn. Flora, 1: 230.

***Cerastium vulgatum,** L. A weed common in many places west of the Divide. Kalispell, July 21, 1900; Troy, July 25, 1900; Columbia Falls, July 20, 1900 Borax, August 11, 1901; Thompson Falls, August 8, 1901.

Lychnis montana, Wats. In alpine and subalpine situations. Horsefly Pass, Crazy Mts., 8200 ft., July 20, 1902; Mt. Hyalite, 10,000 ft., Aug. 1, 1902.

Sagina nivalis, Fries. Found near melting snow at Maynard's Camp, head of Cottonwood Cr., Tobacco Root Range, 9000 ft., Aug. 10, 1902.

Silene Antirrhina vaccarifolia, Rydberg, Bull. Torr. Bot. Club, 31:407. "Big Horn River, 1891, F. Tweedy."

Silene Douglasii viscida, Robinson. Camp below Sperry Glacier, 6140 ft., Sept. 1, 1903; Black Butte, Tobacco Root Range, 10,000 ft., Aug. 11, 1902; Cut-bank Canyon, Teton Co., July 27, 1897, R. S. Williams; Head of Butcher-knife Cr., Little Belt Mts., 7800 ft., Aug. 14, 1901, F. A. Spragg, 808.

***Silene noctiflora,** L. An occasional weed in gardens and waste places. Bozeman, 1898, 1904.

Silene Suksdorfii, Robinson. Black Butte , Tobacco Root Range, 10,000 ft., Aug. 11, 1902.

***Spergula arvensis,** L. A weed in grain fields, rare. Bozeman, July, 1898.

Spergularia salina, J. & C. Presl. Common in alkali flats, Bowdoin Lake, Malta, Aug. 25, 1903; Billings, June 30, 1903.

Stellaria borealis, Bigelow. Plains, June 6, 1902; Middle Cr. Canyon, July 30, 1902. The variety *corallina*, Fenzl. seems far more common than the type in this state.

***Stellaria graminea,** L. A weed which should be found frequently in door yards and waste places. Helena, E. N. Brandegee.

***Stellaria media,** Cyrill. Not infrequent as a weed in door-yards and lawns in the larger towns. Plains, Aug. 7, 1901; Helena, Aug. 12, 1898, E. N. Brandegee; Bozeman, Aug. 18, 1898.

RANUNCULACEÆ.

Anemone Canadensis, L. In low woodlands along the Missouri River. Culbertson, July 11, 1904, and region adjacent.

Anemone Drummondii, Wats.? "Rocky Mts. Summits at 8000 ft. Lat. 49 degrees N." Dr. Lyall, 1861 in Gray Herb. I am inclined to refer this specimen to *A. Tetonensis,* Porter, as in my opinion this and all other specimens of *Drummondii* from the Rocky Mountains are the former species. The two appear to intergrade westward, but *Drummondii* is properly a species of the Coast Range and southward.

Anemone lithophylla, Rydberg, Bull. Torr. Bot. Club, 29: 152. "Little Belt Mountains 9 miles from Barker, 1896, J. H. Flodman, 459."

Anemone globosa, Nutt. is *A. multifida,* Poir. I am unable to see that the Montana form of this species differs essentially in pubescence or other character from the South American forms of the type, so that Nuttall's *globosa* seems quite untenable, even as a variety.

Aquilegia formosa, Rydberg, Flora, 155. All the specimens from Montana referred to this are probably the red-sepaled form of *A. flavescens,* Wats., which is common in the mountains along with the form with yellow sepals; its long curved spurs and yellow or pinkish sepals separate it from *formosa* with straight spurs and deep carmine red or scarlet sepals. The latter species appears not to be within our limits.

Clematis Scottii, Porter (Rydberg, Flora, 160) is *C. Wyethii,,* Nutt. below.

Clematis Wyethii, Nutt., Jour. Acad. Phila. 7: 6. Rydberg says it is "common in Montana." (Bull. Torr. Bot. Club, 29:155), but it is not commonly separated from *Douglasii* and is doubtfully distinct.

Delphinium bicolor Montanense, Rydberg, Flora, 157. Is not "glandular pilose," but viscid pubescent and is in part at least the early spring form of *D. Menziesii,* DC., and in part apparently an intergrade between *D. bicolor,* Nutt. and *Menziesii,* both of which are

common in the state and appear to intergrade in many localities. A subalpine form of *Menziesii*, growing in loose limestone shingle on Mt. Bridger (8500 ft.), has long ligneous roots like *bicolor*, but otherwise agrees well with *Menziesii*.

Delphinium diversicolor, Rydberg, Bull. Torr. Bot. Club, 29:149. "Rattlesnake Creek, Beaverhead Co., 1887, F. Tweedy, 34."

Delphinium elongatum, Rydberg, Bull. Torr. Bot. Club, 29:148. Nearest *D. glaucum*, Wats. "Lima, 1895, Rydberg."

Delphinium glaucescens, Rydberg and var. *multicaule*, Rydberg, Flora, 157. These appear to be a form of *D. occidentale*, Wats. (D. *scopulorum subalpinum*, Gray), tending apparently toward *D. scopulorum*, Gray in its small flowers, pubescent ovaries and more dissected leaves. *D. occidentale*, Wats. is not "glandular," but viscid pubescent along the inflorescence and Nelson's form of *subalpinum* differs from Watson's type of *occidentale*, chiefly in the smaller size and larger, deep-blue sepals, Watson's type of *occidentale* being a larger, branching plant with paler flowers, evidently tending toward *D. glaucum*, Wats. None of the specimens under the variety *subalpinum* in the Gray Herbarium have glandular pubescence.

Delphinium Nuttallii, Gray. In alpine and subalpine situations. Camp below Sperry Glacier, 6000 ft., Sept. 1, 1903; Little St. Mary's Lakes, Sept. 1, 1903, L. M. Umbach; Hall's Peak, Mission Range, July 20, 1902, M. J. Elrod; Plains, June 6, 1902.

Delphinium occidentale, Wats. See *D. glaucescens*, Rydberg above.

Delphinium pauciflorum, Nutt. Common on dry wooded upland benches along the lower Clark's Fork. Plains and Thompson Falls, June 27, 1902.

Delphinium pauciflorum depauperatum, Gray. In alpine situations. Mary Baker Lake, Sperry Glacier, 8000 ft., Aug. 22, 1901, L. M. Umbach. I am inclined to regard this as a variety of *D. Nuttallii*, Gray, as it more nearly approaches it in habitat and will probably be found to intergrade with it. In this state, at least, *D. pauciflorum*, Nutt. is a species of the lower forests westward and apparently occurs nowhere in this immediate vicinity, yet in the finely dissected leaves and small follicles the variety more nearly resembles *pauciflorum* with which it has been placed.

Myosurus apetalus, Gray. In the bed of a dry pond. Gardiner, July 4, 1899.

Ranunculus acriformis, Gray. Monida, June 26, 1902; Copperopolis, Meagher Co., July 23, 1902; Sunset, June 17, 1896, Mrs E. W. Scheuber.

Ranunculus alpeophilus, A. Nelson is R. *inamoenus,* Greene. Rydberg (Flora, 164) seems to have taken a form near his own *saxicola* for Nelson's species.

Ranunculus cardiophyllus, Rydberg, Flora, 165, is R. *inamoenus,* Greene.

Ranunculus circinatus, Sibth. In ditches and slow streams, frequent. Gallatin River, July 27, 1898; Big Coulee Cr., Sweet Grass Co., June 15, 1892; Broadwater, Helena, June 14, 1898, E. N. Brandegee.

Ranunculus Cymbalaria alpinus, Hook. Near the Continental Divide, Empire, Aug. 1902, Owen Byrnes.

Ranunculus ellipticus, Greene. See *R. glaberrimus* below.

Ranunculus eremogenes, Greene. The characters given by Greene (Erythea, 4: 121) for this species will hold equally well for European and Asiatic specimens of *R. sceleratus,* L., and even the rank, fleshy, fistulus, large-flowered form, which he regards as the typical European *sceleratus,* occurs occasionally here in situations which preclude its introduction. All our specimens come under *R. sceleratus,* L.

Ranunculus Flammula intermedius, Hook. In wet places, infrequent. Flathead Lake, July 23, 1900; Belton, Aug. 19, 1902; Columbia Falls, June 25, 1894, R. S. Williams; Thompson Falls, Aug. 6, 1901; Midvale, July 1, 1903, L. M. Umbach.

Ranunculus Flammula varians, n. var.

Stems filiform, 10-20 cm. long, creeping and rooting at the nodes; leaves ovate, rarely oval, 5-12 mm. long, on petioles nearly twice that length; petals 4 mm. long: otherwise as in *R. Flammula reptans,* Gray, from which it differs mainly in its ovate leaves. Crow Creek, Mission Mts., Aug., 1897, M. J. Elrod, 234. A similar but larger form with leaves 1-2 cm. long and 8-12 mm. wide, collected in wet places at Lake McDonald, Aug. 30, 1903, appears to be the same verging toward the variety *intermedius,* Hook.

Ranunculus glaberrimus, Hook., Fl. Bor. Am. 1: 12; *R. ellipticus,* Greene, Pittonia, 2:10; Rydberg, Flora, 163. It is very probable that two species are included in Hooker's description of *R. glaberrimus,* or have been classified as such, but there is no reason for the separation and renaming the one with entire basal leaves, for this is clearly the form Hooker made most prominent in his description and represented in his figure (T. V.). If any renaming is done, it should be the one with trilobed basal and entire cauline leaves, which is not found in Montana. The common spring buttercup here is the *R. ellipticus,* Greene, which is therefore a synonym for *R. glaberrimus,* Hook.

Ranunculus Helleri, Rydberg, Bull. Torr. Bot. Club, 29: 159. "Sperry Glacier, 1901, F. K. Vreeland, 1110."

Ranunculus Macounii Oreganus, Davis; *R. Oreganus,* Howell. A smoothish, thin-leaved form of *Macounii* with smaller flowers and heads, in swales about Lake MacDonald, Aug. 29, 1903, L. M. Umbach, 773.

Ranunculus Montanensis, Rydberg, Flora, 166. This appears to be a rank, large-flowered form of *R. acriformis,* Gray.

Ranunculus orthorhynchus platyphyllus, Gray; *R. maximus,* Greene. Borax, Missoula Co., Aug. 8, 1901, also in Yellowstone Park.

Ranunculus saxicola, Rydberg, Flora, 164. A form of *R. Eschscholtzii,* Schlecht., tending somewhat in leaf form toward *R. eximius,* Greene, but having pubescent akenes.

Ranunculus sceleratus, L.; *R. eremogenes,* Greene. Common in wet places.

Thalictrum polycarpum, Wats. Said in the Synoptical Flora (1:16) to "extend apparently to Montana." What evidence Dr. Gray had for this statement is uncertain, for there is nothing in the Gray Herbarium to support it and recent collections seem to show that the species ranges little eastward from the Coast Range.

BERBERIDACEÆ.

Berberis Aquifolium, Rydberg, Flora, 170, is the next species.

Berberis repens, Lindl. Rydberg (Flora, 170) decides that the names of these two species of western *Berberis* have been transposed on the ground that Pursh's figure of *Aquifolium* (Flora Am. Sept.

219) is *B. repens*, Lindl., except the detailed drawing of one leaflet, which has the more acute apex and fewer and larger serrations of the true *Aquifolium* of the Pacific Coast. The figure perhaps represents parts of two species, but the botanist must go, as a final resort, not to the figure and description, but to the plants from which they are drawn. Lindley (Bot. Reg. t. 1176) clearly distinguishes the two species and says that the plants of Menzies in the Banksian Herbarium were the types from which the figure and description of Pursh were taken and that these are *B. Aquifolium*—not his *B. repens*, but thinks that probably those of the Lewis collection were the latter. The plants of the Lewis and Clark Expedition have recently been gone over at the Gray Herbarium by Robinson and Greenman (Proc. Acad. Phila. 1898: 12-49) and they say (p. 48) the Lambert Herbarium specimens from this collection are *Aquifolium*. Pursh in his description of *Aquifolium* calls the leaves "nitida," which is true only of *Aquifolium*. *B. repens* has normally but 3-5 leaflets, *B. Aquifolium* has 7-11; Pursh's figure represents seven leaflets and the type locality is the Great Rapids (Dalles) of the Columbia, where *Aquifolium* occurs and not *repens*, so there is not sufficient ground for changing Lindley's interpretation.

CRUCIFERÆ.

***Alyssum calycinum**, L. A rare weed here. U. S. Fish Station, Bozeman, May 30, 1902, Mrs. H. F Henshall.

Arabis arcuata subvillosa, Wats. Meadows at Midvale, July 4, 1903, L. M. Umbach, 263; Mt. Bridger, 8500 ft., July 11, 1903; Bozeman, June 28, 1899.

Arabis Kochii, n. sp.

Annual or biennial, 2-4 dm. high, finely stellate pubescent below, glabrous above, except the peduncles and calyx, stem usually simple and erect: radical leaves oblanceolate or oblong-lanceolate, entire, rarely somewhat denticulate; cauline linear-lanceolate or oblanceolate, entire, more or less sagittate at base: flowers becoming reflexed; petals purplish, 4-6 mm. long, twice the length of the sepals: pods straight, rarely somewhat arcuate, 4½ cm. long, 1-1½ mm. wide, valves 1-nerved below, narrowed above to the sessile stigma: peduncles abruptly reflexed and mostly appressed, seeds in one row, orbicular, narrowly winged, as broad as the valves; cotyledons accumbent.

Near *A. Holboelii*, Hornem., with which it is commonly confused, but differs from this in being lower and more slender, stems glabrous above, less sagittate cauline leaves, pods about half as long and wide and more appressed and seeds in one row. From *A. arcuata subvillosa*, Wats. it is separated by its lower, more slender habit and its smaller, appressed, straight pods. In appearance it closely resembles *A. exilis*, Nelson (Bull. Torr. Bot. Club, 26:123), but differs in its sagittate cauline leaves, narrower pods and winged seeds.

Frequent in dry rocky glades in the mountains from 5-7000 ft., while the larger wide-fruited *A. Holboelii* belongs to the plains and lower valleys. Named for Peter Koch of Bozeman, Mont., who so long collected industriously the flora of this region and gave his work to advance the cause of science.

Plains, Missoula Co., June 6, 1902; Lower Canyon of the Gallatin River, 5500 ft., July 5, 1898; Lower Basin of the Gallatin, 6000 ft., July 6, 1898; Bridger Canyon, 5000 ft., July 20, 1898; Lombard, June 1, 1901.

Barbarea stricta, Andrz. Flowers smaller and a paler yellow, fruiting raceme strict, separating it from *B. vulgaris arcuata*, Fries, which also occurs here, but less frequently.

Spring Hill, July 3, 1903, Amy M. Cooke; Evaro, June 8, 1902; Yellowstone, E. N. Brandegee.

***Brassica campestris,** L. A frequent weed in old fields and waste places. Bozeman, July 22, 1898; Craig, July 29, 1900; Salesville, Sept. 2, 1892, W. T. Shaw.

***Brassica juncea,** Cosson. A rare introduction. Bozeman, July 27, 1903, Amy M. Cooke.

***Brassica nigra,** Koch. Not infrequent as a weed in fields and waste places. Great Falls, 1900; Alhambra, July 24, 1898, E. N. Brandegee; St. Ignatius, Sept. 7, 1899; Wibaux, July 9, 1901; Crow Agency, July 15, 1901; N. Boulder, June 25, 1899, C. D. Flaherty.

Cardamine acuminata, Rydberg, Bull. Torr. Bot. Club, 29:237; *C. hirsuta acuminata*, Nutt. Middle Cr., June 3, 1900; Gallatin River, June 28, 1899; Columbia Falls, June 2, 1894, R. S. Williams, 338; Belt R. Canyon, June 21, 1885, R. S. Williams; Bozeman, July 23, 1898.

***Conryngia perfoliata,** Link. Introduced in a few localities. Hinsdale, June 13, 1901; Midvale, July 19, 1903, L. M. Umbach.

Drapa alpina, L. Mountain sides, Midvale, July 12, 1903, L. M. Umbach, 312. A large (15 cm. high) subcaulescent form near *D. hirta,* L.

Draba borealis, DC. Specimens collected by R. S. Williams at St. Mary's Lake, July 4, 1897, are densely cæspitose and appear to belong here rather than with *D. incana,* DC.

Draba Breweri, Wats. Dry rocks; subalpine. Horsefly Pass, Crazy Mts., 8200 ft., July 20, 1902; St. Mary's Lake, July 4, 1897, R. S. Williams.

Draba cana, Rydberg, Bull. Torr. Bot. Club, 29:241. Most American forms of *D. incana,* L., are split off under this name; distinguished by its more narrow, pubescent pods.

Draba Fladnizensis, Wulf. The following seems best placed here: Divide Mt., Teton Co., July 16, 1897, R. S. Williams.

Draba oligosperma microcarpa, n. var.

Differs from *oligosperma* in its smaller (2 mm. long, instead of 3-4 mm.), more orbicular and often more pubescent pods and smaller flowers, and from *D. andina,* Nelson, in its smaller pods, longer (4-6 mm.) and narrower leaves and racemose inflorescence. One of the confluent *glacialis* group to which it is desirable to call attention.

Black Butte, Tobacco Root Range, 10,000 ft., Aug. 11, 1902; Dewey, June 24, 1902; Horsefly Pass, Crazy Mts., 8200 ft., July 20, 1902.

Draba saximontana, A. Nelson. "Monida, Madison Co., June 16, 1899, A. & E. Nelson."

***Eruca sativa,** Lam. Resembles *Brassica alba,* Boiss. Our specimens appear to be 2-3 feet high and nearly glabrous, but the fruit is glabrous and wider (6 mm.) than is normal with the species. Not before reported as a weed in America. Collected in the vicinity of Kalispell, Sept. 9, 1898, by Dr. E. V. Wilcox.

***Hesperis matronalis,** L. Occasionally escaped from ornamental cultivation. Bozeman, 1891, W. T. Shaw; 1898.

Lepidium pubicarpum, A. Nelson, Bot. Gaz. 30:189. Distinguished from *L. apetalum,* Willd. by its much lower, branching habit and by being puberulent throughout, even to the pods.

Dwelle's, Upper Madison River, July 30, 1899, A. & E. Nelson; Bozeman, July 2, 1898.

Lesquerella Ludoviciana, Wats. Petals frequently purplish. Wibaux, May 25, 1902; Great Falls, June 9, 1885, R. S. Williams; Martinsdale, May 26, 1880, R. S. Williams.

***Nasturtium Armoracia,** Fries. A not infrequent escape from cultivation. Helena, July 9, 1900; Bozeman, Aug., 1901.

Physaria macrantha, n. sp.

5-8 cm. high with a long, deeply penetrating root: petals 10-14 mm., long, bright yellow: fruit didymous and much inflated, often large, 10-14 mm. diameter. In dry stony subalpine localities, 7-9000 ft. altitude, and appears to intergrade with *P. didymocarpa,* Gray, which grows at lower elevations and has smaller (7-8 mm.) and paler colored petals and smaller (7-10 mm.) fruit.

Hills near Granite Butte, Sept., 1902, Owen Byrnes; Midvale, July 9, 1903, L. M. Umbach; Mt. Bridger, 8500 ft., July 11, 1903; Dewey, June 24, 1902.

Sisymbrium decumbens, (Rydb.); *Schoenocrambe decumbens,* Rydberg, Bull. Torr. Bot. Club, 31:409. Separated from *S. linifolium,* Nutt. "Melrose, 1895, Rydberg, 2671; Sheridan, 1895, L. A. Fitch."

***Sisymbrium altissimum,** L. The "Tumbling Mustard" is becoming a common and troublesome weed in many sections of the state. Great Falls, July 10, 1900; La Salle, June 24, 1901, W. F. Jellison; Belgrade, Oct. 20, 1904; Missoula, June 5, 1892.

Sisymbrium canescens, Nutt. In the eastern plains, frequent. Great Falls, R. S. Williams, May 24, 1885; Custer Station, May 30, 1890; Forsyth, June 29, 1898; Fergus Co., July 5, 1901, F. A. Spragg.

Sisymbrium incisum Californicum, (T. & G.); *Sophia Californica,* Rydberg, Bull. Torr. Bot. Club, 29:238. Dewey, Beaverhead Co., June 24, 1902.

Sisymbrium viscosum, (Rydb); *Sophia viscosa,* Rydberg, Bull. Torr. Bot. Club, 29:238. Distinguished from *S. incisum,* Engelm. by its viscid pubescence throughout and narrower siliques.

Deep Cr. Canyon, Big Belt Mts., Aug. 14, 1899.

Smelowskia Americana, Rydberg, Bull. Torr. Bot. Club, 29:239. The American forms of *S. calycina,* C. A. Meyer are separated under this name.

Thelypodium Nuttallii, Wats.? Some two feet high with

branching inflorescence. Has the leaves and general habit of *Nuttallii*, but the flowers are smaller, with petals about 6 mm. long and apparently white.

Hallett's Ranch, Helena, Aug. 15, 1892, E. N. Brandegee.

CRASSULACEÆ.

Sedum frigidum, Rydberg, Bull. Torr. Bot. Club, 28:283. The American forms of *S. Rhodiola*, DC. (S. *roseum*, Scop.) are thus separated as a distinct species.

Sedum subalpinum, n. sp.

Perennial, 5-10 cm. high, glabrous, except the leaves, branching from the base: leaves terete, sometimes flattened, 4-7 mm. long, usually densely pulverulent under a lens, mainly aggregated in basal rosettes: cymes contracted, 2-4 cm. in diameter: petals 5 mm. long, equalling the short, thick, erect follicles: bracts, sepals and petals often purplish. Rocky ledges in alpine and subalpine situations, 8000 feet and upwards, passing below into *S. stenopetalum*. Colorado and Oregon, northward in the mountains.

S. stenopetalum, Pursh, is distiguished from this species by its greater size (10-18 cm.), fewer basal rosettes: leaves 8-12 cm. long: cymes diffuse and divisions divergent, 4-8 cm. in diameter: petals 8 mm. long, equalling the erect, slender follicles, and it is found in the lower mountains from 3-8000 feet. The smaller size, more abundant basal rosettes, smaller leaves, cymes, flowers and fruit and higher altitude readily separate *subalpinum* from this species, though the two appear to have been confounded in most herbaria.

Sperry Glacier, 8000 ft., Sept. 1, 1903; Beef Straight, Jefferson Co., June 30, 1902; Mt. Hyalite, Gallatin Co., 10,000 ft., Aug. 1, 1902; Horsefly Pass, Crazy Mts., 8200 ft., July 20, 1902; Mt. Bridger, 8500 ft., July 11, 1903; Monida, 7000 ft., June 26, 1902.

PAPAVERACEÆ.

Argemone alba, Lesteb. Apparently native in the eastern plains. Custer Station, June 23, 1890; Forsyth, July 24, 1901; Meyers, 1902.

Papaver nudicaule arcticum, Elkan.; Rydberg, Flora, 475. Is *P. pygmaeum* below.

Papaver pygmaeum, Rydberg, Bull. Torr. Bot. Club, 29:159; *P. nudicaule arcticum*, Rydberg, Flora, 475. Also at Sperry Glacier, Sept. 1, 1903, 8000 ft.

SAXIFRAGACEÆ.

Heuchera alpina, n. comb., *H. cylindrica alpina*, Wats. Horse-fly Pass, Crazy Mts., 8200 ft., July 20, 1902; Monida, June 26, 1902.

Heuchera saxicola, E. Nelson, Bot. Gaz. 30:118. Separates our Montana form commonly referred to *H. ovalifolia*, Nutt. as the above species, which is characterized as "villous and viscid glandular" and *ovalifolia* proper as "wholly destitute of villous hairs." Torrey & Gray (Fl. N. Am. 1:581) seems to have used the latter term to distinguish this species from *H. cylindrica*, Dougl., previously described and it is not at all evident that he did not mean our species.

Leptarrhena amplexifolia, R. Br. Mountain sides, Holzinger Basin, Sperry Glacier, Aug. 22, 1901, L. M. Umbach, 356.

Mitella stauropetala, Piper, Erythea, 7:161. Differs from *M. trifida*, Graham in being larger throughout, raceme secund, petals twice the length of the sepals and divided half down into three filiform divergent lobes; *trifida* having relatively few flowers, petals scarcely exserted and very shortly lobed. Close to *M. violacea*, Rydb., of which it may be the normal form, but differs from it in its larger size, more numerous flowers and petals trifid into long, filiform, divaricate segments. In leaf and pubescence they seem identical and in fruit can only be distinguished by size. Petals often a beautiful violet. Evaro, June 8, 1902, low wet places; Mt. Hyalite, 8000 ft., Aug. 1, 1902.

Parnassia Kotzebuei, C. & S. In bogs at the outlet of the Lower Basin of the Gallatin River, July 7, 1898. 3-15 cm. high, staminodia 5 and fairly typical of the species. Not heretofore found south of the British boundary.

Ribes aureum chrysococcum, Rydberg, Flora, 204. There is no basis for separating the yellow-fruited forms of *R. aureum* from the black-fruited ones, as variation in fruit-coloration is not infrequent. There are red and white fruited forms of *Actaea arguta*, Nutt., red and yellow fruited forms of *Shepherdia argentea*, Nutt. and *S. Canadensis*, Nutt., as well as red and black fruited *Prunus demissa*, Walp. In regard to the yellow, red and black fruit of *Ribes aureum* see Bot. Gaz. 14:289 and 15:24. Yellow appears to be the normal color of the fruit here.

Ribes camporum, n. sp.

Infra-axillary spines 1-3, short; more or less prickly and densely canescent on the younger branches: leaves usually small, 1-2 cm. long, deeply 3-5 lobed, lobes deeply and often acutely incised, cordate or truncate at base, thick, densely canescent with short hairs, especially below when young, veins impressed above, salient beneath; petioles about the length of the blade, lanate: peduncles short, 1-2 flowered; pedicels and calyx glabrous: bracts and bud scales glabrous and ciliate: flowers 8-10 mm. long; calyx-tube cylindric, about the length, or a trifle longer than the lobes, greenish-white or somewhat purplish: petals spatulate or oboval, about half the length of the calyx lobes; stamens equaling the petals: fruit glabrous, apparently red when ripe, 6-8 mm. diameter. A shrub 6-12 dm. high on dry cliffs and broken uplands throughout the plains region east of the mountains.

Apparently *R. Cynosbati*, Mx. var. γ of Hooker (Fl. Bor. Am. 1:230) and *R. oxycanthoides*, L. var. γ of Torrey & Gray (Fl. N. Am. 1:546), but all the specimens consulted seem to show the calyx, pedicels and fruit glabrous, though there may be variation in this respect. Certainly different from *R. setosum*, Lindl., which has larger, thinner, nearly glabrous, crenately dentate leaves, much less conspicuous veining, longer pedicels and calyx-tube nearly twice longer than its lobes. *R. setosum* is a shrub of the lowland thickets, while *R. camporum* is found on the dry upland cliffs. It is also very different from *R. saxosum*, Hook., which has larger, glabrous leaves, 4-6 flowered peduncles, larger flowers, fewer prickles and the pubescence wholly lacking; the range of the latter also is west of the Continental Divide. *R. camporum* appears to extend from the Saskatchewan southward to Colorado in the plains east of the mountains.

Big Horn River, 7 miles south of Custer Station, May 3, 1890, No. 9; Glasgow, July 17, 1900 (in fruit); Wibaux, May 25, 1902.

Ribes echinatum, Lindl.; Rydberg, Flora, 202. It does not seem possible to separate the western form of *R. lacustre*, Poir, from the eastern one, as the characters given do not hold.

Ribes Hudsonianum, Richards. All Montana specimens so referred are *R. petiolare*, Dougl., which has larger leaves, longer racemes and glabrous calyx. *Hudsonianum* is more northern and apparently does not reach our limits.

Ribes lacustre, Poir. includes *R. echinatum*, Lindl. See above.

Ribes lentum, Coville & Rose, Proc. Biol. Soc. Wash. 15:26-29 (F. V. Coville); *R. lacustre molle*, Gray. In subalpine situations.

Head of Cottonwood Cr., Tobacco Root Range, 9000 ft., Aug. 11, 1902; Single-shot Mts., Teton Co., 7000 ft., July 4, 1897, R. S. Williams.

Ribes leptanthum, Gray. A small rigid-branched, spiny shrub, 2-3 ft. high, in dry rocky places, 6000-8500 ft. altitude in the mountains east of the Divide. *R. saximontanum*, E. Nelson (Bot. Gaz. 30:119)?

Rocky Canyon, Bozeman, May 26, 1900, 6000 ft.; Horsefly Pass, Crazy Mts., July 20, 1902, 8000 ft.; Wilder, July 9, 1897, R. S. Williams.

Ribes leucoderme, Heller, seems the same as *R. irriguum*, Dougl.

Ribes longiflorum, Nutt. in Fraser's Catalogue. See Coville, Proc. Biol. Soc. Wash. 15:23. The yellow-flowered currant of the Missouri and its tributaries in the plains has longer (16 mm.) flowers and the lobes of the leaves acute and straight margined (*R. longiflorum*, Nutt.), while the mountain form has shorter (11 mm.) flowers, the lobes of the leaves obtuse and incurved toward the apex (*R. aureum*, Pursh). Wibaux, May 25, 1902; Box Elder Cr., Valley Co., July 14, 1900; Fergus Co., Aug. 2, 1901, F. A. Spragg.

Ribes Purpusi, Koehne, (ined?). (F. V. Coville). An unarmed shrub with whitish bark and thin glabrous leaves; flowers 2 or 3 in axillary, usually drooping, racemes; calyx tube campanulate, greenish or rarely purplish, with lobes equaling or longer than the tube; petals white, half shorter than the lobes of the calyx; stamens exserted and calyx lobes reflexed on maturity; fruit black, naked. Along shady streams.

Limekiln Canyon, Bozeman, June 18, 1900; Middle Cr. Canyon, July 31, 1902; Flathead-Brackett Cr. Divide, July 16, 1902.

Saxifraga austromontana, Wiegand, Bull. Torr. Bot. Club, 27: 389; *S. cognata*, E. Nelson; Bot. Gaz. 30:118. Our Rocky Mountain species of *S. bronchialis*, L. has been separated as the above, but an examination of any considerable number of Siberian and East Asia specimens will show their great variability and relative approximation to the American forms in leaf and flower, so that separation is questionable.

Saxifraga caespitosa minima, n. n.; *S. moschata* forma *compacta*,

Mert. & Koch; *S. acaulis*, Gaud. The small, condensed, more cæspitose form of *S. caespitosa*, L., 1-3 cm. high and 1-3 flowered, in alpine situations.

Single-shot Mountain, Teton Co., 7000 ft., July 4, 1897, R. S. Williams; Mt. Hyalite, 10,000 ft., Aug. 1, 1902; Mt. Henry, Teton Co., June 28, 1903, L. M. Umbach.

Saxifraga Columbiana, Piper, Bull. Torr. Bot. Club, 27: 393. One of the segregates of *S. integrifolia*, Hook., characterized by having narrow, obovate-oblong petals, shorter than the calyx lobes and calyx-tube adnate to the ovary, which is immersed in a lobed disk.

Bozeman, May, 1887, Peter Koch; Mt. Bridger, May 16, 1901; Plains, June 6, 1902; Thompson Falls, June 7, 1902; Columbia Falls, June 7, 1893, R. S. Williams.

Saxifraga exarata, Vill. Much more lax than *S. caespitosa*, L. and the basal leaves are not aggregated, as in that species; flowering stems weak and ascending. In the spray of the falls with *S. debilis*, Engelm.

Middle Cr., Gallatin Co., July 7, 1901, W. W. Jones; same locality, July 30, 1902.

Saxifraga integrifolia, Hook. By the splitting up of this composite species the true *integrifolia* is not found in Montana, but is native further west. See Coville, Proc. Biol. Soc. Wash. 7:79 and Small, Bull. Torr. Bot. Club, 23:366.

Saxifraga Greenei, n. sp.

S. *nivalis* of most authors, as to the Rocky Mountain species.

Apparently annual or biennial from a short, fibrous-rooted caudex; acaulescent: leaves ovate to ovate-elliptical, coreaceous, crenately serrate, 15-20 mm. long by about two-thirds as wide, usually with some rusty tomentum beneath, obtuse at apex and narrowed abruptly into a winged, often ciliate petiole of about the length of the blade; scape about 10 (3-16) cm. high, densely glandular-pubernlent above; flowers nearly sessile in dense terminal heads, bracts linear, scarcely equaling the glabrous calyx: calyx short-turbinate, the tube about as long as the ovate erect acute or obtuse segments, and adherent to ovary; petals elliptical or oboval, narrowed to a sessile base, 2 mm. long, twice the length of the calyx segments, white, lateral nerves rarely confluent above: carpels widely divergent above on maturity, deep purple: bracts and calyx segments usually purplish.

The true *S. nivalis*, L. is a species of the Arctic regions and is readily separated from this species of the Rocky Mountains by its glabrate, canescent or sparse purple-glandular pubescence; its wider, more rounded, thinner serrate-dentate leaf-blades; wider calyx-tube and shorter petals. The nearest relative of *S. Greenei* in the Rockies is *S. rhomboidea*, Greene (Pittonia, 3:343), which is a much larger plant with interruptedly spicate inflorescence, longer (4 mm.) petals, more viscid pubescence and found in lower situations (3-8000 feet).

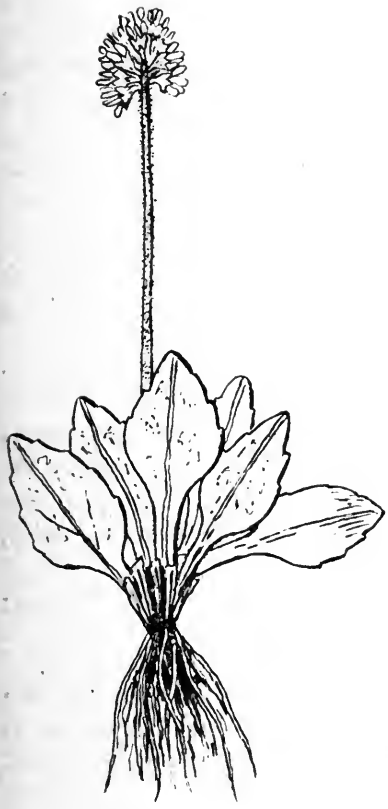
Mt. Hyalite, Aug. 1, 1902, 10,000 ft.; Black Butte, Tobacco Root Range, Aug. 11, 1902, 10,000 ft.; Dewey, June 24, 1902, 9000 ft.; Flat-top Mountain, Teton Co., July 5, 1897, 7000 ft., R. S. Williams; Red Lodge, June, 1899, J. M. Kay; Old Hollowtop, near Pony, July 9, 1897, Rydberg & Bessey, 4267; Lake Plateau, Aug. 1, 1897, Peter Koch.

In alpine and subalpine situations throughout the Rocky Mountain region, passing in lower situations into *S. rhomboidea* and probably in the extreme north into *S. nivalis*. [PLATE I, A and B].

Saxifraga nivalis, Rydberg, Flora, 194, and other authors as to the Rocky Mountain specimens. All specimens so named from this region must be divided between *S. rhomboidea*, Greene, and the smaller *S. Greenei* above. The true S. *nivalis* is confined to the Arctic regions.

Saxifraga Marshallii, Greene, Pittonia, 1: 159. *S. occidentalis*, Wats., Proc. Amer. Acad. 23:264, in part; *S. saximontana*, E. Nelson, Erythea, 7:168; *S. Idahoensis*, Piper, Bull. Torr. Bot. Club, 27: 394. A careful study of this group convinces me that these are all one species. Small (Bull. Torr. Bot. Club, 23:362) would limit *S. occidentalis*, Wats. to the specimens cited from Vancouver Island, which have larger petals (4 mm. long), sepals nearly always erect even in fruit, glabrous stems and leaves rufous-tomentous beneath and marked by Watson "n. sp.," although in publication he first cited the Rocky Mountain specimens of Drummond, which are identical with those here considered and previously described by Greene as *S. Marshallii*. Nelson and Piper appear to have in mind only the form with purple-glandular pubescent stem, nearly glabrous leaves and small flowers. Our species appears to vary considerably in the size of the petals (1½-3 mm.) and hight of the plants (1-3 dm.), but none appear to have the "oval green spot on each side of the midnerve toward the base" of the petals, mentioned by

PLATE I.



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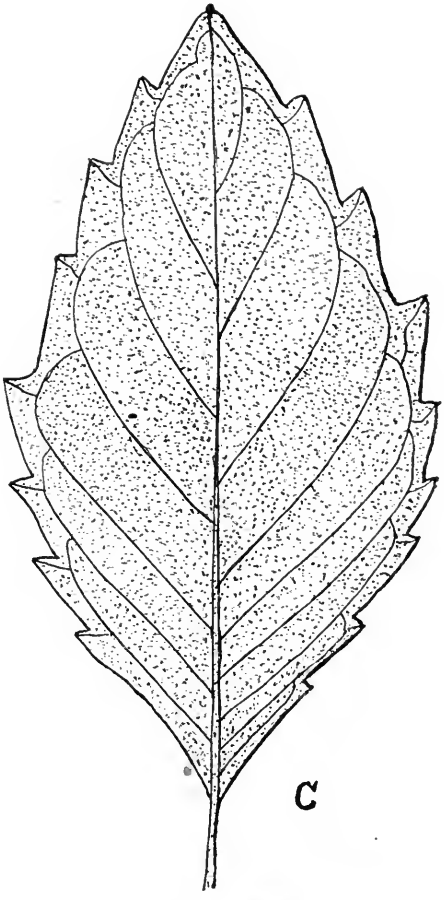
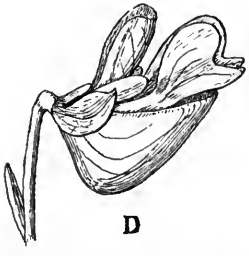


C

B



D

SAXIFRAGA GREENEI, BLANKINSHIP.

A. Plant natural size.
B. Flower X 5.

IMPATIENS ECALCARATA, BLANKINSHIP.

C. Leaf natural size.
D. Flower X 2.

Greene. It differs from *S. Californica*, Greene (Pittonia. 1:286) in its usually smaller size and flowers, its glabrous leaves and cymose, instead of racemose, inflorescence. From *S. reflexa*, Hook., with which it is usually confused, it is separated by its purple-glandular (not hoary) pubescence and pure white, instead of orange-spotted petals. The reflexed sepals, glandular (not viscid) pubescence and peduncled flowers at once distinguish it from *S. Virginiensis*, Michx.

Upper Sand Coulee, May 30, 1888, R. S. Williams, 700; Missoula, 4500 ft., June 7, 1897, M. J. Elrod; Bozeman, May 30, 1901, W. W. Jones; Spanish Creek, 1901, Jacob Vogel; Mt. Hyalite, 10,000 ft., Aug. 1, 1902; Sperry Glacier, 6-8000 ft., Sept. 1, 1902, in the latter situation growing with *S. Notkana*, Moc.

Saxifraga Sierræ, Small, Bull. Torr. Bot. Club, 23:360; Coville, Proc. Biol. Soc. Wash. 7:78. Like *S. rhomboidea*, Greene, but the calyx-tube is shorter, petals equaling the calyx-lobes and the leaves are wider. From *S. Columbiana*, Piper, it is distinguished by its sepals often erect in anthesis, calyx-tube more adherent below, petals wider, leaves wider and abrupt at base and inflorescence long, branching and divergent below.

Bridger Canyon, Bozeman, May 16, 1898, Mrs. R. M. Wilcox; Sedan, June 11, 1901, B. Jones.

Saxifraga Oregana, Howell, Erythea, 3:34. Related to the last but much larger (6-12dm.) with long (3-20cm.), lanceolate to oblong, nearly entire leaves and petals twice the length of the calyx-lobes. Missoula, May 11, 1897, M. J. Elrod, 54.

Saxifraga reflexa, Rydberg, Flora, 193, is *S. Marshallii*, Greene, though none examined have the orange-spotted petals mentioned by him.

Saxifraga rhomboidea, Greene, Pittonia, 3:343; *S. reflexa*, Small, Bull. Torr. Bot. Club, 23:367. One of the segregates of *S. nivalis*, characterized by its larger size (2-5 dm. high), stems densely glandular puberulent or somewhat viscid-pubescent, long-turbinate calyx-tube, large (4 mm. long), conspicuous white petals, twice as long as the lobes of the calyx, and flowers in glomerate cymes. Common in the lower mountains of the state.

Bozeman, May 26, 1901; Canyon of the Gallatin, July 5, 1898; Spanish Creek, May 30, 1901, Jacob Vogel; Mt. Hyalite, Aug. 1. 1902; Bozeman, May 26, 1901; Canyon of the Gallatin, July 5, 1898.

Saxifraga Rydbergii, Small; Rydberg, Flora, 194. Mt. Bridger, Bozeman, May 3, 1903, Faith Jackson; Mt. Hyalite, 10,000 ft., Aug. 1, 1902.

Saxifraga comosa, Britton; *S. stellaris comosa*, Poir. With *S. Nothana*, Moc. and apparently intergrading with that species.
Sperry Glacier, 6000 ft., Sept. 1, 1903.

ROSACEÆ.

Amelanchier Cusickii, Fernald. Leaves serrate from near the base, glabrous when young; petals 2 cm. long. West of the Divide. Missoula, May, 1897, M. J. Elrod, 40; Plains, June 6, 1902.

Cercocarpus parvifolius, Nutt.; Rydberg, Flora, 222.
Though common southward in Wyoming, there is no evidence that it has ever been found in this state.

Crataegus flabellata, Rydberg, and C. *macracantha*, Rydberg, Flora, 228. All Montana specimens referred to these species appear to be *C. Piperi*, Britton; neither of the two species mentioned appear to cross the plains.

Cratægus Piperi, Britton, Torreya, 1:33. See *C. flabellata* above.

Geum macrophyllum, Willd. Mountains, infrequent. Rumsey, July 15, 1892, F. D. Kelsey; Spanish Basin, June 23, 1897, Rydberg & Bessey, 4406; Bozeman, June 28, 1899; Upper Madison River., July 16, 1899; Kalispell, Aug. 27, 1903; Swan Lake, June, 1902, M. J. Elrod.

Ivesia alpicola, Rydberg; Howell, Fl. N. W. Am. 1:182; *H. Gordoni alpicola*, Rydberg, Mon., Pot. 152.
Mt. Bridger, 9000 ft., June 26, 1899.

Potentilla filipes, Rydberg, Bull. Bot. Club, 28: 174. "Bridger Mts., 1896, J. H. Flodman."

Potentilla fissa, Nutt.; Rydberg, Mon. Pot. 198. Rather frequent in the mountains on dry cliffs.
Rocky Canyon, Bozeman, May 25, 1900, B. Jones; Spring Hill, July 3, 1903, Amy M. Cooke; Plains, June 6, 1902.

Potentilla glandulosa monticola, (Rydberg), Mon. Pot. 199. "F. D. Kelsey, 1891."

Potentilla Nicollettii, Sheldon. Great Falls, July 10, 1900.

Potentilla nivea Altiaca, Rydberg, Mon. Pot. 86. Flat-top Mtn., Teton Co., 7000 ft., July 5, 1897, R. S. Williams.

Potentilla Norvegica, L. This narrow-leaved, rugose fruited form seems more common here than the villous, wider-leaved *P. Monspeliensis,* L.

Bozeman, Sept. 22, 1897; Kalispell, Sept. 8, 1899; Billings, June 30, 1903.

Potentilla Pennsylvanica strigosa, Pursh. Eastern plains mainly. Rocky Canyon, Bozeman, May 26, 1900; Big Coulee Cr., Sweet Grass Co., June 15, 1901; Wibaux, July 9, 1901; Stanford, July 5, 1901, F. A. Spragg, 217; N. Boulder, Jefferson Co., June 25, 1899, C. D. Flaherty.

Potentilla rhomboidea, Rydberg, Bull. Torr. Bot. Club, 23:248. Ridge above Bannock, 7000 ft., July 19, 1880, S. Watson, 114 (Gray Herb.).

***Poterium annua,** Nutt. In waste places, well established at Arlee, Aug. 5, 1901.

Prunus emarginata, Rydberg, Flora, 477, is *P. trichopetala,* (Greene) below.

Prunus trichopetala, (Greene); *Cerasus trichopetala,* Greene, Proc. Biol. Soc. Wash. 1905; *Prunus emarginata,* Rydberg. Columbia Falls, May 28, and Aug. 20, 1894, R. S. Williams, 1005.

Prunus Virginiana, L. Various authors have referred this species to Montana by including in it *P. demissa,* Walp. and this is even followed by Sargent (Sylva, 4:42), though he enumerates the chief points of distinction. The two are perfectly distinct as species and need never be confused even in the herbarium. *P. demissa* is a shrub or small tree, rarely attaining a diameter of 5 inches, the young twigs are usually more slender, the leaves are smaller, thicker, paler beneath, less acuminate and with the tips of the teeth normally somewhat incurved and the fruit is smaller (16 mm.), sweet and edible when ripe, though slightly bitterish and astringent. The latter is the common "choke cherry" in Montana, but the true *P. Virginiana* occurs in some localities west of the Divide as a good-sized tree 8-10 inches in diameter. The twigs are thicker and it has larger, thinner more acuminate leaves, with straight or salient teeth, and larger fruit.

Columbia Falls, Sept. 6, 1892, R. S. Williams; Plains, June 6, 1902.

Rosa acicularis, Lindl. Not infrequent along streams in the mountains. Fruit large with prominent neck and edible.

Columbia Falls, Sept. 9, 1899; St. Ignatius, Sept. 7, 1899; Leonia, Sept. 16, 1900; Kalispell, Sept. 8, 1899; Mystic Lake, Aug. 1, 1898: Bridger Canyon, Bozeman, July 20, 1898; Lower Basin of the Gallatin, July 8, 1898.

Rosa blanda, Rydberg, Flora, 477 and others, as to western specimens. The true *R. blanda,* Ait. appears not to extend westward as far as Montana (Crepin, Bot. Gaz. 22:12); the western form usually referred to that species is *R. Nutkana,* Presl.

Rosa pisocarpa, Gray. Not rare in the mountains. Mt. Bridger, Aug. 23, 1898; Columbia Falls, July 20, 1900; Flathead Lake, July 23, 1900; Kalispell, Aug. 27, 1903; Belton, Aug. 19, 1902; Garrison, Sept. 4, 1899.

Spiraea Douglasii, Rydberg, Flora, 206, is *S. Menziesii,* Hook. The tomentulose *S. Douglasii* seems not to extend eastward to our limits.

Spiræa Menziesii, Hook; *S. Douglasii Menziesii,* Presl. Frequent in the western part of the state.

Troy, July 25, 1900; Libby Creek, July 26, 1900; Lolo Cr. Canyon, S. Watson, Aug. 19, 1880, No. 99 (Gray Herb.); White Pine, Sept. 8, 1904.

LEGUMINOSÆ.

Astragalus aculeatus, A. Nelson, Bull. Torr. Bot. Club, 26:10; Rydberg, Flora, 249. The wisdom of separating the red-flowered forms of *A. tegetarius,* Wats. from the ones with the flowers "ochroleucus, the keel purplish" of Colorado, is doubtful, judging from a comparison of the types of both, as such slight variation in color is rarely sufficient basis for founding a species.

Astragalus adsurgens albifolius, n. var.

Larger than the type; leaves canescent with a white sericeous pubescence, like that of *A. terminalis,* Wats.; petals white or cream-colored, or possibly purplish when young; calyx and fruit white, somewhat lanate with short hairs; otherwise like the type.

Field on 7-mile road, Helena, July 19, 1898, E. N. Brandegee; Alhambra, July 24, 1898, E. N. Brandegee; Canyon Ferry, June 22, 1898, E. N. Brandegee.

Astragalus adsurgens pauperculus, n. var.

15 cm. high or less, spike 1-2 cm. long, flowers about 12 mm. and legume about 6 mm. long. This is the other extreme from variety *robustior*, Hook., much smaller than the normal form in hight, leaf, flower and fruit. On dry, gravelly ridges.

Billings, July 7, 1902; Garfield Peak, Wyo., July 24, 1894, A. Nelson, 646. Intermediate forms have been found at Bozeman and Big Timber.

Astragalus adsurgens robustior, Hook. This ranker, nearly erect form with less nigrescent calyx is not rare in the plains eastward.

Melville, July 21, 1901.

Astragalus amphidoxus, n. sp.

Perennial, cæspitose from a long, thick taproot: branches ascending, 12-18 cm. long, sparsely hirsute, slender: stipules broadly ovate or triangular acute, connate below; leaves 5-8 cm. long including the petiole of one-third that length; leaflets 6-8 pairs, ovate oblong to linear, acute, thin, nearly sessile, the younger often revolute in drying, 1-2 cm. long, 2-4 mm. wide: inflorescence 6-8 flowered in a lax raceme, about equaling the leaves; peduncles long (3-6 cm.): bracts 2 mm. long, linear to lanceolate: calyx pubescent with some short, black hairs, teeth linear, about equaling the tube; corolla violet, 8 mm. long; similar to the larger flowered forms of *vexiliflexus* which it resembles in habit and with which it appears to intergrade: legume flat, straight, sessile, about 3-seeded, 5-8 mm. long, somewhat oblique.

Near *A. miser*, Dougl. (Hooker, Fl. Bor. Am. 1:153 note), but it is yet doubtful just what this species is. Nuttall's description (Torrey & Gray, Fl. N. Am. 1: 338) differs from Douglas's in the obovate leaflets and Gray (Proc. Am. Acad. 6:228) describes it as cinereous pubescent (like *A. vexilliflexus*, Sheld.), instead of subpubescent (Douglas) or somewhat hirsute (Nuttall) and the leaves, as with Douglas, as broad-linear to oblong and obtuse, not obovate and acute, as with Nuttall. Watson (King's Rep. 5:444) and Howell (Flora N. W. Am. 153) follow Gray in their description of the species. *A. amphidoxus* differs from *A. miser*, Dougl. in having more leaflets (6-8 instead of 5-6); and sparsely hirsute instead of cinereous pubecence; from Nuttall's in its oval-oblong to linear, acute leaves (not obovate) and from Gray's in being hirsute pubescent, instead of cinereous pubescent, and the peduncles not exceeding the leaves. In

this confusion as to *A. miser*, it seems best to describe our plant as new, until the identity of *A. miser*, Dougl. be determined.

Sky High, Unionville, 6000 ft., July 10, 1898, E. N. Brandegee. A form collected by F. L. Scribner, Shield's River, Mont., June 6, 1883, No. 27, and distributed as *A. pauciflorus*, Hook. seems intermediate between this and *A. vexilliflexus*, Sheld.

Astragalus arietinus, Jones, Proc., Calif. Acad. II. 5:653. See *A. iodanthus* below.

Astragalus atropubescens, Coult. & Fish., Bot. Gaz. 18: 30. "Deer Lodge, June, 1892, F. D. Kelsey."

Astragalus decumbens, Gray. In dry open places, frequent.

Bozeman, June 18, 1900; Kalispell, July 21, 1900; St. Joe Cr., Ennis, June 18, 1899, W. W. Jones; Columbia Falls, July 4, 1894, R. S. Williams, 1003.

Astragalus divergens, n. sp.

Caespitose from a perennial, woody, deeply penetrating caudex, 10-15 cm. high, somewhat caulescent with short, divergent branches terminating in long (5-10 cm.) naked peduncles twice as long as the basal leaves; sericeous pubescent throughout with short appressed hairs: leaves pinnate, 9-13 foliate, 3-5 cm. long with broadly deltoid-ovate stipules or the upper lanceolate, more or less connate and the lower scarious; leaflets elliptical to linear-oblong and acute, sessile or nearly so, 4-6 x 1-2 mm.: raceme aggregate, 6-12 flowered; bracts linear, about equaling the pedicels: flowers 8 mm. long; calyx campanulate, dark pubescent, teeth linear-lanceolate, about half as long as the tube; standard purple (blue in drying) or white and purple-lined, emarginate, about a third longer than the keel, the latter with an attenuate, inflexed and deeply colored tip; wings white: mature legume 15 mm. long, 2 mm. wide, straight and nearly terete, 1-celled, coriaceous, stipe at maturity about equaling the calyx.

Nearest *A. decumbens*, Gray to which it has usually been referred, but differs from that species in its more caespitose, subacaulescent habit, wider and shorter leaves, subcapitate inflorescence, smaller purple or purplish flowers and nearly terete, stipitate pod. The true *A. decumbens*, Gray is a strictly caulescent and much larger plant, with longer and narrower leaves, flowers about twice as large and scattered in a lax raceme and with longer, compressed, sessile fruit. In habit and situation it closely resembles *A. caespitosus*, Gray and *A. simplicifolius*, Gray, with which it was found on high dry gravelly uplands near Big Coulee creek, about 30 miles northeast of Big

Timber, Sweet Grass county, June 15, 1902.

The species belongs to the plains, like *A. decumbens* with which it appears to intergrade. A. Nelson's "No. 198, Laramie Hills, Wyo., June 9, 1894" seems to belong here and "No. 7085, Steamboat Mtn., Sweetwater Co., Wyo., June 10, 1900" also, though the latter has narrower leaves and hook-tipped, mottled fruit. E. Nelson's "No. 4374, Willow Creek, Wyo., July 1, 1898," seems intermediate between this and *A. decumbens*. [PLATE II.]

Astragalus Geyeri, Gray. Sandy roadsides with *A. pictus filifolius*, Gray. Glendive, June 27, 1903; Miles City, May 26, 1902.

Astragalus glareosus, Dougl. Fair-grounds, Helena, June 8, and 25, 1898, E. N. Brandegee; Monida, June 16, 1899, A. & E. Nelson, 5416.

Astragalus iodanthus, Rydberg, Flora, 244. All specimens referred to this species in Montana appear to be *A. arietinus*, Jones.

Astragalus leptaleus, Gray. Extends northward to the Saskatchewan (Macoun). Head of Cottonwood Creek, Tobacco Root Range, 9000 ft., Aug. 10, 1902.

Astragalus Macounii, Rydberg, Flora, 243, is *A. Robbinsii Jessupi*, Eggleston & Sheldon (Minn. Geol. & Nat. Hist. Surv. 1:155); *A. Blakei*, Eggleston (Bot. Gaz. 20: 271).

Astragalus pictus filifolius, Gray; *A. ceramicus*, Sheldon, Minn. Bot. Stud. 1:137. Glendive, June 17, 1903. Sandy roadsides, rare.

Astragalus prunifer, Rydberg, Flora, 239, is *A. caryocarpus*, Ker, which varies considerably in the color of the flowers, width of leaves and size of pod; neither ought Nuttall's *A. crassicarpus* be taken up, as its characterization in Fraser's Catalogue is insufficient and may as well apply to *A. Mexicanus*.

Astragalus Robbinsii Jessupi, Eggleston & Sheldon. See *A. Macounii* above.

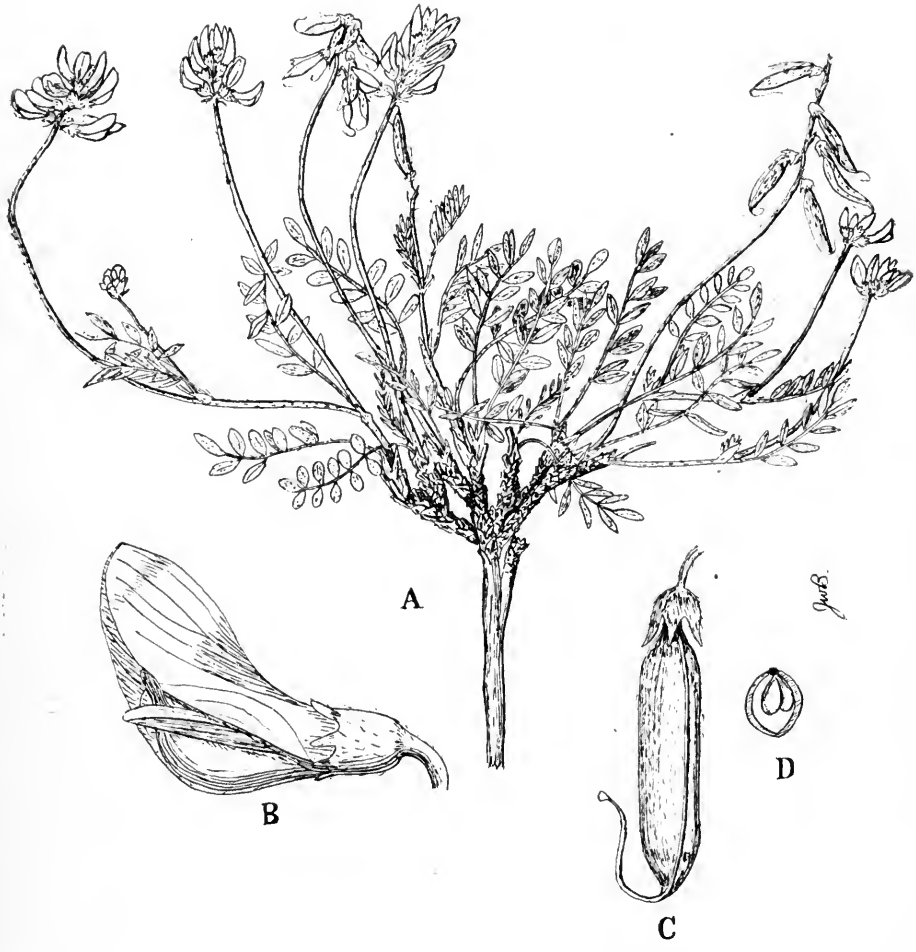
Astragalus simplicifolius, Nutt. Leaves silvery canescent, simple, shorter than in *A. caespitosus*, Nutt., and peduncles shorter and pods thicker and more strongly keeled. On dry upland plains.

Big Coulee Cr., Sweet Grass Co., June 15, 1902.

Hedysarum occidentale, Greene, Pittonia, 3:19. Leaves larger than in *H. boreale*, Nutt. and loment segments few, larger and sparsely hispidulous.

Leonia, Sept. 14, 1900; Midvale, July 4, 1903, L. M. Umbach, 270.

PLATE II.



ASTRAGALUS DIVERGENS, BLANKINSHIP.

A, Plant half natural size.
B. Flower X 6.
C. Mature legume X 3.
D. Legume, section X 3.

Lupinus alpestris, A. Nelson, Bull. Torr. Bot. Club, 26:127. Differs from *L. pseudoparviflorus,* Rydb. in its larger flowers, less gibbous calyx, usually denser raceme and leaflets pubescent on both sides. It is found in mountain meadows 7-9000 ft. altitude, while *parviflorus* is a native of the forests from 5-7000 ft. in the mountains.

Middle Cr., Gallatin Co., 8000 ft., July 30, 1902; Tobacco Root Range, 8000 ft., Aug. 9, 1902.

Lupinus aphronorus, n. sp.

Herbaceous perennial, much branched below, about 2 dm. high: leaflets 6-8, narrowly oblanceolate, 2-3 cm. long, silky canescent or subvillous with appressed hairs on both sides; stipules subulate, petioles about as long as the leaflets: calyx scarcely gibbous; standard blue with white or yellowish center, 10 mm. long, pubescent keel white, tipped with blue, ciliate: bracts linear, deciduous: fruit not seen.

Differs from *L. flexuosus,* Lind. in its smaller size, small leaflets, shorter and denser verticillate racemes, and shorter (4 mm.) pedicels as well as its higher altitude. Resembles *L.candicans,* Rydberg, but has larger flowers, pubescent standard and ciliate keel.

Divide of Horsefly Pass, Crazy Mts., 8000 ft., July 20, 1902.

Lupinus argenteus argophyllus, Wats. These more silky pubescent forms are more frequent eastward. Wibaux, July 9, 1901; Sixteen Mile Cr., Aug. 15, 1899; Deep Cr., Smith River Divide, Aug. 14, 1899; Judith Basin, July 24, 1901, F. A. Spragg; E. Flathead Cr., June 22, 1901, W. W. Jones.

Lupinus axillaris, n. sp.

Herbaceous, erect perennial, 2-4 dm. high, with short, appressed sericeous pubescence, sometimes villous and spreading on the lower stem; leaflets 8-10, oblanceolate, acute, 3-4 cm. long; petioles nearly twice as long; stipules lance-linear, 1 cm. long; axils of cauline leaves with 2-3 supernumerary leaves of equal size: inflorescence rather lax with 1-4 flowers in verticels: bracts subulate; pedicels 8 mm. long; calyx slightly gibbous; flowers blue or purplish, 10 mm. long; standard often with yellowish center, glabrous; keel verging to white below, minutely ciliate above: legumes 3-5 seeded, short villous or woolly.

Nearest *L. Rydbergii* below, of which it may be a more cauline variety, with supernumerary axillary leaves, but inhabits the dry eastern plains.

Miles City, May 26, 1902; Custer Station, May 25, 1890; Lombard, June 1, 1901, the latter connecting with *L. Rydbergii.*

Lupinus caespitosus, Nutt. In dry gravelly situations. West Gallatin River W. of Bozeman, June 3, 1900; Head of Cottonwood Cr., Tobacco Root Range, 9000 ft., Aug. 10, 1902.

Lupinus candicans, Rydberg, Bull. Torr. Bot. Club, 28:35. "E. V. Wilcox, 1900, 451; Boulder, 125 & 129 in part; Big Timber, 385; R. S. Williams, Highwood Mts., 42; Columbia Falls, 1897."

Lupinus cyaneus, Rydberg, Bull. Torr. Bot. Club, 28:35. Common in the lower canyons and mountain forests, 5-7000 ft., with *L. pseudoparviflorus,* Rydb.

Bridger Cr., July 25, 1902; Porcupine Cr., Crazy Mts., July 18, 1902; Limekiln Canyon, Bozeman, July 27, 1901; Bridger Canyon, July 25, 1902.

Lupinus decumbens, Torr., Rydberg, Flora, 231. Torrey's description is insufficient to separate this from *L. argenteus,* Pursh., which varies greatly in laxity of spike, abundance of leaves and size of flower and I agree with Britton & Brown (Ill. Fl. 2: 296) in reducing *decumbens* to a synonym.

Lupinus flavescens, Rydberg, Bull. Torr. Bot. Club, 29:245; *L. sulphureus,* Dougl. in part. "Medicine Clay Prairies," Wyeth." Doubtfully in Montana; probably in Washington or Idaho.

Lupinus flexuosus, Lindl.; Agardh, Syn. 34; *L. sericeus,* Rydberg, Flora, 230 and recent authors. This is the most common lupine on the dry plains and uplands of Montana and has usually been confused with *L. sericeus,* Pursh., which is characterized by its coarsely villous and subsilky, spreading pubescence, while *L. flexuosus* has pubescence short, silky and appressed, as with our species. It is more difficult to separate *L. flexuosus* from *L. ornatus* Dougl., but in general the latter has leaves fewer and more scattered, leaflets larger and flat, pubescence short silky appressed, raceme longer, denser and more acuminate, verticels often 6-flowered, flowers larger (14-16 mm.) and standard less pubescent. *L. flexuosus* is characterized by its densely leafy stems, leaflets smaller, often conduplicate, less silky, subvillous and appressed, rarely somewhat spreading pubescence, shorter and more abrupt raceme, with flowers more scattered and smaller (10 mm.) bracts and pedicels longer and more densely pubescent standard. The former appears to be found mainly west of the Divide, where the two seem to intergrade and

westward. Bozeman, Aug. 30, 1899; Columbia Falls, July 20, 1900; Kalispell, July 23, 1900; Missoula, June 30, 1903; Arlee, Aug. 5, 1901; Leonia, Sept. 16, 1900; Libby Cr., July 26, 1900; Ennis, July 17, 1899; Big Timber, July 15, 1902; Melville, July 21, 1901.

Lupinus Hellerae,Rydberg, Flora, 231. See *L. caulescens* above.

Lupinus laxus, Rydberg, Bull. Torr. Bot. Club, 30:258. "Forks of the Madison, 1897, Rydberg & Bessey, 4442 & 4443a."

Lupinus minimus, Dougl. Flat-top Mtn., Teton Co., 7000 ft., July 5, 1897, R. S. Williams; Mt. Henry, Midvale, 7-8000 ft., July 16, 1903, L. M. Umbach, 94, 175, 304, 398; Upper Marias Pass, east side, 7000 ft., Aug. 4, 1883. W. M. Canby, 67 (Gray Herb.).

Lupinus ornatus, Dougl. See *L. flexuosus*, Lindl. above. Thompson Falls, Aug. 6, 1901; Big Fork, Aug. 25, 1901, L. M. Umbach, 589.

Lupinus pulcherrimus, Rydberg, Bull. Torr. Bot. Club, 30:258. "Divide between McDonald and Camas Lakes, 1901, F. K. Vreeland, 996; Little Belt Pass, 1896, Rydberg, 3318, J. H. Flodman, 620; Baltic, 1900, E. V. Wilcox, 58."

Lupinus Rydbergii, n. sp.: *L. Hellerae*, Rydberg, Flora, 231.

A short-caulescent, herbaceous perennial, 2-3 dm. high: leaves mainly radical on long (5-10 cm.) petioles; leaflets 8-10, oblanceolate, acute, 3-4 cm. long, 6-9 mm. wide, coarsely canescent to subvillous with white appressed pubescence: racemes 8-14 cm. long and about 3 cm. in diameter, exserted above the leaves on peduncles about half as long: bracts linear, deciduous; pedicels 5-7 mm. long; calyx slightly gibbous: corolla blue or purplish, 10 mm. long; standard with white or yellowish center, naked; keel ciliate, white below: legume 3-5 seeded, densely silky villous. Dry ridges and uplands of the lower mountains mainly. Certainly near *L. Hellerae*, Heller, but differs in its smaller flowers and pubescence. The typical *Hellerae* has not yet been found in the state. Near *L. axillaris* above.

Big Coulee Cr., Sweet Grass Co., June 15, 1902; Menida, June 26, 1902; 16-mile Cr., July 24, 1902; Dewey, 7500 ft., June 22, 1902; Sedan, June 7, 1902, W. W. Jones; Columbia Falls, May 22, 1897, R. S. Williams.

Lupinus Scheuberæ, Rydberg, Bull, Torr. Bot. Club, 29:244.

Garnet, Granite Co., July 20, 1901, Mrs. E. W. Scheuber, No. 135.

Lupinus sericeus, Pursh., not Rydberg. See *L. flexuosus,* Lindl. In the western part of the state, rare. Plains, Missoula Co., June 6, 1902; Monida, June 26, 1902.

Lupinus Jonesii, n. sp.

A herbaceous perennial with many simple stems from a branching caudex, puberulent, erect, slender, 2-4 dm. high: petioles appressed to stem or little divergent, lower 2-3 times as long as the leaves; stipules lanceolate-subulate, 8-12 mm. long; leaflets 8, narrowly oblanceolate, about 30 mm. long and 3-5 mm. wide, thin, glabrous above, appressed puberulent below, often conduplicate, apex acute: racemes short pedicled, often dense, 4-7 cm. long, 2 cm. wide attenuate above; bracts linear about as long as the pedicels, silky canescent, as is the gibbous calyx: flowers small, 8 mm. long, pale blue; standard glabrous with a white or yellowish center, wings and keel more or less white below, keel rarely somewhat ciliate; fruit silky villous, 3-seeded. Referred to *L. decumbens,* Torr. by some authors.

Easily distinguished from the related *L. alpestris,* Nelson, and *L. pseudoparviflorus,* Rydberg by its smaller size, more slender stems, smaller, narrower leaves, narrower, more condensed raceme and smaller flowers, as well as its more alpine situation. Often growing in large clumps.

Monida, June 26, 1902; Lower Basin of the Gallatin, July 8, 1898; Head of Porcupine Cr., Crazy Mts., July 18, 1902. Also collected in the Yellowstone Park at the Yellowstone Falls, July 8, 1899, and near the Norris Geyser Basin, July 7, 1899. Named for Wyatt W. Jones, whose collections have aided materially in the representation of the botany of this region.

The slow means of dispersion of Lupinus tends to develop local variations in many places and only more careful study in the field and herbarium will determine which are good species and varieties and which are mere hybrids or integrades, that the obscure nature of many of the characters of the genus now render doubtful.

***Medicago denticulata,** Willd. A bad weed in alfalfa fields, occasionally. Utica July 29, 1904.

***Medicago lupulina,** L. Occasionally introduced as a weed. Clyde Park, July, 1903, W. C. Simcock; Columbia Falls, Mrs. I. M. Kennedy; Bozeman, Aug. 8, 1904.

Oxytropis Besseyi, (Rydberg); *Aragallus Besseyi*, Rydberg, Flora, 250 is *A. Blankinshipii*, Nelson, Erythea, 7:58. The types of both were collected within a few miles of each other. The fruited specimens of Nelson were pathogenic, infected with Uredo, causing the ovary to remain undeveloped and an abnormal calyx, the legume in the species usually exceeding the calyx; otherwise they are identical.

Oxytropis Cusickii, Greenman, Erythea, 7:116. (J. M. Greenman). Mt. above Stanton Lake, Aug. 7, 1894, R. S. Williams. Hitherto known only from the Wallowa Mts., of East Oregon (Cusick).

Oxytropis multiceps, Nutt. Dewey, June 24, 1902; Big Coulee Cr., Sweet Grass Co., June 15, 1902.

Oxytropis Parryi, Gray. Our specimens have the leaves somewhat larger, mainly elliptical and a sparser pubescence, than in the type, but otherwise appear identical.

Sperry Glacier, 8000 ft., Sept., 1, 1903.

Oxytropis podocarpa, Gray. Just north of Yellow Mtn., Teton Co., June 21, 1897, R. S. Williams, 1086. Good specimens in both fruit and flower.

Oxytropis villosa. (Rydb.); *Aragallus villosus*, Rydberg, Bull. Torr. Bot. Club, 28; 36. "Craig, 1900, E. V. Wilcox, 378."

Petalostemon multiflorum, Nutt.; Rydberg, Flora, 238. Possibly an immature form of *P. oligophyllum*, Rydb. There must be some error in referring *P. multiflorum*, Nutt. to Montana, as it has not hitherto been found anywhere near our limits and is a more southern species.

Petalostemon villosum, Nutt. I question the occurrence of this species in the state, although a specimen in the Gray Herbarium is labelled "Montana, L. F. Ward", but may have come from east of our limits and there are no "sand hills" (Rydberg, Flora, 238) in the state.

Petalostemon violaceum pubescens, Gray. This with more pubescent stem and leaflets is the usual form in the plains region of the state, though the typical glabrous *violaceum* occurs sparingly (Helena, E. N. Brandegee).

Bear Tooth, Aug. 21, 1898, E. N. Brandegee; Great Falls, July 10, 1900; Wibaux, Aug. 15, 1903; Fergus Co., F. A. Spragg, 1901.

Trifolium andinum, Nutt.; Rydberg, Flora, 235. Nutall never collected in Montana and all specimens of his collection so referred are in error. He ascended the Missouri River with the Bradbury Expedition of 1810, which did not go beyond Mercer Co., N. Dak. and accompanied the second Wyeth Expedition of 1834-6, which passed through southern Wyoming, Utah and Idaho, nearly on the line of the present Union Pacific Railway. This specimen doubtless came from the collection of the latter expedition, and is not within our bounds.

Trifolium brachypus, (Wats.); *T. longipes brachypus*, Wats., Bib. Ind. 264, not *T. subcaulescens*, Gray. Dwarf, 3-7 cm. high, leaves shorter and less acuminate than in *T. longipes*, Nutt. and peduncles shorter; in alpine situations, near melting snow. Head of Cottonwood Cr., Tobacco Root Range, 9000 ft., Aug. 10, 1902.

Trifolium latifolium, Greene, Pittonia, 3:223; *T. longifolium latifolium*, Hook. Common in coniferous forests on the river benches in the extreme western part of the state.

Thompson Falls, Aug. 6, 1901; White Pine, Sept. 8, 1904.

Trifolium macrocephalum, Poir.; *T. megacephalum*, Nutt. Rydberg (Flora, 234) follows Coulter (Man. R. M. Bot. 54), who accepts Pursh's (Fl. N. Am. 479) "At the headwaters of the Missouri", now a part of Montana. The recent revision of the collection of the Lewis & Clark Expedition (Proc. Phila. Acad. 1898: 11-49) shows the original label of this specimen to have been "A species of clover near Rockford camp, on high hills, April 17, 1806", which was the Rockfort camp at the Dalles of the Columbia (Coues, Lewis and Clark Ex. 3: 950-953) and nowhere near our limits. The species has not been found in Montana. Boise, Idaho is the nearest locality yet found for the species.

Trifolium Montanense, Rydberg, Flora, 236. I doubt the possibility of separating this from *T. Parryi*, Gray, as the type of the latter species is the small form, 7-10 cm. high, and there appears to be little relation between size and leaf-width, though the size and length of the involucral bracts correspond fairly well. Moreover, while our Montana plants are usually small with leaflets broader than in the type of *Parryi*, the narrow leaved forms occur, as on Mt. Hyalite, along with the other form and the larger bracted forms are found, as on the Spanish Peaks, having the low size and wider leaf.

Trifolium Parryi, Gray. See *T. Montanense* before.

***Trifolium procumbens,** L. The hop clover is an occasional weed in gardens. Bozeman, Oct. 7, 1903. Introduced with garden seed.

***Vicia sativa,** L. Introduced at Plains, Aug. 9, 1901.

MALVACEÆ.

***Hibiscus Trionum,** L. A weed occasionally introduced in gardens. Bozeman, Sept. 26, 1901, Mrs. A. B. Carow.

Malva rotundifolia, L. Not infrequent as a weed in waste places. Plains, Aug. 7, 1901.

Sidalcea campestris, Greene, Bull. Calif. Acad. 1: 77. In mountain meadows at Chisholm's Camp, head of Middle Cr., Gallatin Co,. Aug., 1888, Peter Koch; same locality July 31, 1902. This is a rare species of the Pacific Coast west of the Cascades and its occurrence here in great abundance in an isolated mountain park is remarkable.

VIOLACEÆ.

Viola arenaria, DC.; *V. canina puberula,* Wats.; *V. monticola,* Rydberg, Flora, 264. Small forms with characteristic incised stipules not rare.

Rocky Canon, Bozeman, May 26, 1900; Philipsburg, May 20, 1903, G. T. Bramble.

Viola aurea, Kellogg, Proc. Calif. Acad. 2: 185; *V. Thorii,* A. Nelson, Bot. Gaz. 30: 193. Very distinct from *V. praemorsa,* Dougl. with which it has been confused and its occurrence at this extreme locality has led to its being regarded as a new species.

Bridger Mts., Baldy, 8000 ft., June 26, 1899, in limestone "breaks" near the "saddle"; good typical specimens; same range farther north, June 1, 1901, E. J. S. Moore. See *V. praemorsa* below.

Viola monticola, Rydberg, Flora, 264. The characters separating this from *V. arenaria,* DC. will not hold with our specimens, though the stipules are often entire.

Viola praemorsa, Dougl.; *V. vallicola,* A. Nelson, Bull. Torr. Bot. Club, 26: 128; Rydberg, Flora, 262. The redescription is doubtless due to the confounding in most books and herbaria of *V. praemorsa,* Dougl. with *V. aurea,* Kell. The former, as figured by Lindley (Bot. Reg. t. 1254), is clearly our common yellow spring violet here; the leaves are identical and the premorse root is characteristic, but

the figure shows the flowers larger and the peduncles longer than the normal, due doubtless to cultivation. *V. aurea*, Kellogg. (Proc. Calif. Acad. 2:185, fig. 54) is quite a different species. *Praemorsa* has leaves entire, inconspicuously serrulate or somewhat undulate and, except one or two of the earliest, pinnately nerved, is much less cauline, and has a praemorse root while *aurea* more frequently has palmately nerved and sinuate-dentate leaves, is decidedly cauline and has a long perpendicular, branching rootstock. There is a similar confusion between *V. praemorsa* and *V. Nuttallii*, Pursh, and Hooker's figure (Fl. Bor. Am. 1:79) seems nearer *V. flavovirens*, Pollard, while his var. *major* can hardly be anything else. *V. Nuttallii* can easily be distinguished by its longer, narrower, more tapering leaves, narrowed into the petiole at base and by its long, deeply penetrating roots, very different from the thick, premorse root of *praemorsa*. The latter is common in the valleys and plains of the state below 5000 ft., passing above into the mountain *V. flavovirens*, Pollard, while *V. aurea* is subalpine at 8000 feet and above. *V. Nuttallii* occurs with *V. praemorsa*, but on dry sandy hillsides and dry uplands; *praemorsa* affecting the flats and moister situations.

Viola praemorsa altior, n. var. A tall, diffuse form of *praemorsa* with larger leaves on long petioles and less cordate at base, stems often produced and exceeding the leaves and roots often long and fibrous like *Nuttallii*. Resembles *V. flavovirens* in leaf but is clearly only a rank form of *praemorsa* growing in loose shady soil or cultivated land. Bozeman, June 20, 1899; May, 18, 1901; Sweet Grass River near Melville, June 16, 1902; Lombard, June 1, 1901.

Viola renifolia, Gray. In damp woods. Belton, Aug. 19, 1902.

Viola retusa, Greene, Pittonia, 4: 6. Our specimens differ from Greene's description in having the peduncles longer than the leaves, the petals white, varying to blue, and by no means always retuse. Not the same as *V. cognata*, Greene, which is found here about mountain brooks and springs in more or less shady places.

In wet alkaline flats along Beaver Cr., Wibaux, May 25, 1902; Custer Station, May 29, 1890.

Viola sarmentosa, Dougl. Yellowstone, July 9, 1892. E. N. Brandegee.

GERANIACEÆ.

***Erodium circutarium,** L'Her. Introduced from the Pacific coast and frequent in localities below.

Thompson Falls, Aug. 8, 1901; Plains, June 6, 1902.

Floerkia proserpinacoides, Willd.; *F. occidentalis*, Rydberg, Flora, 268. The characters separating *occidentalis* from *prosperinacoides* will not hold as to these specimens. Here a weak, decumbent or trailing vine, 3-5 dm. long, abundant in wet shady places.

Evaro, June 8, 1902.

Geranium nervosum, Rydb., Bull. Torr. Bot. Club, 28: 34. The fact that this is intermediate in character between *G. incisum*, Nutt. and *G. Richardsonii*, F. & T., is found growing with those species and is relatively rare would seem to indicate a hybrid between them.

Flathead Cr., Gallatin Co., July 16, 1902.

Impatiens aurella, Rydberg, Bull. Torr. Bot. Club, 28: 34.. At a spring on the road between big Fork and Swan Lake, Mission Mts., Aug. 11, 1894, Millie M. Smith. Fairly typical, having the salient toothed leaves and the small, narrow, deep yellow flowers and long recurved spur of that species.

Impatiens biflora, Walt. These appear to have the small flowers and often unspotted corola of *I. aurella*, Rydberg (Bull. Torr. Bot. Club, 28: 34), but the leaves are crenate serrate and in other respects resemble *biflora*.

Prickly-Pear Canon, July 23, 1887, R. S. Williams, 688; Woodlawn, Sept. 10, 1899, E. N. Brandegee; Child's Ranch, July 29, 1898, E. N. Brandegee.

Impatiens ecalcarata, n. sp.

9-12 dm. high; leaves ovate to ovate-elliptical, about 10 cm. long by 5 wide on petioles of equal length, usually acute at base and apex, distantly serrate-dentate, teeth and apex mucronate, light green above, paler beneath, thin: cymes 2-6 flowered in the axils of the upper leaves; bracts linear-lanceolate, 3 mm. long: flowers 12-15 mm. long and nearly as wide, orange or pale-yellow, unspotted, the saccate sepal shallow and rounded at base, spurless, about 13 mm. long and 10 deep, lateral sepals oblique-elliptical, hooked cuspidate at apex, 6 mm. long: petals

5, the lower lateral irregular, 12-14 mm. long, the upper lateral oblanceolate, rounded at apex, 6 mm. long, upper (anterior) petal orbicular to reniform, notched at apex: capsule 18 mm. long, 2-4 wide, irregularly nodulose.

Near *I. aurea*, Muhl., but differs from that species in its ovate, serrate-dentate leaves and its smaller spurless flowers, in which it approximates *I. aurella*, Rydberg but has the saccate sepal very different.

Found in abundance along the damp shady margin of a small stream about half a mile east of Plains, Missoula county, Aug. 9, 1901. A similar specimen collected by Dr. Lyall in the "Columbia Valley, 1860" has been referred to *I. biflora* by Trelease, as was a related form found on "moist shady banks near the Missouri River, Montana, alt. 3600 ft., Sept. 7, 1883" by F. L. Scribner (No. 18), but this latter specimen does not exhibit the characteristic serrate dentation of the leaves and has shorter petioles. The altitude given would place this locality in the vicinity of Hilger's at the Gate of the Mountains. [PLATE I, C and D].

***Tropæolum peregrinum**, L. Canary-Bird Flower. Not rarely escaped from ornamental cultivation. Helena, E. N. Brandegee.

LINACEÆ.

Linum rigidum tenerrimum, n. var.

Tall and slender, diffusely branching above with long internodes, about 3 dm. high: leaves 2-3 cm. long: capsules larger and more acute: sepals longer, more attenuate and persistent than the type.

This tall, diffuse form is very different in appearance from the low, rigid, more common plant of the dry upland, but is frequently found with it and intergrades are common. The variety is more usual in low situations.

Big Horn River, June 15, 1890; Custer Co., July 1, 1892, Mrs. J. E. Light; Wibaux, July 9, 1901; Rainbow Falls of the Missouri, July 12, 1888, R. S. Williams, 145 in part.

***Linum usitatissimum**, L. The cultivated flax is frequently persistent in old fields.

Bozeman, July 22, 1898; Wibaux, Aug. 15, 1903.

EUPHORBIACEÆ.

Euphorbia Arkansana Missouriensis, Norton, Rep. Mo. Bot. Gard., 11:104; *E. dictyosperma*, Rydberg, Flora, 267, and authors as to the Montana specimens. Frequent in the eastern plains.

E. dictyosperma, F. & M. See last above.

Euphorbia maculata, L. A nearly glabrous form approaching *E. serpyllifolia*, Pers., but with characteristic spotted leaves.
Forsyth, July 24, 1900.

Euphorbia petaloidea, Engelm. Wibaux, July 9, 1901; Tusler, July 7, 1901.

Euphorbia serpens, HBK. Great Falls, Oct. 24, 1886, R. S. Williams, 160, in part; Miles City, Aug. 16, 1903.

CALLITRICHACEÆ.

Callitriche Bolanderi, Hegelm. A species close to *C. palustris*, L. but larger, with larger, rhombic-ovate leaves and styles longer than the fruit. Apparently not hitherto reported east of the Cascade Mountains, so its occurrence here on the Continental Divide is surprising. Bernice, Sept. 7, 1900, 6000 ft.

ANACARDIACEÆ.

Rhus occidentalis, (Torr.); *R. glabra occidentalis*, Torrey, Bot. Wilkes Exp. 257; *R. glabra*, Rydberg, Flora, 479. Differs from *R. glabra*, L. in its longer (3-4 dm.), less spreading leaves, usually larger number of leaflets (15-19), which are less acutely serrate and decidedly less glaucus beneath, shorter calyx and linear-oblong anthers. It is also separated in range from *R. glabra*, not being found east of the Continental Divide, so that with the characters given, it appears to be a good species. Extends from Washington eastward up the Clark's Fork into Montana, but very local in distribution in the valley of that stream, as if introduced. It occurs at Ravalli, Jocko and Paradise Valley.

Rhus Toxicodendron, L. Occurs in the typical form, both shrubby and climbing and should be included in our flora, even if the dwarf form (*R. Rydbergii*, Small) be regarded as distinct.
Kalispell, July 21, 1900.

ACERACEÆ.

Acer Douglasii, Hook.; *A. glabrum Douglasii*, Piper. Not infrequent in the forests west of the Divide, sometimes attaining a diameter of six inches. Distinguished from the common shrub maple (*A. glabrum*, Torr.) by being a medium-sized tree, by its larger leaves (8-12 cm. long) and larger fruit. Belton, July 27, 1900.

Acer glabrum tripartitum, Pax.; Rydberg, Flora, 270. Whatever may be the validity of this variety elsewhere, its occurrence in Montana is doubtful, though the young shoots of *A. glabrum* are not rarely trifoliate, and occasionally there is a similar tendency in the foliage of the whole shrub, such sporting forms are so rare and foliage so mixed on the same shrub that they can hardly be called even a variety in this region.

Acer grandidentatum, Nutt. Described from a specimen collected by Nuttall on the "Bear River of Timpanagos" in southwestern Wyoming or southeastern Idaho—not "N. Montana," as in the Syn. Fl. 1: 440; Sargent, Sylva, 2: 100; Rydberg, Flora, 270 and elsewhere, for Nuttall never was in the present limits of the state of Montana. See remarks under *Trifolum andinum*, Nutt. (p. 81). "Headwaters of the Columbia River" locality arose from the reference of a specimen of *A. barbatum*, Dougl. collected in "Valleys near springs on the west side of the Rocky Mountains, near the sources of the Columbia" (Torr. & Gray, Fl. N. Am. 1: 248) from Hooker (Fl. Bor. Am. 1: 113), a specimen which Hooker afterwards renamed correctly *A. Douglasii* (Lond. Jour. Bot. 6: 77), so all references of the species to Montana are in error. *A. grandidentatum* ranges northward to Evanston, Wyo. (Nelson) and Pocatello, Idaho (Henderson).

VITACEÆ.

Ampelopsis quinquefolia, Michx. Often in ornamental cultivation, apparently indigenous along the Missouri and lower Yellowstone. Poplar, July 12, 1900; Arden, July 15, 1900; Glendive, 1903.

Vitis vulpina, L. Not infrequent in the bottoms of the Little Big Horn River and reported thence down the Big Horn and Yellowstone Rivers.

Crow Agency, July 15, 1901.

LOASACEÆ

Mentzelia nuda, Torr. & Gray. Probably not rare in the sandy eastern plains. Miles City, Aug. 16, 1903.

LYTHRACEÆ.

Ammannia alcalina, n. sp.

A low annual, 8-12 cm. high, glabrous, divaricately branching from the base: leaves oblanceolate, narrowed abruptly to an acute or obtuse apex, sessile and somewhat auriculate at base, often purplish,

2-3 cm. long: flowers 1-3 in each axil, apparently apetalous, stamens 4, included; style much less than half the length of capsule, 1 mm. long, often nearly sessile: capsule globose, 4 mm. diameter, enclosed by the prominently 8-veined calyx. In wet alkali flats.

Lake Bowdoin, near Malta, Aug. 25, 1903; Milk River, Aug. 19, (1853-4), Suckley (Gray Herb.).

Differs from *A. coccinea*, Rottb. in its small size, stem not fleshy at base, leaves usually wider and more abrupt at apex and short style. More nearly related to *A. Kochnei*, Britton, but much smaller, apetalous and of different range. The Milk River specimens of Suckley are called *A. latifolia*, L. by Watson (Bot. Calif. 1:214). A related specimen from the Columbia River, Oregon (Suksdorf), but petaliferous, is called *A. coccinea*, Rottb. by Koehne, even though the styles are less than one-fourth the length of the capsule (Gray Herb.).

ONAGRACEÆ.

Epilobium palustre, L. Mountain near Columbia Falls, Aug. 20, 1904, R. S. Williams.

OEnothera andina, Nutt.; *Sphaerostigma andinum*, Walp.; Rydberg, Flora, 281, and various authors; apparently not yet found in Montana. The Blackfoot River, where Nuttall collected it, is in southeastern Idaho. It should occur in this state, as Macoun has it from several localities in Assiniboia, just north.

OEnothera brachycarpa, Gray. Watson, Rev. Oen., Proc. Amer Acad. 8:586; Coulter, Man. R. M. Bot., 104; Small, Bull. Torr. Bot. Club, 23:183, and others, following Watson, who seems to base his assertion on a specimen in the Gray Herbarium collected in Montana by Winslow J. Howard about 1866, which is certainly only an unfruited specimen of *OE. caespitosa*, Nutt. and is mounted on a sheet with *OE. Wrightii*, Gray. The two may be easily distinguished by the larger flowers, winged fruit and dense canescence of *OE. brachycarpa* and the smaller flowers, usually tuberculate, cristate fruit and nearly glabrous leaves of *caespitosa*. *OE. brachycarpa* is a much more southern species.

OEnothera depressa, Greene, Pittonia, 2:216. See *OE. muricata* below.

OEnothera muricata, L., Syst. 12 ed, 263; *OE. biennis muricata*, Lindl., Bot. Reg. t. 1604; *OE. depressa*, Greene, Pittonia, 2: 216; *Onagra depressa*, Small, Bull. Torr. Bot. Club, 23:170; Rydberg, Flora,

279; *O. strigosa*, Rydberg, Flora, 278. This is the common strigose, muricate, western form of *OE. biennis*, L. and, as it has a distinct range from the type and well marked characters, had best be regarded as a species. Greene's *OE. depressa* was grown in the botanic garden at Berkeley, California from seeds of the common erect Montana plant, collected by myself at Custer Station, Aug. 19, 1890 and which is still in my herbarium and differs in no respect from the *O. strigosa*, Rydb. The peculiar form of the plant described by Greene is due to cultivation and new climatic conditions. Here an erect annual or biennial in low ground and occasionally a weed in fields and waste places, like *OE. biennis*, L.

OEnothera strigosa, (Rydberg), Flora, 278. See *OE. muricata* above.

UMBELLIFERÆ.

Angelica Dawsoni, Wats.; *Thaspium aureum involucratum*, Coulter & Rose. Columbia Falls, July 12 & Aug. 18, 1894, R. S. Williams; Borax, Aug. 8, 1901.

Angelica Roseana, Henderson, Cont. Nat. Herb. 5:201; l. c. 7: 159. Tree limit, Spanish Peaks, July 20, 1901, Jacob Vogel; Head of Cottonwood Cr., Tobacco Root Range, 9000 ft., Aug. 10, 1902.

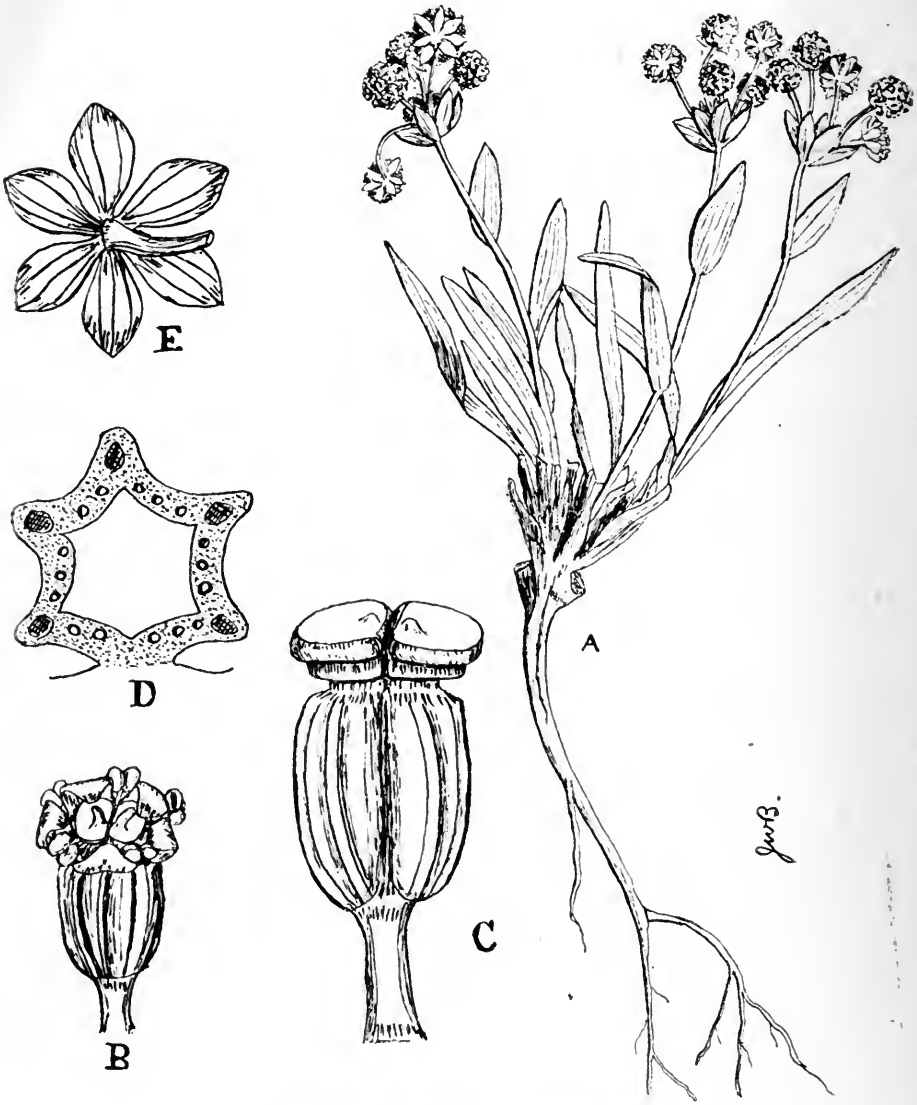
Bupleurum purpureum, n. sp.

B. ranunculoides, A. Nelson, (?) Bull. Wyo. Agr. Exp. Sta. 28:115.

Perennial from a long ligneous rootstock, branched above and producing about three (1-5) erect or somewhat spreading stems 3-10 cm. high; glabrous and somewhat glaucus: basal leaves numerous, linear-lanceolate, 2-5 cm. long and 3-6 mm. wide; cauline one to three, shorter and wider, sessile and more or less clasping, ovate-oblong to elliptical, 2-5 cm. long, not prominently nerved: involucre of 4-5 ovate, acute, unequal bracts; those of the involucels about 6, obovate to elliptical and relatively wide and obtuse, rarely acute, 3-nerved: primary rays of umbel about 5, unequal, 2-12 mm. long; secondary rays 10-12 very short; umbels 5-7 mm. diameter: flowers about half as large (1-2 mm.) as in *B. Americanum*; petals and stylopodium dark purple, rarely yellow, anthers yellow: carpel with prominent ribs and well-marked strengthening cells, oil-tubes 1-3, usually 3, in each interval.

Not infrequent in alpine situations and appears to intergrade with *B. Americanum* in intermediate altitudes. It is readily distinguished

PLATE III.



BUPLEURUM PURPUREUM, BLANKINSHIP.

A. Plant natural size.
B. Flower X 15.
C. Fruit X 15.
D. Mericarp, section X 15.
E. Bracts of involucel X 5.

from this species by its low, subcaulescent habit, shorter leaves, the wider, obtuse bracts of the involucels, smaller heads, smaller, dark purple flowers, shorter mericarps with fewer oil-tubes in the intervals and its alpine situation.

Mt. Hyalite, Gallatin Co., 10,000 ft. alt., Aug. 1, 1902; Black Butte, Tobacco Root Range, 10,000 ft. alt., Aug. 11, 1902; Bridger Mts. 9,000 ft. alt., Aug. 29, W. W. Jones. [PLATE III.]

Carum montanum, n. sp.

Roots fusiform, fascicled, fleshy: stems erect, 8-12 dm. high, glabrous and channeled: leaves with wide inflated, clasping petioles, 2-3 dm. long, odd-pinnate with about 5 pairs of leaflets; leaflets irregularly cleft into several lanceolate or oblanceolate, acuminate divergent divisions, 4-8 cm. long and 5-10 mm. wide; uppermost usually simply pinnate with linear-lanceolate leaflets; umbels 13-17 rayed; primary rays 2-4½ cm. long, secondary 4-8 mm.; involucre of 2-4 filiform bracts, 5-10 mm. long; involucels of short linear bractlets, as in *C. Gairdneri*: petals prominent and sepals evident, as long as the stylopodium, the latter depressed conical and style 1 mm. long: the oil-tubes large and solitary in the intervals: fragrant.

Distinguished from *C. Gairdneri*, Gray by its larger size, larger leaves and pinnately incised leaflets with lanceolate or oblanceolate segments, its larger fruit and longer styles. Near *C. Oreganum*, Wats. from which it is separated by its long. lanceolate incised leaflets, short linear bractlets of the involucels and its larger size.

In low thickets, Bozeman, Aug. 11, 1898; Flathead-Brackett Cr., Divide, Aug. 18, 1899; Hills of Lapwai, Clearwater Valley, Idaho, June 18, 1895, L. F. Henderson, 4868 (Gray Herb.). [PLATE IV].

Conioselinum scopulorum, Coult. & Rose; *Ligusticum scopulorum*, Gray. Borax, Coeur D'Alene Mts., 5500 ft., Aug. 8, 1901, in low ground.

Cymopterus Parryi, Jones; Coulter & Rose, Cont. Nat. Herb. 7: 182. "Gallatin Co., Tweedy, May, 1888".

Cymopterus terebinthinus, Rydberg, Flora, 292, is *Pterixia thapsoides*, Nutt.

Glycosma ambigua, Gray; *Washingtonia ambigua*, Coult. & Rose. Broadwater swamp, Helena, June 11, 1898, E. N. Brandegee.

Osmorrhiza divaricata, (Rydberg); *Washingtonia divaricata*, Rydberg, Flora, 290, is *O. obtusa*, Fernald (*Washingtonia obtusa*, Coult. & Rose, Cont. Nat. Herb. 7:64).

PLATE IV.

CARUM MONTANUM, BLANKINSHIP.

A. Lower leaf half natural size. B. Fruit X 12. C. Same, section.

Rydberg transposing this and *O. divaricata*, Nutt. and redescribing the latter as *Washingtonia intermedia*, Rydberg, Flora, 289. The true *O. divaricata*, Nutt. is rare in Montana.

Osmorrhiza intermedia, (Rydberg); *Washingtonia intermedia*, Rydberg, Flora, 289, is *O. divaricata*, Nutt.

Osmorrhiza Leibergii, (Coult. & Rose); *Washingtonia Leibergii*, Coult. & Rose, Cont. Nat. Herb. 7:66. Camp below Sperry Glacier, 6,000 ft., Sept. 1, 1903.

Osmorrhiza obtusa, Fernald; *Washingtonia obtusa*, Coult. & Rose; *W. divaricata*, Rydberg, Flora, 290. Frequent in the state in low shady places.

Peucedanum circumdatum, Rydberg, Flora, 286, is *P. montanum*, (Coult. & Rose). The true *P. circumdatum*, Wats. is found only westward of our limits.

Peucedanum Cous, Rydberg, Flora, 285, is *P. montanum* (Coult. & Rose, Cont. Nat. Herb. 7:215), as to the Montana specimens.

Peucedadum Cusickii, Wats. Beaverhead Co., near Dewey, 7,000 ft., near melting snow, June 24, 1902. Although the specimens are without mature fruit and the flowers seem yellow on drying, the small size, finely dissected, glabrous leaves and glabrous stem will hardly permit its being placed elsewhere.

Peucedanum montanum, (Coult. & Rose); *Lomatium montanum*, Coult. & Rose, Cont. Nat. Herb. 7:215; *Peucedanum circumdatum*, Rydberg, Flora, 286; *P. Cous*, Rydberg, Flora, 285 in part. Common in the mountainous parts of the state. The acaulescent form is now separated from the caulescent *P. circumdatum*, Wats., as *P. montanum*.

Peucedanum orientale, (Coult. & Rose); *Lomatium orientale*, Coult & Rose, Cont. Nat. Herb. 7:220. Custer Station, Apr. 24 and May 3, 1890; Miles City, May 26, 1902. Dry uplands.

Pterixia thapsoides, Nutt.; *Cymopterus terebinthinus*, Rydberg, Flora, 292. Common on dry hillsides in the mountains, 3-5000 ft. Difficult to distinguish from *P. terebinthina*. "Leaf-segments greener and not so rigid," can be said only of the species in flower, as in mature fruit the leaves are quite as pale and rigid as in *P. terebinthina*, though the fruit is characteristic.

Bozeman, May 14, 1900; Flathead-Brackett Cr. Divide, Aug. 18,

1899; Helena, June 15, 1899, E. N. Brandegee.

Zizia aurea, Koch. Flathead-Brackett Cr. Divide, Aug. 18, 1899: Arrow Cr., R. S. Williams, Sept. 1886, Coulter & Rose, Cont. Nat. Herb. 7:91.

CORNACEÆ.

Cornus Baileyi, Coult. & Evans, Bot. Gaz. 15:37. This is the common dogwood west of the Divide, *C. stolonifera,* Michx. being there much more rare. It is easily distinguished from the latter by its larger size (often 8 feet or more high), brownish-green bark, purplish only on the younger twigs; large (7 x 12 cm.), broadly ovate leaves, somewhat woolly pubescent below, and fruit with a peculiar broad flat seed. Forms with nearly orbicular flattened and pointed seeds occur, but otherwise like the type. The seeds of *C. stolonifera* in Montana are nearly always strongly oblique.

Belton, July 27, 1900; Troy, July 25, 1900; Columbia Falls, Sept. 16, 1892, R. S. Williams.

ERICACEÆ.

Gaultheria Myrsinites, Hook. Spanish Peaks, 8-9000 ft., Sept. 20, 1901, Jacob Vogel; Mt. Hyalite, 10,000 ft., Aug. 1, 1902.

Menziesia urceolaris, Rydberg, Flora, 297, is *M. glabella,* Gray. It is clearly an error to refer *urceolaris* to Montana. Collections made in nearly every part of the state fail to show it and the specimen Rydberg cites (Kelsey, Granite, 1902) is good *M. glabella,* Gray, though its filaments are glabrous, like most other species of *glabella* in the state. The leaves and young parts of the true *urceolaris* are strigose-hirsute, the leaves more acute and the flowers nearly twice as large as in glabella.

Phyllodoce hybrida, Rydberg and *P. intermedia,* Rydberg, Flora, 298, appear to be, as the author suggests, mere hybrids between *Bryanthus empetriformis,* Gray, and *B. glanduliflorus,* Gray, as they occur only where these two species are growing together and their characters are intermediate between them.

Pyrola bracteata, Hook.; *P. rotundifolia bracteata,* Gray. Easily distinguished from *P. uliginosa,* Torr., by its taller, red scapes, large bracts and denticulate, acutish leaves.

Belton, Aug. 21, 1903, L. M. Umbach, 723; Big Fork, Aug. 11, 1901, L. M. Umbach, 143; Summit, Sept. 12, 1902.

Pyrola secunda pumila, Paine. Smaller than the type; the latter found mainly west of the Divide; frequent.

Lower Basin of the Gallatin, 6000 ft., July 7, 1898; Spanish Basin, Aug. 25, 1899; Middle Cr. Canyon, 6500 ft., July 31, 1902; Gould, Oct., 1902, Owen Byrnes, 71; Indian Cr., July 21, 1897, 8000 ft., Rydberg & Bessey, 4646; Jack Cr. Canyon, July 15, 1897, 7000 ft., Rydberg & Bessey, 4644.

Vaccinium caespitosum arbuscula, Gray; *V. arbuscula,* Howell, Fl. N. W. Am. 411. Our form has narrow, oblanceolate, acute leaves, but appears to belong here. Forms appear to pass into *V. myrtilloides,* Hook., with which Rydberg seems to have placed it.

Evaro, June 8, 1902; Gallatin Co., Mrs. M. L. Alderson; Belt Park, Aug. 16, 1886, R. S. Williams, 538.

Vaccinium Canadense, Kalm. In open woodlands.

Belton, Aug. 19, 1903, L. M. Umbach; Aug. 19, 1902.

Vaccinium erythrococcum, Rydberg, Flora, 301; V. *Myrtillus microphyllum,* Hook. Must give place to *V. scoparium,* Leiberg, below.

Vaccinium Myrtillus, L. Frequent in the mountains, but at a somewhat lower altitude (5-8000 ft.) than *V. scoparium,* Lieberg, with which it intergrades.

Porcupine Cr., Crazy Mts., 8000 ft., July 18, 1902; Tobacco Root Range, 8000 ft., Aug. 9, 1902; Columbia Falls, Aug. 30, 1895, R. S. Williams, 492; Belt Park, Aug. 13, 1886, R. S. Williams, 492.

Vaccinium scoparium, Leiberg, Cont. Nat. Herb. 5: 103; *V. erythrococcum,* Rydberg. Common on shady mountain slopes.

PRIMULACEÆ.

Primula Americana, Rydberg, Bull. Torr. Bot. Club, 28:500. Separated from the European *P. farinosa,* L.

GENTIANACEÆ.

Erythraea Douglasii, Gray. Big Horn River near Custer Station, Aug. 24, 1890.

Frasera speciosa angustifolia, Rydberg, Bull. Torr. Bot. Club, 31: 632. "Lima, 1895, Shear, 3369."

OLEACEÆ.

Fraxinus viridis, Michx. The green ash is common along the lower Yellowstone River from the Big Horn River eastward and down the Missouri from Hinsdale. Crow Agency, July 15, 1901; Arden, July 15, 1900; Poplar, July 12, 1900.

CONVOLVULACEÆ.

Cuscuta Epithymum, Murr. Parasitic on alfalfa; probably introduced from Utah. Livingston, Aug. 8, 1898, and other localities.

Cuscuta inflexa, Engelm. Parasitic on *Salix* and *Glycyrrhiza lepidota* along the banks of the Missouri. Poplar, July 12, 1900; Glasgow, July 17, 1900, on *Salix*; Great Falls, July 10, 1900, on *Glycyrrhiza lepidota.*

Evolvulus argenteus, Pursh. Big Horn River near Custer Station, July 2, 1890; Billings, June 30, 1902.

Ipomoea leptophylla, Torr. Big Horn River, near Custer Station, Aug. 10, 1890. Dry hillsides, not infrequent there.

HYDROPHYLLACEÆ.

Romanzoffia Sitchensis, Bongard. Mt. Henry, Teton Co., Aug. 15, 1897, R. S. Williams; Sperry Glacier, 8000 ft., Sept. 1, 1903, in spray of falls; Stanton Lake, 7500 ft., Aug. 7, 1894, R. S. Williams, 1032.

BORRAGINACEÆ.

***Cynoglossum officinale,** L. Big Timber, July, 1900, V. K. Chesnut; July 13, 1901. A weed in waste places; infrequent.

Heliotropium spathulatum, Rydberg, Bull. Torr. Bot. Club, 30:262. Separated from *H. Curassavicum,* L., and includes all the Montana specimens.

Krinitzkia pustulata, n. n.; *Oreocarya affinis,* Greene, not *Krinitzkia affinis,* Gray. Resembles *K. glomerata,* Gray, but easily distinguished by its larger size, its coarse hispid pubescence with prominent pustulate-based hairs, its more spreading scorpoid racemes and its narrower, tuberculate (not rugose) nutlets. A species of the eastern plains, while *K. glomerata* is more frequent in the mountains and foothills.

Wibaux, July 9, 1901; Glendive, July 9, 1901; Arden, July 15, 1900; Culbertson, June 11, 1901; Billings, July 7, 1902; Trail Cr., Park Co., July 2, 1899; Livingston, July, 1886, F. Tweedy, 1172.

Lappula trachyphylla, Piper, Bull. Torr. Bot. Club; 29:540. "Winslow J. Howard in Montana."

***Lithosperum arvense,** L. Bozeman, June 11, 1901, W. W. Jones.

Mertensia membranacea, Rydberg, Bull. Torr. Bot. Club, 28:33; *M. paniculata*, Rydberg, Flora, 336. "Electric Peak, 1897, Rydberg & Bessey, 4864."

Mertensia paniculata, Rydberg, Flora, 336, is *M. membranacea,* Rydberg, above.

Mertensia subpubescens, Rydberg, Bull. Torr. Bot. Club, 30: 261. To segregate this from *M. Siberica,* Don merely on leaf pubescence is questionable, unless there be some biological factor of range, habitat or period of blooming to separate them, which is doubtful.

Myosotis macrosperma, Engelm. Big Fork, June 29, 1902, M. J. Elrod.

***Symphytum officinale,** L. Streets and waste places, introduced; rare. Bozeman, July 13, 1898.

VERBENACEÆ.

Verbena stricta, Vent. Frequent in the bottoms along the Little Big Horn River at the Crow Agency, July 14, 1901.

LABIATÆ.

***Hyssopus officinalis,** L. Escaped from gardens; infrequent. Kalispell, July 21, 1900.

***Lamium amplexicaule,** L. Occasional as a weed in gardens. Ennis, Aug. 20, 1900.

Lycopus Virginicus, L. In sphagnum bogs at the head of Lake McDonald, Aug. 29, 1903, L. M. Umbach. There common.

***Nepeta Glechoma,** Benth. Occasionally escaped from ornamental cultivation. Livingston, May 24, 1892, Miss E. Gay; Bozeman 1902.

***Salvia lanceolata,** Wilid. Streets of Helena, introduced. Sept. 19, 1903; Sept. 10, 1898, E. N. Brandegee.

SOLANACEÆ.

***Hyoscyamus niger,** L. A weed in the streets and waste places introduced. Billings, E. V. Wilcox, May, 1900; Big Timber, June 15, 1900, V. K. Chesnut; Bozeman, Sept., 1900.

***Physalis ixocarpa,** Brot.; *P. œquata* Jacq. f. Persistent in old gardens after cultivation. Bozeman, Aug. 18, 1898.

Physalis heterophylla, Nees.; *P. Virginiana,* Gray. Apparently native. Forsyth, July 24, 1901.

SCROPHULARIACEÆ.

***Linaria vulgaris,** Mill. Frequently escaped from ornamental cultivation. Crow Agency, July 15, 1901; Missoula, 1903; Columbia Fall, Sept. 9, 1899.

Mimulus Langsdorfii alpinus, (Gray); *Mimulus luteus alpinus,* Gray. Mt. Hyalite, 10,000 ft., Aug. 1, 1902.

Orthocarpus pachystachyus, Rydberg, Flora, 362 is *O. tenuifolius,* Benth., as shown by the yellow corolla not exceeding 18 mm. in length. *O. pachystachyus,* Gray seems never to have been found except in the original locality, where it was collected by Greene. See Pittonia, 4:101.

Penstemon Wilcoxii, Rydberg, Bull. Torr. Bot. Club, 28: 28. "Kalispell, 1900, E. V. Wilcox, 370 & 368".

***Verbascum Blattaria,** L. The moth mullein is common as an introduced weed in many places along the railroad between Missoula and Thompson Falls. Thompson Falls, Aug. 8, 1901.

***Veronica Byzantina,** B. S. P. Occasionally as a weed in gardens; imported with garden seed, but rarely persistent. Bozeman, Sept. 29, 1900.

OROBANCHACEÆ.

Aphyllon uniflorum, Gray. Columbia Falls, July 10, 1895, R. S. Williams; Belt R. & Martinsdale, June 6, 1884, R. S. Williams, 3 & 239; Mt. Hyalite, 8500 ft., Aug. 1, 1902.

LENTIBULARIACEÆ.

Utricularia minor, L. Ditches near the Sweet Grass River, Melville, June 21, 1901. Not in bloom but can hardly be anything else.

PLANTAGINACEÆ.

***Plantago lanceolata**, L. Occasionally introduced with grass and garden seed. Bozeman, Aug. 8, 1904.

Plantago spinulosa, Dcne.; *P. Patagonica spinulosa*, Gray. Reported in Montana by E. L. Morris, Bull. Torr. Bot. Club, 28: 117.

CAPRIFOLIACEÆ.

Sambucus Canadensis, Rydberg, Flora, 370, is *S. glauca*, Nutt.

Sambucus glauca, Nutt. Common in low ground west of the Divide. Missoula, June 25, 1897, M. J. Elrod; Flathead Lake, July 27, 1900; Plains, Aug. 7, 1901; St. Ignatius, Sept. 7, 1899; Troy, July 25, 1900; Leonia, Sept 14, 1900.

VALERIANACEÆ.

***Valerianella macrocera**, Gray. In hill pastures back of Plains, June 6, 1902. Probably introduced by sheep from the west.

COMPOSITÆ.

Achillea Millefolium, L. The typical, more glabrous eastern plant is not infrequent in the region west of the Divide.

Swan Lake, June, 1902, M. J. Elrod, 112.

***Ambrosia trifida**, L. Frequent as a weed along the Great Northern R. R. from Havre eastward; probably introduced.

Arden, July 15, 1900; Poplar, July 12, 1900; Savoy, July 18, 1900; Chinook, Sept. 10, 1900; Havre, July 28, 1900; Crow Agency, July 15, 1901.

Antennaria arida humilis, E. Nelson, Proc. U. S. Nat. Mus. 23: 710; *A. foliacea humilis*, Rydb., Flora 414.

"Brdger Mountains, Rydberg & Bessey, No. 5149."

Antennaria corymbosa, E. Nelson; Rydberg, Flora, 413, is *A. nardina*, Greene, according to Nelson, Proc. U. S. Nat. Mus. 23: 707.

Antennaria foliacea, Rydberg, Flora, 413, is *A. reflexa*, E. Nelson, according to the latter, Proc. U. S. Nat. Mus. 23: 703.

Antennaria foliacea, Rydberg, Flora, 413, is *A. oxyphylla*, Greene, in part at least (Pittonia, 4:284).

A. foliacea humilis, Rydberg, is *A. arida humilis*, E. Nelson, l. c.

Antennaria Howellii, Greene Pittonia, 3: 174. "Montana", E. Nelson, Proc. U. S. Nat. Mus. 23: 713; Columbia Falls, June 8, 1894, R. S. Williams, 1019; Thompson Falls, June 7, 1902.

A. nardina, Greene, Pittonia, 4:82; *A. corymbosa*, E. Nelson, l. c.

Antennaria oblancifolia, E. Nelson, Bot. Gaz. 30:121. Bridger Mts., June 26, 1899.

Antennaria oxyphylla, Greene, Pittonia, 4: 284; *A. foliacea*, Rydberg, Flora, 413. "Spanish Basin, Gallatin Co., Rydberg & Bessey, No. 5148".

Antennaria pulvinata, Greene, Pittonia, 3: 287; *A. media*, Rydberg, Flora, 410, in part at least. Tiger Butte, 1887, R. S. Williams, 729, as cited by E. Nelson, Proc. U. S. Nat. Mus. 23: 702.

Antennaria pulvinata albescens, E. Nelson, Proc. U. S. Nat. Mus. 23:702. Bridger Mts., June 18, 1897, Rydberg & Bessey, 5162, as quoted.

Aplopappus Andersonii, (Rydb.); *Stenotus Andersonii*, Rydberg, Bull. Torr. Bot. Club, 27:615. "Belt Mts., 1886, F. W. Anderson".

Aplopappus integrifolius pumilus, (Rydberg); *Pyrrocoma integrifolia pumila*, Rydberg, Bull. Torr. Bot. Club, 27:626; *P. Howellii*, Rydberg, Flora, 382. "Butte, 1895, Rydberg".

Aplopappus rigidus, (Rydberg); *Pyrrocoma rigida*, Rydberg, Bull. Torr. Bot. Club, 27, 624. Separated from *A. carthamoides*, Gray. "Columbia Falls, 1894, R. S. Williams".

***Arctium Lappa**, L. The burdock is not rare as a weed in a few localities. Big Timber, July 11, 1901; Libby Creek, July 26, 1900.

***Artemisia annua**, L. An introduced weed in waste places at Billings, Aug. 29, 1904.

Aster angustus, Torr. & Gray; *Brachyactis angustus*, Britton. Frequent in alkali soil.

Great Falls, Sept. 16, 1886, R. S. Williams; Havre, Sept. 15, 1900; Chinook, Sept. 10, 1900; Malta, Sept. 9, 1900; Columbia Falls, Sept. 17, 1894, R. S. Williams; Custer Station, Aug. 24, 1890.

Aster crassulus, Rydberg, Bull. Torr. Bot. Club, 28: 504.

Aster hesperius, Gray. (G. H. Shull).
Kalispell, Sept. 8, 1899; Leonia, Sept. 14, 1900.

Aster Nelsonii, Greene, Pittonia, 4:219. (G. H. Shull). Bozeman, Aug. 26, 1898; Steele ,Teton Co., Aug. 20, 1901.

Aster ptarmicoides, Torr. & Gray. Wibaux, Aug. 15, 1903. Rare.

Aster Sibericus, L. Common along the gravel margins of the Flathead River, July 27, 1900, and of the Koutenai above Leonia, Sept. 14, 1900; also Tenderfoot Cr., Teton Co., July 31, 1891, R. S. Williams.

Balsamorrhiza floccosa, Rydberg, Bull. Torr. Bot. Club, 27:629. Separated from *B. Hookeri,* Nutt. "Spanish Basin, 1897, Rydberg & Bessey, 5175."

Bidens frondosa, L. Eastern plains, rare.
Sand Coulee, 1886, R. S. Wiliams; Box Elder Cr., Valley Co., July 14, 1900; Crow Agency, July 15, 1901.

***Centaurea Cyanus,** L. The corn-flower is a frequent escape from ornamental cultivation. Bozeman, 1902; Missoula, 1903.

Chrysopsis villosa discoidea, Gray. "Canyons of W. Montana, Watson." Syn. Flora, 1:123.

***Cichorium Intybus,** L. The chickory is introduced in a few localities and promises to be permanent. Holt, July 23, 1900.

***Cnicus lanceolatus,** Willd. The Scotch thistle is frequent along railroads and in many localities in the western part of the state. Kalispell, July 21, 1900; White Pine, Sept. 9, 1904, and other localities.

Erigeron Nelsonii, Greene, Pittonia, 3:294. (G. H. Shull).
Bozeman, July 1, 1898.

***Galinsoga parviflora,** Cav. Occasional as a weed about greenhouses. Bozeman, Apr. 19, 1901.

Helianthus Maximiliani, Schrad. Frequent in low ground along the Missouri River from Malta eastward.
Missouri River, near Calais, July 14, 1900; Malta, Sept. 9, 1900; Upper Little Big Horn River, July 13, 1890.

Lactuca Canadensis, L. Big Fork, Aug. 8, 1904. Millie M. Smith.

***Madia filipes,** Gray. An abundant weed introduced in waste places in the extreme western part of the state.

Troy, July 25, 1900; Thompson Falls, Aug. 8, 1901.

***Madia dissitiflora,** Torr & Gray; *M. sativa disitiflora,* Gray. A weed introduced from westward along the railway. Thompson Falls, Aug. 8, 1901.

Petasites dentata, n. sp.

P. sagittata, Gray, in Brew. & Wats., Bot. Calif., 1:407; Syn. Fl. 1: 376; not *Tussilago sagittata,* Pursh, Fl. N. Am. 531. In Pursh's description of the latter the radical leaves are said to be "oblongis acutis sagitatis integerrimis, lobis obtusis," which cannot apply to the common Rocky Mountain species with broadly ovate-hastate, repand-dentate radical leaves meant by Gray. *T. sagittata* of Pursh is from Hudson's Bay. M. L. Fernald of the Gray Herbarium first noted this species as distinct from that described by Pursh, but I do not find it elsewhere distinguished.

Petasites sagittata, Rydberg, Flora, 484 and authors, as to the Rocky Mountain species, is *P. dentata* above.

Pyrrocoma Howellii, Rydberg, Flora, 382 is *Aplopappus integrifolius pumilus.*

Rudbeckia ampla, A. Nelson, Bull. Torr. Bot. Club, 28:234. Appears to include all the Rocky Mountain *R. laciniata,* L.

Rudbeckia laciniata, Rydberg, Flora, 416, is the last.

Senecio alpicola, Rydberg, Flora, 447, is *S. saxosus,* Klatt. (J. M. Greenman).

Senecio altus, Rydberg, Flora, 443, is *S. sphaerocephalus,* Greene. (J. M. Greenman).

Senecio atriapiculatus, Rydberg, Flora, 442; apparently identical with *S. Hookeri,* Torr. & Gray. (J. M. Greeman).

Senecio Balsamitae, Rydberg, Flora, 446 is *S. flavovirens,* Rydberg.

Senecio debilis, Nutt.; *S. nephrophyllus,* Rydberg, 446? (J. M. Greenman). Fair Grounds, Helena, July 23, 1898, E. N. Brandegee; Big Blackfoot River, July 13, 1883, W. M. Canby.

Senecio exaltatus, Nutt. (J. M. Greenman).
Thompson Falls, June 7, 1902.

Senecio flavovirens, Rydberg, Bull. Torr. Bot. Club, 27:181, is the western form of *S. Balsamitae,* Muhl. and includes all Montana species referred to the latter (Flora, 446).

Senecio Hookeri, Torr. & Gray. Apparently Rydberg's *S. atriapiculatus.*

Senecio integerrimus, Nutt. (J. M. Greenman). Between Bozeman and Belgrade, May 29, 1898, collector doubtful.

Senecio lugens, Richardson. (J. M. Greenman). Lower Basin of the Gallatin, July 8, 1898.

Senecio nephrophyllus, Rydberg, Flora, 446; apparently *S. debilis,* Nutt. (J. M. Greenman).

Senecio ovinus, Greene, Pittonia, 4:110. (J. M. Greenman).
Sperry Glacier, 8000 ft., Sept. 1, 1903; Mt. Hyalite, 10,000 ft., Aug. 1, 1902; McDonald's Peak, Mission Range, July 19, 1893. W. M. Canby.

Senecio saxosus, Klatt.; *S. petraeus,* Klatt.; *S. petrocallis,* Greene; *S. alpicola,* Rydberg, Flora, 447. (J. M. Greenman).
Black Butte, Tobacco Root Range, 10,000 ft., Aug. 11, 1902. Northernmost range yet reported.

Senecio sphaerocephalus, Greene, Pittonia, 3:106; *S. altus,* Rydb. (J. M. Greenman). Brackett-Flathead Cr. Divide, 7000 ft., June 26, 1902.

Solidago multiradiata scopulorum, Gray. Mountain near Stanton Lake, 7000 ft., Aug. 1, 1894, R. S. Williams; mountain near Nyack, 9000 ft., Aug. 25, 1902, M. J. Elrod.

***Sonchus arvensis,** L. Imported from the East with shrubbery. Bozeman, July 30, 1904. Apparently not maturing seed here.

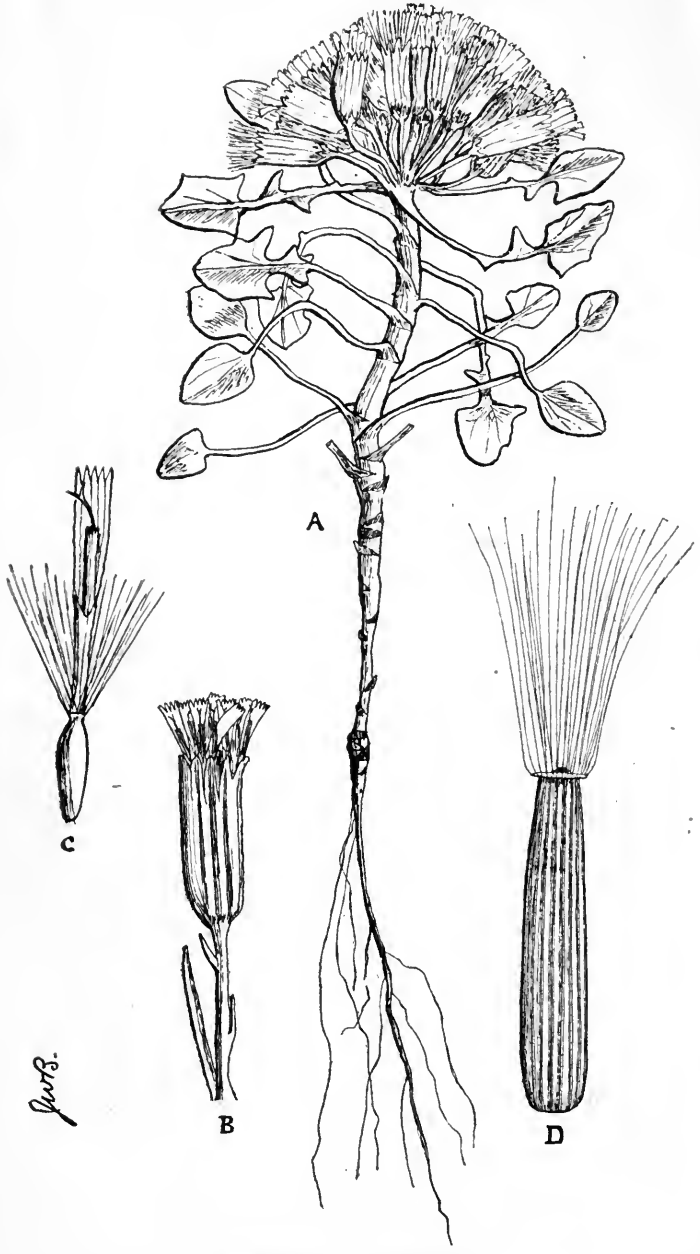
***Sonchus oleraceus,** L. Much more rare than *S. asper,* Vill. Prickly Pear Canyon, July 28, 1887, R. S. Williams; Bozeman, July 30, 1894.

Stenotus Andersonii, Rydberg, Bull. Torr. Bot. Club, 27:615. See *Aplopappus Andersonii* before.
"Belt Mts., 1886, F. W. Anderson, 3561."

***Troximon heterophyllum**, Greene. Dry hill pastures back of Plains, June 6, 1902. Apparently introduced by stock from the Pacific Coast.

***Xanthium spinosum**, L. Well established as a weed at a sheep camp east of Victor, Bitter Root Valley, R. Parkhurst, Sept. 15, 1900. Probably brought in by sheep from the Pacific Coast.

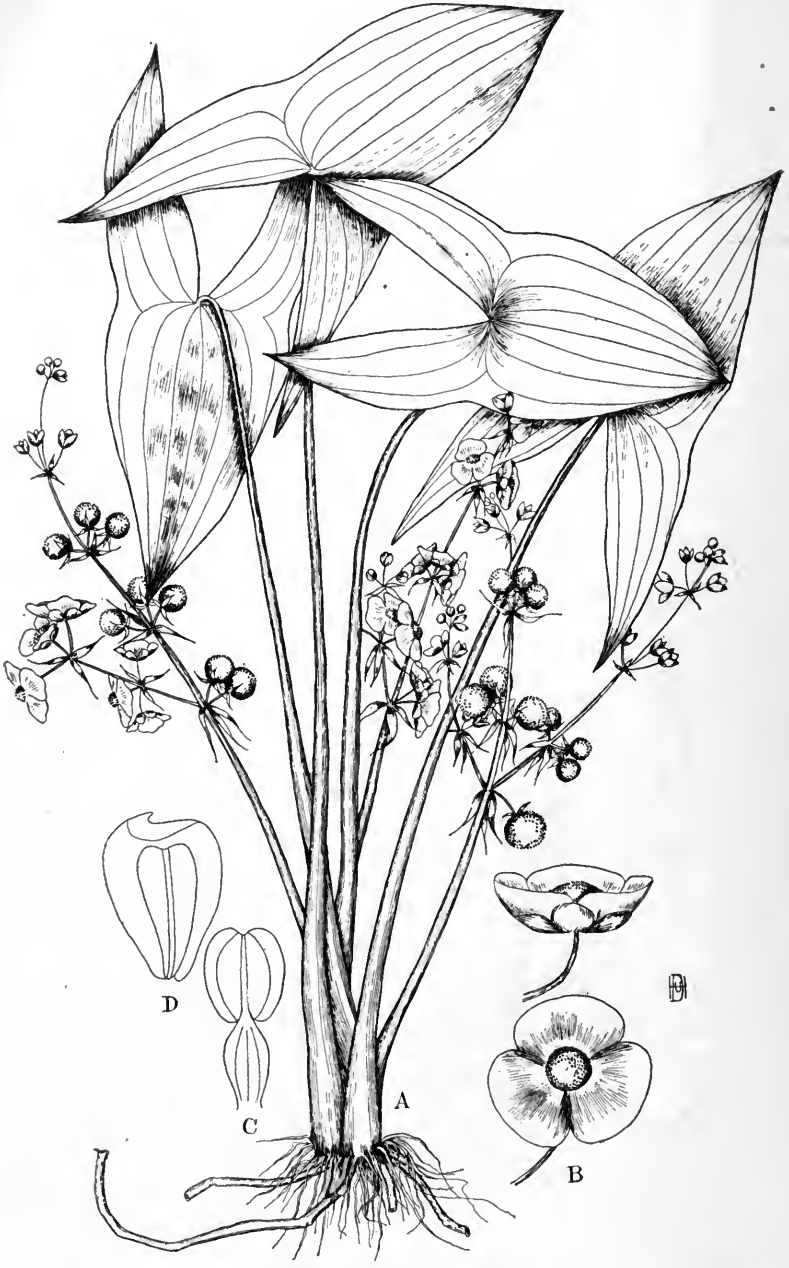
PLATE V.



CREPIS NANA, RICHARDSON.

A. Plant natural size.
B. Single head X 2.
C. Flower X 3.
D. Mature fruit X 7.

PLATE VI.



Drawing by Miss E. A. DuHamel.

SAGITTARIA PANICULATA, BLANKINSHIP.

A. Plant about half size.
Flower natural size.

C. Stamen X 5.
D. Akene X 7.

INDEX.

VOL. I. MAY, 1905. NO. 3.

MONTANA AGRICULTURAL COLLEGE SCIENCE STUDIES.

BOTANY.

COMMON NAMES OF MONTANA PLANTS.

BY J. W. BLANKINSHIP, AND HESTER F. HENSHALL.

Frontispiece: The Bitter-root.

BOZEMAN, MONTANA.
PUBLISHED QUARTERLY BY THE COLLEGE.

NOTICE.

I WOULD REGARD IT AS A FAVOR, IF THE READER WOULD CALL MY ATTENTION TO ALL ERRORS AND OMISSIONS IN THE FOLLOWING LISTS, AS IT IS DESIRED TO SECURE AS MANY AS POSSIBLE OF THE COMMON NAMES OF OUR NATIVE MONTANA PLANTS, AS WELL AS INFORMATION IN REGARD TO THEIR USES AND ADAPTABILITY TO PURPOSES OF ORNAMENTAL CULTIVATION, FOR USE IN FUTURE PUBLICATIONS.

J. W. BLANKINSHIP.

AVANT COURIER PRINT.

MONTANA AGRICULTURAL COLLEGE SCIENCE STUDIES.

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COMMON NAMES OF MONTANA PLANTS.

By J. W. BLANKINSHIP and HESTER F. HENSHALL.

PREFACE.

The present list of the popular plant names of some of the more common or striking plants of Montana has been gradually brought together by noting down the names heard in common use throughout the state and is intended to supply a want not met by any of the text books dealing with our flora and to give aid and encouragement to the amateur and student of our native flowers and trees, for whom the scientific names may be hard to remember. No attempt has been made by the authors to invent names for the deserving, but unnamed beauties, which bloom about us, nor have we gone to books to find the names elsewhere in use for any particular species; we only try to portray faithfully the names originated or applied in local usage, though many of these have been simply transferred from similar or related plants in other regions and have thus become established among us.

The question is often asked, "Why are these hard scientific names necessary?" By reference to the list of common names in the index following it will be seen that the same common name is often applied to two or more very different species in different parts of the state and to still other species in other countries or states, so that any discussion of our flowers by their common names would scarcely be understood outside of the limited locality where the paper was written, while it is intended to have only one scientific name, expressed in Latin, for each species in every language and in all countries and thus secure accuracy of expression otherwise unattainable. Hence it is that, while common names may be very helpful in the local study of a flora, they cannot supply the place of their Latin equivalents in papers intended for general circulation.

We would now remind you of the fact that only a small proportion of our flowers have yet received common names and that you have just as much right to christen them as any one else, while the

chances are that the name you apply, if found eminently appropriate and frequently mentioned, is apt to become permanently established and even to displace another less characteristic.

The common names of plants aptly portray the genius of a people. They express disgust at unwarranted intrusions and disagreeable dispositions and flout before us the appearance of the ugly and misshapen. They advertise their evils habits and warn us against their unknown dangers. Some plants harp upon the fact that they furnish food for this or that animal, or have an unfortunate habit of lying in wait and poisoning some unsuspecting herbivore, never thinking that from the point of view of the plant it is acting strictly in self-defence. We also find their good qualities often mentioned, as well as their various and peculiar habits of growth or seed-dissemination, while their friendship for their late friends and admirers, the noble Red Man, and often even their Indian names, yet cling to them in our popular nomenclature, as a badge of honor and a well-earned recognition of their former services. But it is from their relationships and resemblances, real or imagined, that the greater number of popular names are derived and it is a common habit of an immigrant people to christen the strange plants of their new homes with the names of the loved flowers of their former land and to keep up the old names of the weeds that follow in their footsteps. Yet, the genius of a people finds its most natural expression in the new names given to these new species which bloom around them and it is here that we see the comic, the poetic, the indignant hatred, the love and the wild, free happiness of childhood and the country home so often displayed, and we can trace in these names the love of beauty and grace, the boundless admiration and the deepest appreciation of the human heart for the purity, simplicity and elegance of these gentle flowers of Nature, so lavishly displayed before us, to charm our minds and hearts away from the ceaseless toil and the evil passions of this social edifice we have built about us—to give us rest and inspire us with higher, purer and nobler aims than those we now attempt.

For convenience of reference two alphabetical lists are given, one of the common names with their scientific equivalents, the other of the scientific names followed by their corresponding common names.

Valuable assistance in compiling the present work has been rendered by Mrs. E. W. Scheuber of Livingston, Mrs. M. L. Alderson of Bald Butte, Mrs. R. R. Finlay, Amy M. Cooke and Wyatt W. Jones of Bozeman, and the many students of botany at the Montana Agricultural College, who have each year contributed to extend the list of names here given.

COMMON NAMES.

Aconite; Aconitum Columbianum, Nutt.
Adder's-tongue; Erythronium grandiflorum, Pursh.
Alder; Alnus tenuifolia, Nutt.
Alfalfa Dodder; Cuscuta Epithymum, Murr.
Alfilaria; Erodium cicutarium, L'Her.
Alkali-grass; Distichlis spicata, Greene.
Alpine Fir; Abies lasiocarpa, Nutt.
Alpine Pine; Pinus albicaulis, Nutt.
Arrow-leaf; Balsamorrhiza sagittata, Nutt.; Sagittaria arifolia, Nutt.
Artichoke; Carum Gairdneri, Gray; Helianthus Maximiliani, Schrad.
Ash-leaved Maple; Negundo aceroides, Moench.
Aspen Poplar; Populus tremuloides, Michx.
Atabasco Lily; Calochortus species.
Baby Blue-eyes; Pentstemon acuminatus, Dougl.
Badgers; Anemone patens Nuttalliana, Gray.
Balm; **Balm of Gilead**; Populus balsamifera, L.
Balsam; **Balsam Fir**; Abies lasiocarpa, Nutt.
Baneberry; Actæa spicata, L. and A. rubra, Willd.
Barberry; Berberis repens, Lindl.
Bazzle-weed; Iva axillaris, Pursh.
Bearberry; Lonicera involucrata, Banks.
Bear-grass; Xerophyllum tenax, Nutt.; X. Douglasii, Wats.
Bee Flower; Cleome integrifolia, T. & G.
Beggar-ticks; Echinosperum floribundum and other species.
Bell-flower; Campanula rotundifolia, L.
Big-root; Balsamorrhiza sagittata, Nutt. Ipomœa leptophylla, Torr.
Bindweed; Polygonum Convolvulus, L.
Bird-bills; Geranium Carolinianum, L. and G. Bicknellii, Britton.; Dodecatheon conjugens, Greene and other species.
Birdseed; Lepidium apetalum, Willd.
Biscuit-root; Lomatium cous, C. & R. and other species.
Bitter-root; Lewisia rediviva, Pursh.
Black Currant; Ribes Americanum, Mill.
Blackeyed Susan; Gaillardia aristata, Pursh.; Rudbeckia laciniata, L.
Black Haw; Cratægus Douglasii, Lindl.
Black Moss; Alectoria Fremontii, Tuckerm.
Black Mustard; Brassica nigra, Koch:
Black Pine; Pinus scopulorum, Lemmon.
Bladder-pod; Physaria didymocarpa, Gray.

Blanket-flower; Gaillardia aristata, Pursh.
Blazing-star; Liatris punctata, Hook.
Blue Anemone; Anemone patens Nuttalliana, Gray.
Blue Bean; Lupinus species.
Blue Camas; Camassia esculenta, Lindl.
Blue-bells; Mertensia oblongifolia, Don.; Campanula rotundifolia, L.
Blue Clematis; Clematis Columbiana, T. & G.
Blue Columbine; Aquilegia cærulea, James.
Blue-eyed Grass; Sisyrinchium species.
Blue Flag; Iris Missouriensis, Nutt.
Blue Flax; Linum Lewisii, Pursh.
Blue-joint; **Blue-stem**; Agropyron occidentale, Scribn.
Blue Larkspur; Delphinum Menziesii, DC. & D. bicolor, Nutt.
Blue Lupine; Lupinus leucopyllus, Dougl. and other species.
Blue Pea; **Blue-weed**; Lupinus species.
Blue Sage; Artemisia cana, Pursh.
Blue Tulip; Anemone patens Nuttalliana, Gray.
Blue Violet, Viola adunca, Smith.
Box-Elder; Negundo aceroides, Moench.
Brake Fern; Pteris aquilina, L.
Bread-root; Psoralea esculenta, Pursh.
Brown-cup Mariposa Lily; Calochortus Gunnisoni, Wats.
Brown Lily; Fritillaria atropurpurea, Nutt.
Buckbush; Symphoricarpus species.
Buchthorn; Neillia malvacea, Greene.
Buffalo-berry; Shepherdia argentea, Nutt.
Buffalo-grass; Bouteloua oligostachya, Torr.; Bulbilis dactyloides, Raf.
Buffalo Pea; Astragalus caryocarpus, Ker. Oxytropis Lambertii, Pursh.
Buffalo Rye; Elymus condensatus, Presl.
Bull-berry; Shepherdia argentea, Nutt.
Bull-grass; Eleocharis palustris, L.
Bull Pine; Pinus scopulorum, Lemmon.
Bull Thistle; Cnicus lanceolatus, Willd.
Bulrush; Equisetum arvense, L.; Scirpus lacustris occidentalis, Wats,; Typha latifolia, L.
Bunch-grass; Agropyron divergens, Nees. Festuca ovina, L.
Burdock; Arctium Lappa, L.
Bur Ragweed; Franseria Hookeriana, Nutt.
Bur-reed; Sparganium species.

Bush Honeysuckle; Lonicera Utahensis, Wats.
Buttercup; Ranunculus glaberrimus, Hook. and other species.
Butterfly Lily; Calochortus species.
Butterfly Weed; Gaura coccinea, Nutt.; Asclepias speciosa, Torr.
Cactus; Opuntia species.
Calipso; Calipso borealis, Salisb.
Camas; Camassia esculenta, Lindl.
Canada Thistle; Cnicus arvensis, Hoffm.
Cancer-root; Aphyllon faciculatum, Gray.
Cane-grass; Phragmites communis, Trin.
Canoe Birch; Betula papyrifera, Marsh.
Careless Weed; Iva xanthiifolia, Nutt.; Amaranthus retroflexus, L.
Carpet-weed; Euphorbia glytosperma, Engelm.
Catnip; Nepeta cataria, L.
Cat's-eye; Anemone patens Nuttalliana, Gray.
Cat-tail; **Cat-tail Flag**; Typha latifolia, L.
Cedar; Thuja plicata, Don.; Juniperus scopulorum, Sarg.
Cheat; **Chess**; Bromus racemosus, L. & B. secalinus, L.
Chickweed; Cerastium vulgatum, L.; Stellaria media, Smith.
Chinese Lettuce; Lactuca Scariola L.
Choke Cherry; Prunus demissa, Walp.
Clarkia; Clarkia pulchella, Pursh.
Cockle; Saponaria Vaccaria, L.
Coltsfoot; Petasites sagittata, Gray.
Columbine; Aquilegia.
Comfrey; Symphytum officinale, L.
Compass Plant; Lactuca Scariola, L.
Cone-flower; Lepachys Columnaris, T. & G.; Rudbeckia laciniata, L.
Coral-vine; Cuscuta arvensis, Beyrich.
Cotton-weed; Lactuca pulchella, DC.; Epilobium paniculatum, Nutt.
Cous; **Cous-root**; Lomatium cous, C.& R.; L. montanum, C. & R. and other species.
Cowbane; Cicuta occidentalis, Greene.
Cow Cabbage; Heracleum lanatum, Michx.
Cow Cockle; Saponaria Vaccaria, L.
Cow Parsnip; Heracleum lanatum, Michx.
Cowslip; Anemone patens Nuttalliana, Gray.
Crane's-bill; Geranium Carolinianum, L. and other species.
Crocus; Anemone patens Nuttalliana, Gray.
Cucklebur; Glycyrrhiza lepidota, Pursh; Xanthium Canadense, Mill.

Currant; Ribes species.
Cushion Cactus; Mamillaria vivipara, Haw.
Daisy; Townsendia Parryi, Eaton.
Dandelion; Taraxacum officinale, Weber.
Deadly Nightshade; Solanum nigrum, L.
Death Camas; Zygadenus venenosus, Wats.
Devil's Darning-needles; Stipa comata, F. & R.; S. spartea, Trin.
Devil's Walking-stick; Fatsia horrida, Benth. & Hook.
Diamond Willow; Salix Mackenziana, Barratt.
Dock; Rumex crispus, L.; R. salicifolius, Weimm.
Dodder; Cuscuta.
Dog Fennel; Anthemis Cotula, DC.
Dog-tooth Violet; Erythronium grandiflorum, Pursh.
Douglas Fir; Pseudotsuga mucronata, Sudw.
Douglasia; Douglasia montana, Gray and other species.
Dragonhead; Dracocephalum parviflorum, Nutt.
Elder; **Elderberry**; Sambucus glauca, Nutt.
Elecampane; Balsamorrhiza sagittata, Nutt.
Elephant's Head; Pedicularis Grœnlandica, Retz.
Elm; Ulmus Americanus, L.
Engelmann's Spruce; Picea Engelmanni, Engelm.
Evening Primrose; Œnothera cæspitosa, Nutt.; OE. pinnatifida, Nutt.
Fairy Pinks; Orthocarpus tenuifolius, Benth.
False Flax; Camelina sativa, Crantz.
False Solomon's Seal; Smilacina species.
Field Draba; Draba nemorosa, L.
Field Mustard; Brassica Sinapistrum, Boiss.
Fir; Abies; Pseudotsuga.
Fireweed; Epilobium angustifolium, L.; Erigeron Canadense, L.
Fishweed; Potamogeton species.
Five-finger; Potentilla.
Flowering Sage; Bigelovia graveolens, Gray.
Flowering Spurge; Euphorbia marginata, Pursh.
Forgetmenot; Myosotis alpestris, Schmidt.
Foxtail; Hordeum jubatum, L.
Frog-sprouts; Equisetum lævigatum, A. Br.
Frost Grape; Vitis vulpina, L.
Garlic; Allium species.
Golden Aster; Aplopappus acaulis glabratus, Eaton; Chrysopsis villosa, Nutt.

Golden Daisy; Chrysopsis villosa, Nutt.
Golden Rod; Solidago species.
Goosegrass; Polygonum aviculare, L.
Grama Grass; Bouteloua oligostachya, Torr.
Graisse de Boeuf; Shepherdia argentea, Nutt.
Grass Cactus; Yucca angustifolia, Pursh.
Greasewood; Bigelovia graveolens, Gray; Sarcobatus vermiculatus, Torr.
Green Ash; Fraxinus viridis, Michx.
Green Dogfennel; Matricaria discoidea, DC.
Ground Cherry; Astragalus caryocarpus, Ker.; Solanum triflorum, Nutt.
Ground Hemlock; Taxus brevifolia, Nutt.
Ground-nut; Claytonia multicaulis, Nelson.
Ground Plums; Astragalus caryocarpus, Ker.
Ground Vervain; Verbena bracteosa, Michx.
Grouse-berry; Vaccinum scoparium, Leiberg.
Gumweed; Grindelia squarrosa, Dunal.
Harebell; Campanula rotundifolia, L.
Headache-weed; Clematis Douglasii, Hook.
Hedge Mustard; Sisymbrium officinale, Scop.
Hemlock; Tsuga heterophylla, Sarg.
Henbane; Hyoscyamus niger, L.
Honey Clover; Melilotus alba, Lam.
Hop-vine; Humulus Lupulus, L.
Horehound; Marrubium vulgare, L.
Horsemint; Monarda scabra, Beck.
Horsetail; Equisetum arvense, L.
Horseweed; Ambrosia trifida, L.; Iva xanthiifolia, Nutt.; Erigeron Canadensis, L.
Houndstongue; Cynoglossum officinale, L.
Huckleberry; Vaccinium mebranaceum, Dougl.
Indian Hemp; Apocynum androsæmifolium, L.; A. cannabinum, L.
Indian Millet; Eriocoma cuspidata, Nutt.
Indian Pea; Astragalus caryocarpus, Ker.
Indian Pink; Castilleia; Cleome integrifolia, T. & G.
Indian Turnip; Psoralea esculenta, Pursh.
Ironweed;, Artemisia biennis, Willd.; Epilobium angustifolium, L.
Jacob's Ladder; Polemonium cæruleum, Gray.
Jerusalem Oak; Chenopodium Botrys, L.
Joint-weed; Equisetum lævigatum, A. Br.

Jonny-jump-ups; Dodecatheon conjugens, Greene and Viola adunca, Smith.
Juneberry; Amelanchier alnifolia, Nutt.; Symphoricarpus occidentalis, Hook.
Juniper; Juniperus Sabina procumbens, Pursh.
Kalispell; Heuchera glabella, T. & G.
Kinnikinink; Arctostaphylos Uva-ursi, Spreng.; Cornus stolonifera, Michx.
Knotgrass; Polygonum aviculare, L.; P. littorale, Link.
Kitten-tails; Synthyris rubra, Benth.
Lady-slipper; Cypripedium.
Lamb's-quarter; Chenopodium album, L.
Larb; Arctostaphylos Uva-ursi, Spreng.
Larkspur; Delphinium.
Leopard Lily; Fritillaria atropurpurea, Nutt.
Lion's-beard; Anemone patens Nuttalliana, Gray; Clematis Douglasii, Hook.
Little Buffalo-grass; Bulbilis dactyloides, Raf.
Little Sugar Pine; Pinus monticola, Dougl.
Lobelia; Zygadenus species.
Loco-weed; **Loco**; Oxytropis Lambertii, Pursh and other species.
Lodgepole Pine; Pinus Murrayana, Murr.
Love-vine; Cuscuta arvensis, Beyrich.
Maple; Acer.
Maple-leaved Goosefoot; Chenopodium hybridum, L.
Marigold; Actinella acaulis, Nutt.
Mariposa Lily; Calochortus species.
Mayflower; Anemone patens Nuttalliana, Gray.
Mayweed; Anthemis Cotula, DC.
Meadow-sweet; Galium boreale, L.
Milfoil; Achillea lanulosa, Nutt.
Milkweed; Asclepias speciosa, Torr.; Lactuca pulchella, DC.
Missoula Pine; Pinus ponderosa, Dougl.
Monkshood; Aconitum Columbianum, Nutt.
Montana Edelweiss; Gentiana frigida, Haenke.
Moose-grass; Xerophyllum tenax, Nutt.
Moss Phlox; Phlox Hoodii, Rich.
Moss Pink; Phlox Hoodii, Rich.
Moss Rose; Lewisia rediviva, Pursh.
Moth Mullein; Verbascum Blattaria, L.
Mountain Alder; Alnus sinuata, Rydb.

Mountain Ash; Pyrus sambucifolia, C. & S.
Mountain Birch; Betula microphylla, Bunge.
Mountain Clover; Trifolium species.
Mountain Laurel; Ceanothus velutinus, Dougl.
Mountain Lily; Calochortus Nuttallii, T. & G.; Lilium montanum, Nelson.
Mountain Mahogany; Cercocarpus ledifolius, Nutt.
Mountain Maple; Acer glabrum, Torr.
Mountain Pink; Douglasia species.
Mountain Primrose; Oenothera cæspitosa, Nutt.
Mountain Thistle; Cnicus eriocephalus, Gray.
Mountain Timothy; Phleum alpinum, L.
Mullein; Verbascum Thapsus, L.
Narrow-leaved Cottonwood; Populus angustifolia, James.
Nettle; Urtica gracilis, Ait.
Nigger-head; Rudbeckia occidentalis, Nutt.
Nut Pine; Pinus albicaulis, Engelm.; P. flexilis, James.
Oak-leaved Goosefoot; Chenopodium glaucum, L.
Old-man; Artemisia frigida, Willd.
Old-man Graybeard; Cnicus eriocephalus, Gray.
Old-man's Whiskers; Geum triflorum, Pursh (in fruit); Clematis Douglasii, Hook. in fruit.
Oregon Grape; Berberis repens, Lindl.
Ox-eye Daisy; Chrysanthemum Leucanthemum, L.
Paint-brush; Castilleia.
Paint-cup; Castilleia species.
Paper Birch; Betula papyrifera, Marsh.
Partridgeberry; Symphoricarpus species.
Pennycress; Thlaspi arvense, L.
Pepper-grass; Lepidium apetalum, Willd.
Pig's-feet; Astragalus caryocarpus, Ker. in bloom.
Pigweed; Amaranthus retroflexus, L.; Chenopodium album, L.
Pigweed Pursely; Amaranthus blitoides, Wats.
Pin Clover; Erodium cicutarium, L'Her.
Pine-grass; Xerophyllum tenax, Nutt. & X. Douglasii, Wats.
Pink Violet; Viola Canadensis, L.
Pitch Pine; Pinus albicaulis, Engelm.
Plantain; Plantago Asiatica, L.; P. major, L.
Poison Oak; Rhus Toxicodendron, L.; R. Rydbergii, Small.
Pomme Blanche; **Pomme de Prairie**; Psoralea esculenta, Pursh.
Porcupine Grass; Stipa comata, F. & R.; S. spartea, Trin.

Poverty-weed; Iva axillaris, Pursh; Monolepis chenopodioides, Moq.
Prairie Apples; Astragalus caryocarpus, Ker.
Prairie Bean; Thermopsis rhombifolia, Nutt.
Prairie Star; Tellima parviflora, Hook.
Prickly Lettuce; Lactuca Scariola, L.
Purple Heather; Bryanthus empetriformis, Gray.
Prickly Pear; Opuntia polyacantha platycarpa, Coult. and other species.
Prince's Pine; Chimaphila umbellata, Nutt.
Quaker Bonnet; Lupinus species.
Quaking Asp; Populus tremuloides, Michx.
Rabbit-weed; Bigelovia graveolens, Gray.
Racine amare; Lewisia rediviva, Pursh.
Ragweed; Ambrosia artemisiæfolia, L.; Erigeron Canadensis, L.
Rayless Dogfennel; Matricaria discoidea, DC.
Rattlesnake-weed; Echinacea angustifolia, DC.
Rattleweed; Astragalus frigidus Americanus, Gray with dry fruit.
Red Cedar; Juniperus scopulorum, Sarg. and J. Virginiana, L.
Red Columbine; Aquilegia flavescens, Wats.
Red-cup Mariposa Lily; Calochortus Nuttallii, T & G.
Red Fir; Pseudotsuga mucronata, Sudw.
Red Haw; Cratægus coccinea, L.
Red-head Louisa; Lewisia rediviva, Pursh.
Red Huckleberry; Vaccinnum scoparium, Leiberg.
Red Loco; Oxytropis Blankinshipii, (Nelson).
Red Monkey-flower; Mimulus Lewisii, Pursh.
Red Willow; Cornus stolonifera, Michx.
Reed Grass; Phragmites communis, Trin.
Ribgrass; Plantago Patagonica gnaphalioides, Gray.
River Cottonwood; Populus deltoides, Marsh. (Eastern plains.)
Rock-rose; Œnothera cæspitosa, Nutt.
Rockweed; Balsamorrhiza sagittata, Nutt.
Rosinweed; Grindelia squarrosa, Dunal.; Madia glomerata, Hook.
Rush; Equisetum lævigatum, A. Br.
Russian Thistle; Salsola Kali Tragus, Moq.
Rye-grass; Agropyron tenerum, Vasey; Elymus condensatus, Presl.
Sage-brush; Artemisia tridentata, Nutt.; A. cana, Pursh and other species.
Salmonberry; Rubus Nutkanus, Moc.
Salsify; Tragopogon porrifolius, L.
Saltgrass; Distichlis spicata, Greene.

Salt Sage; Iva axillaris, Pursh.
Sand Lily; Mentzelia ornata, T. & G. and M. lævicaulis, T. & G.
Sand Puffs; Abronia micrantha, Chois. and other species.
Sand Rose; Œnothera cæspitosa, Nutt.; Lewisia rediviva, Pursh.
Sarsaparilla; Apocynum androsæmifolium, L.; Aralia nudicaulis, L.
Sarvice-berry; Amelanchier alnifolia, Nutt.
Scorpion-weed; Phacelia leucophylla, Torr.
Scotch Thistle; Cnicus lanceolatus, Willd.
Scrub Pine; Pinus scopulorum, Lemmon.
Sedge; Carex species.
Sego Lily; Calochortus species.
Shadberry; Amelanchier alnifolia, Nutt.; Rubus Nutkanus, Moc.
Shepherd's Purse; Capsella Bursa-pastoris, Moench.
Shoe-strings; Oxytropis Blankinshipii (Nelson) and other species.
Shooting-stars; Dodecatheon conjugens, Greene and other species.
Shrub Maple; Acer glabrum, Torr.
Silkweed; Asclepias speciosa, Torr.
Silver-bush; Elæagnus argentea, Pursh.
Silver Plant; Eriogonum ovalifolium, Nutt.
Skeleton-weed; Lygodesmia juncea, Don.
Skunkweed; Polemonium cæruleum, Gray.
Slough Grass; Beckmannia erucæformis, Host.; Carex species; Hordeum jubatum, L.
Small Bunch-grass; Festuca ovina, L.
Snake-root; Steironema ciliatum, Raf.
Snapdragon; Mimulus Langsdorfii, Don.
Snow-on-the-mountains; Euphorbia marginata, Pursh.
Soap-root; **Soapweed**; Yucca angustifolia, Pursh.
Sour Greens; Rumex venosus, Pursh.
Sow-thistle; Sonchus asper, Vill.
Spanish Bayonet; Yucca angustifolia, Pursh.
Spatlum; Lewisia rediviva, Pursh.
Spear-grass; Stipa comata, F. & R.; S. spartea, Trin.
Spider Plant; Cleome integrifolia, T. & G.
Spotted-cup Lily; Fritillaria atropurpurea, Nutt.
Spring Beauty; Claytonia lanceolata, Pursh & C. multicaulis, Nelson.
Spring Daisy; Townsendia Parryi, Eaton.
Spring Lily; Leucocrinum montanum,, Nutt.
Spruce; Picea species.
Spurry; Spergula arvensis, L.

Squaw Cabbage; Montia parvifolia, Howell.
Squaw Feather; Castilleia.
Squaw Lettuce; Montia asarifolia, Howell.
Squaw-root; Carum Gairdneri, Gray.
Squirrel-tail Grass; Hordeum jubatum, L.
Stagberry; Symphoricarpus species.
Star-flower; Tellima parviflora, Hook.
Star of Bethlehem; Leucocrinum, montanum, Nutt.
Star-strikers; Erythronium grandiflorum, Pursh.
Sticktights; Echinospermum species.
Sticky Currant; Ribes cereum, Dougl.
Strawberry Pig-weed; Chenopodium capitatum, Wats.
Stinging Nettle; Urtica gracilis, Ait.
Stinkweed; Cleome integrifolia, T. & G.; Solanum triflorum, Nutt.
Sulphur Plant; Eriogonum subalpinum, Greene.
Sunflower; Helianthus annuus, L. and other species.
Swamp Birch; Betula microphylla, Bunge.
Swamp Potato; Sagittaria arifolia, Nutt.
Swamp Sego; Camassia esculenta, Lindl.
Swan Potato; Sagittaria arifolia, Nutt.
Sweet Alyssum; Thlaspi alpestre, L.
Sweet-Clover; Melilotus alba, Lam.; Trifolium Rydbergii, Greene.
Sweetgrass; Glyceria fluitans, R. Br. and G. aquatica, Smith.
Sweet Sage; Artemisia frigida, Willd.
Sweet Sumac; Rhus trilobata, Nutt.
Sweet William; Phlox longifolia, Nutt.
Syringa; Philadelphus Lewisii, Pursh.
Tall Larkspur; Delphinium glaucum, Wats.
Tall Ragweed; Ambrosia trifida, L.
Tall Rye-grass; Elymus condensatus, Presl.
Tall White Primrose; Œnothera albicaulis, Nutt.
Tamarack; Larix occidentalis, Nutt.
Tansy Mustard; Sisymbrium incisum, Engelm.; S. canescens, Nutt.
Tarweed; Madia glomerata, Hook.
Tickle-grass; Panicum capillare, L.
Tickseed; Echinospermum species.
Tiger Lily; Fritillaria atropurpurea, Nutt.
Tobacco-root; Valeriana edulis, Nutt.
Tongue-grass; Lepidium apetalum, Willd.
Trailing Juniper; Juniperus Sabina procumbens, Pursh.
Traveler's Joy; Clematis ligusticifolia, Nutt.

Tree Moss; Alectoria Fremontii, Tuckern. (black); Bazzania trilobata, (yellow), Gray.
Tule; Scirpus lacustris occidentalis, Wats.
Tumble-grass; Panicum capillare, L.
Tumbleweed; Amaranthus albus, L.
Tumbling Mustard; Sisymbrium altissimum, L.
Turkey's Beard; Xerophyllum tenax, Nutt. and X. Douglasii, Wats.
Twinberry; Lonicera Utahensis, Wats.
Umbrella Plant; Eriogonum subalpinum, Greene.
Velvet-leaf Sunflower; Balsamorrhiza sagittata, Nutt.
Venus' Slipper; Calipso borealis, Salisb.
Virginia Creeper; Ampelopsis quinquefolia, Michx.
Virgin's Bower; Clematis lingusticifolia, Nutt.
Wappatoo; Sagittaria arifolia, Nutt.
Water Birch; Betula microphylla, Bunge.
Water Hemlock; Cicuta occidentalis, Greene.
Water-leaf; Hydrophyllum capitatum, Dougl.
Water Lily; Nuphar species and Sagittaria species.
Water Parsnip; Cicuta occidentalis, Greene.
White Birch; Betula papyrifera, Marsh.
White Cedar; Thuja plicata, Don.
White Clematis; Clematis ligusticifolia, Nutt.
White Fir; Abies grandis, Lindl.
White Lady Slipper; Cypripedium montanum, Dougl.
White Larkspur; Delphinium glaucum, Wats.
White Loco; See Loco.
White Melilot; Melilotus alba, Lam.
White Pine; Pinus flexilis, James; P. monticola, Dougl.
White Sage; Artemisia Ludoviciana, Nutt.
White Spruce; Picea alba, Link.
White Sunflower; Wyethia helianthoides, Nutt.
White Violet; Viola Canadensis, L.
White Water-lily; Sagittaria species.
Wide-leaved Cottonwood; Populus deltoides, Marsh.
Wild Arnica; Grindelia squarrosa, Dunal.
Wild Artichoke; Helianthus Maximiliani, Schrad.
Wild Asparagus; Lygodesmia juncea, Don.; Equisetum lævigatum, A. Br.
Wild Baby's-Breath; Gayophytum cæsium, Nutt.
Wild Begonia; Rumex venosus, Pursh.
Wild Buckwheat; Polygonum Convolvulus, L.

Wild Candytuft; Arabis Nuttallii, Robins.
Wild Clematis; Clematis ligusticifolia, Nutt.
Wild Clover; Trifolium species.
Wild Cucumber; Echinocystis lobata, T. & G.
Wild Currant; Ribes species.
Wild Flag; Iris Missouriensis, Nutt.
Wild Fleur de Lis; Iris Missouriensis, Nutt.
Wild Garlic; Allium species.
Wild Ginseng; Aralia nudicaulis, L.
Wild Gooseberry; Ribes setosum, Lindl.
Wild Grape; Vitis vulpina, L.
Wild Heliotrope; Phacelia Menziesii, Torr.
Wild Hollyhock; Malvastrum coccineum, Gray.
Wild Honeysuckle; Lonicera ciliosa, Poir.
Wild Hop; Humulus Lupulus, L.
Wild Hyacinth; Brodiæa Douglasii, Wats.
Wild Hydrangea; Rumex venosus, Pursh.
Wild Lettuce; Lactuca pulchella, DC.
Wild Lily; Lilium montanum, Nelson.
Wild Lily of the Valley; Smilacina species.
Wild Liquorice; Glycyrrhiza lepidota, Pursh.
Wild Mint; Mentha Canadensis, L.
Wild Morning-glory; Convolvulus Sepium, L.
Wild Mustard; Brassica Sinapistrum, Boiss.
Wild Oats; Avena fatua, L.
Wild Onion; Allium species.
Wild Parsley; Lomatium montanum, C. & R.
Wild Parsnip; Leptotænia multifida, Nutt. and other Umbilifers.
Wild Pea; Vicia Americana, Muhl.; Lupinus flexuosus, Lindl.
Wild Peppermint; Mentha Canadensis, L.
Wild Phlox; Phlox longifolia, Nutt.
Wild Plum; Prunus Americana, Marsh.
Wild Potato; Solanum triflorum, Nutt.
Wild Red Geranium; Geranium incisum, Nutt.
Wild Red Raspberry; Rubus strigosus, Michx.
Wild Rice; Eriocoma cuspidata, Nutt.
Wild Rose; Rosa species.
Wild Rye; Elymus Canadensis, L.
Wild Sarsaparilla; Aralia nudicaulis, L.
Wild Strawberry; Fragaria species.
Wild Sunflower; Helianthus annuus, L. and other species.

Wild Syringa; Philadelphus Lewisii, Pursh.
Wild Tansy; Achillea lanulosa, Nutt.
Wild Thistle; Cnicus undulatus, Nutt.
Wild Tomato; Solanum triflorum, Nutt.
Wild Tuberose; Leucocrinum montanum, Nutt.
Wild Turnip; Brassica campestris, L.
Wild White Geranium; Geranium Richardsonii, F. & T.
Willow; Salix species.
Willow Herb; Epilobium angustifolium, L.
Windflower; Anemone patens Nuttalliana, Gray.
Wintergreen; Pyrola uliginosa, Torr.
Wire-grass; Eleocharis palustris, L.; Juncus Balticus, Willd. and other species.
Wolfsbane; Aconitum Columbianum, Nutt.
Wormwood; Artemisia biennis, Willd.
Yamp; Carum Gairdneri, Gray.
Yardgrass; Polygonum aviculare, L.
Yarrow; Achillea lanulosa, Nutt.
Yellow-bell; Fritillaria pudica, Spreng.
Yellow Columbine; Aquilegia flavescens, Wats.
Yellow Currant; Ribes aureum; Pursh.
Yellow Daisy; Chrysopsis villosa, Nutt.
Yellow Flax; Linum rigidum, Pursh.
Yellow Lady Slipper; Cypripedium parviflorum, Salisb.
Yellow Melilot; Melilotus officinalis, Willd.
Yellow Monkey-flower; Mimulus Langsdorfii, Donn.
Yellow Pea; Thermopsis rhombifolia, Nutt.
Yellow Pine; Pinus ponderosa, Dougl.
Yellow Primrose; Œnothera muricata, L. (O. strigosa, Rydb.).
Yellow Rose; Potentilla fruticosa, L.
Yellow Sage; Bigelovia graveolens, Gray.
Yellow Snapdragon; Thermopsis montana, Nutt.
Yellow Thistle; Sonchus asper, Vill.
Yellow Tree-moss; Bazzania trilobata, S. F. Gray.
Yellow Violet; Viola praemorsa, Dougl.
Yellow Water-lily; Nuphar advena, Ait. & N. polysepalum, Engelm.
Yew; Taxus brevifolia, Nutt.

SCIENTIFIC NAMES.

Species starred (*) are introduced and are mostly weeds.

Abies grandis, Lindl. White Fir.
Abies lasiocarpa, Nutt. Balsam; Balsam Fir; Alpine Fir.
Abronia micrantha, Chois. and other species. Sand Puffs.
Acer glabrum, Torr. Mountain Maple; Shrub Maple.
Achillea lanulosa, Nutt. Milfoil; Wild Tansy; Yarrow.
Aconitum Columbianum, Nutt. Monkshood; Wolfsbane; Aconite.
Actæa spicata, L. and **A. rubra,** Willd. Baneberry.
Actinella acaulis, Nutt. Marigold.
Agropyron divergens, Nees. Bunch-grass.
Agropyron occidentale, Scribn. & spp. Blue-joint; Blue-stem.
Agropyron tenerum, Vasey. Rye-grass.
Alectoria Fremontii, Tuckerm. Black Moss; Tree Moss (on Conifers).
Allium Sibericum, L. & spp. Wild Onion; Wild Garlic; Garlic.
Alnus sinuata, Rydb. Moutain Alder.
Alnus tenuifolia, Nutt. Alder.
Amaranthus albus, L. Tumble-weed, from its tumbling habit in the winter.
Amaranthus blitoides, Wats. Pursely; Pigweed Pursely, from its resemblance to the Eastern Purslane (*Portulaca oleracea*).
***Amaranthus retroflexus,** L. Pigweed; Careless-weed.
***Ambrosia artemisiæfolia,** L. Ragweed.
***Ambrosia trifida,** L. Tall Ragweed; Horse-weed.
Amelanchier alnifolia, Nutt. Sarvice-berry; Juneberry; Shadberry.
Ampelopsis quinquefolia, Michx. Virginia Creeper.
Anemone patens Nuttalliana, Gray. Cowslip; Wind Flower; Cat's Eye; Blue Tulip; Blue Anemone; Badgers (when peeping through the ground in early spring); Lion's Beard (from its feathery fruit).
***Anthemis Cotula,** DC. Mayweed; Dog Fennel.
Aphyllon fasciculatum, Gray. Cancer Root (a reputed remedy for this disease).
Aplopappus acaulis glabratus, Eaton. Golden Aster.
Apocynum androsæmifolium, L. Sarsaparilla.
Apocynum cannabinum, L. and **A. androsæmifolium,** L. Indian Hemp.

Aquilegia cærulea, James. Blue Columbine.
Aquilegia flavescens, Wats. Yellow Columbine; Red Columbine.
Arabis Nuttallii, Robins. Wild Candytuft.
Aralia nudicaulis, L. Wild Ginseng; Wild Sarsaparilla.
*Arctium Lappa, L. Burdock.
Arctostaphylos Uva-ursi, Spreng. Larb (L'herb); Kinnikinink.
*Artemisia biennis, Willd. Ironweed; Wormwood.
Artemisia cana, Pursh. Blue Sage.
Artemisia frigida, Willd. Sweet Sage; Old Man.
Artemisia tridentata, Nutt. and **A. cana,** Pursh. Sage-brush.
Artemisia Ludoviciana, Nutt. White Sage.
Asclepias speciosa, Torr. Milkweed; Silkweed; Butterfly Weed.
Astragalus caryocarpus, Ker. Ground Plums; Prairie Apples; Indian Pea; Buffalo Pea; Ground Cherry; Pig's-feet (when in bloom).
Astragalus frigidus Americanus, Gray. Rattleweed (from the dry fruit).
*Avena fatua, L. Wild Oats.
Balsamorrhiza sagittata, Nutt. Big Root; Velvet-leaf Sunflower; Arrow-leaf; Rockweed.
Bazzania trilobata, S. F. Gray. Yellow Tree Moss (on Conifers).
Berberis repens, Lindl. Oregon Grape; Barberry.
Betula microphylla, Bunge. Mountain or Swamp Birch; Water Birch.
Betula papyrifera, Marsh. White Birch; Paper or Canoe Birch.
Beckmannia erucæformis, Host. Slough Grass.
Bigelovia graveolens, Gray. Greasewood; Yellow Sage; Flowering Sage; Rabbit Weed.
Bouteloua oligostachya, Torr. Buffalo-grass; Grama-grass.
*Brassica campestris, L. Wild Turnip.
*Brassica nigra, Koch. Black Mustard.
*Brassica Sinapistrum, Boiss. Wild Mustard; Field Mustard.
Brodiæa Douglasii, Wats. Wild Hyacinth.
*Bromus racemosus, L. and **B. secalinus,** L. Cheat; Chess.
Bryanthus empetriformis, Gray. Purple Heather.
Calochortus apiculatus, Baker and other species. Atabasco Lily; Sego Lily; Mariposa Lily; Butterfly Lily.
Calochortus Gunnisoni, Wats. Brown-cup Mariposa Lily.
Calochortus Nuttallii, Torr. & Gray. Red-cup Mariposa Lily; Mountain Lily.
Calypso borealis, Salisb. Calipso; Venus' Slipper.

Camassia esculenta, Lindl. Camas; Swamp Sego; Blue Camas.
***Camelina sativa**, Crantz. False Flax.
Campanula rotundifolia, L. Blue-bells; Harebell; Bell-flower.
***Capsella Bursa-pastoris**, Moench. Shepherd's Purse.
Carex species. Sedge; Slough-grass.
Carum Gairdneri, Gray. Squaw-root; Yamp (Ind.); Artichoke.
Castilleia spp. Painted-cup; Squaw Feather; Indian Pink; Paint Brush.
Ceanothus velutinus, Dougl. Mountain Laurel.
***Cerastium vulgatum**, L. Chickweed.
Cercocarpus ledifolius, Nutt. Mountain Mahogany.
Chenopodium album, L. Lamb's quarter; Pigweed.
***Chenopodium Botrys**, L. Jerusalem Oak.
***Chenopodium capitatum**, Wats. Strawberry Pigweed.
Chenopodium glaucum, L. Oak-leaved Goosefoot.
***Chenopodium hybridum**, L. Maple-leaved Goosefoot.
Chimaphila umbellata, Nutt. Prince's Pine.
***Chrysanthemum Leucanthemum**, L. Oxe-eye Daisy.
Chrysopsis villosa, Nutt. Golden Aster; Golden Daisy; Yellow Daisy.
Cicuta occidentalis, Greene. Water Hemlock; Water Parsnip; Cowbane.
Clarkia pulchella, Pursh. Clarkia.
Claytonia lanceolata, Pursh. and **C. multicaulis**, Nelson. Spring Beauty; Ground-nut.
Clematis Columbiana, Torr. & Gray. Blue Clematis.
Clematis ligusticifolia, Nutt. Virgin's Bower; White Clematis; Traveler's Joy; Wild Clematis.
Clematis Douglasii, Hook. Lion's Beard; Headache-weed; Old-man's Whiskers.
Cleome integrifolia, Torr. & Gray. Indian Pink; Stinkweed; Bee Flower; Spider Plant.
Cnicus arvensis, Hoffm. Canada Thistle.
Cnicus eriocephalus, Gray. Mountain Thistle; Old-man Graybeard.
***Cnicus lanceolatus**, Willd. Scotch Thistle; Bull Thistle.
Cnicus undulatus, Nutt. Wild Thistle.
Convolvulus Sepium, L. Wild Morning Glory.
Cornus stolonifera, Michx. Red Willow; Kinnikinnik.
Cratægus coccinea, L. Red Haw.
Cratægus Douglasii, Lindl. Black Haw.
Cuscuta arvensis, Beyrich. Love-vines; Coral-vines.

*Cuscuta Epithymum, Murr. Alfalfa Dodder.
*Cynoglossum officinale, L. Hound's-tongue.
Cypripedium montanum, Dougl. White Lady's Slipper.
Cypripedium parviflorum, Salisb. Yellow Lady's Slipper.
Delphinium glaucum, Wats. Tall Larkspur; White Larkspur.
Delphinium Menziesii, DC. and D. bicolor, Nutt. Blue Larkspur.
Distichlis spicata, Greene. Alkali Grass; Salt-grass.
Dodecatheon conjugens, Greene and other species. Shooting-stars; Bird-bills.
Douglasia montana, Gray. Douglasia; Mountain Pink.
Draba nemorosa, L. Field Draba.
Dracocephalum parviflorum, Nutt. Dragonhead.
Echinacea angustifolia, DC. Rattlesnake Weed.
*Echinocystis lobata, Torr. & Gray. Wild Cucumber.
Echinospermum floribundum, Lehm. and other spp. Beggar Ticks; Stick-tights; Tickweed.
Elæagnus argentea, Pursh. Silver-bush.
Eleocharis palustris, L. Wire-grass; Bull-grass.
Elymus Canadensis, L. Wild Rye.
Elymus condensatus, Presl. Rye-grass; Tall Rye-grass; Buffalo Rye.
Epilobium angustifolium, L. Ironweed; Fireweed; Willow Herb.
Epilobium paniculatum, Nutt. Cottonweed.
Equisetum arvense, L. Horsetail; Bulrush.
Equisetum lævigatum, A. Br. Wild Asparagus; Joint-weed; Frog-sprouts; Rush.
*Erigeron Canadensis, L. Ragweed; Fireweed; Horseweed.
Eriocoma cuspidata, Nutt. Wild Rice; Indian Millet.
Eriogonum subalpinum, Greene. Sulphur Plant; Umbrella Plant (with other species).
Eriogonum ovalifolium, Nutt. Silver Plant (A supposed indication of silver ores in the rocks beneath).
*Erodium circutarium, L'Her. Alfillaria; Pin Clover.
Erythronium grandiflorum, Pursh. Star-strikers; Dog-tooth Violet; Adders-tongue.
Euphorbia glyptosperma, Engelm. Carpet-weed.
*Euphorbia marginata, Pursh. Flowering Spurge; Snow on the Mountains.
Fatsia horrida, Benth & Hook. Devil's Walking-stick.
Festuca ovina, L. Bunch Grass; Small Bunch-grass.
Fragaria spp. Wild Strawberry.

Franseria Hookeriana, Nutt. Bur Ragweed.
Fraxinus viridis, Michx. Green Ash.
Fritillaria atropurpurea, Nutt. Tiger Lily; Leopard Lily; Spotted Cup Lily; Brown Lily.
Fritillaria pudica, Spreng. Yellow-Bell.
Gaillardia aristata, Pursh. Blackeyed Susan; Blanket-flower; Gaillardia.
Galium boreale, L. Meadow-sweet.
Gaura coccinea, Nutt. Butterfly Weed.
Gayophytum caesium, Nutt. Wild Baby's-Breath.
Gentiana frigida, Haenke. Montana Edelweiss.
Geranium Carolinianum, L. and **G. Bicknellii,** Britton. Crane's Bill; Bird-Bills.
Geranium incisum, Nutt. Wild Red Geranium.
Geranium Richardsonii, Fisch. & Trautv. Wild White Geranium.
Geum triflorum, Pursh. Old-man's Whiskers (when in fruit).
Glyceria fluitans, R. Br. & **G. aquatica, Smith.** Sweet-grass.
Glycyrrhiza lepidota, Pursh. Wild Liquorice; Cucklebur.
Grindelia squarrosa, Dunal. Rosin-weed; Wild Arnica; Gum-weed.
Helianthus annuus, L. and other spp. Sunflower; Wild Sunflower.
Helianthus Maximiliani, Schrad. Wild Artichoke.
Heracleum lanatum, Michx. Cow Parsnip: Cow Cabbage.
Heuchera glabella, T. & G. Kalispell.
Hordeum jubatum, L. Foxtail; Squirrel-tail Grass; Slough-grass.
Humulus Lupulus, L. Wild Hop; Hop-vine.
Hydrophyllum capitatum, Dougl. Water-leaf.
Ipomœa leptophylla, Torr. Big Root.
Iris Missouriensis, Nutt. Blue Flag; Wild Flag; Wild Fleur de Lis.
Iva axillaris, Pursh. Bazzle-weed; Salt Sage; Poverty weed.
Iva xanthiifolia, Nutt. Careless Weed; Horseweed.
Juncus Balticus, Willd. and spp. Wire-grass.
Juniperus scopulorum, Sarg. Red Cedar.
Juniperus communis alpina, Gaud. and J. Sabina procumbens, Pursh. Juniper; Trailing Juniper.
Lactuca pulchella, DC. Milkweed; Wild Lettuce; Cotton-weed.
Lactuca Scariola, L. Prickly Lettuce; Chinese Lettuce; Compass-Plant.
Larix occidentalis, Nutt. Tamarack.
Lepachys columnaris, Torr. & Gray. Cone-flower.
Lepidium apetalum, Willd. Bird-seed; Tongue-grass; Pepper-grass.

Leptotænia multifida, Nutt. Wild Parsnip.
Leucocrinum montanum, Nutt. Spring Lily; Wild Tuberose; Star of Bethlehem.
Lewisia rediviva, Pursh. Bitter-root; Red-head Louisa; Racine amare (Fr.); Spatlum (Ind.).
Liatris **punctata,** Hook. Blazing Star.
Lilium montanum, Nelson. Mountain Lily.
Linum Lewisii, Pursh. Blue Flax.
Linum rigidum, Pursh. Yellow Flax.
Lithospermum angustifolium, Michx. Indian Paint.
Lomatium ambiguum, Coult & Rose, L. cous, C. & R. (and L. montanum, C. & R.?). Cous; Cous Root; Biscuit Root; Wild Parsley.
Lonicera ciliosa, Poir. Wild Honeysuckle.
Lonicera involucrata, Banks. Bearberry.
Lonicera Utahensis, Wats. Bush Honeysuckle; Twinberry.
Lupinus leucophyllus, Dougl. and other species. Blue Lupine; Wild Pea; Prairie Bean; Blue Bean; Quaker Bonnet; Blue Pea; Blue-weed.
Lygodesmia juncea, Don. Wild Asparagus; Skeleton Weed.
*Madia filipes, Gray. Little Tarweed.
Madia glomerata, Hook. Tarweed; Rosin-weed.
Malvastrum coccineum, Gray. Wild Hollyhock.
Mamillaria vivipara, Haw. Cushion Cactus.
*Marrubium vulgare, L. Horehound.
Matricaria discoidea, DC. Green or Rayless Dogfennel.
*Melilotus alba, Lam. Sweet or Honey Clover; White Melilot.
*Melilotus officinalis, Willd. Yellow Melilot.
Mentha Canadensis, L. Wild Mint; Wild Peppermint.
Mentzelia ornata, T. & G. Sand Lily.
Mertensia oblongifolia, Don. and other spp. Blue-Bells.
Mimulus Langsdorfii, Donn. Snapdragon; Yellow Monkey-Flower.
Mimulus Lewisii, Pursh. Red Monkey-Flower.
Monolepis chenopodioides, Moq. Poverty Weed.
Montia asarifolia, Howell. Squaw Lettuce.
Montia parviflora, Howell. Squaw Cabbage.
Myosotis alpestris, Schmidt. Forgetmenot.
Neillia malvacea, Greene. Buckthorn.
Negundo aceroides, Moench. Box Elder; Ash-leaved Maple.
*Nepeta cataria, L. Catnip.
Nuphar advena, Ait. and **N. polysepalum,** Engelm. Yellow Water

Lily.
Œnothera albicaulis, Nutt. Tall White Primrose.
Œnothera cæspitosa, Nutt. Evening Primrose; Mountain Primrose; Rock Rose.
Œnothera muricata, L. (O. strigosa, Rydb.). Yellow Primrose.
Œnothera pinnatifida, Nutt. Evening Primrose.
Orthocarpus tenuifolius, Benth. Fairy Pinks.
Opuntia polyacantha platycarpa, Coult. Prickly Pear; Cactus.
Oryzopsis. See Eriocoma.
Oxytropis Blankinshipii, (Nelson). Red Loco; Shoe-strings.
Oxytropis Lambertii, Pursh. Loco-weed; White Loco; Buffalo Pea.
***Panicum capillare**, L. Tumble-grass; Tickle-grass.
Pedicularis Groenlandica, Retz. Elephant's Head.
Pentstemon acuminatus, Dougl. Baby Blue-eyes; Mayflower.
Petasites sagittata, Gray. Coltsfoot.
Peucedanum. See Lomatium.
Phacelia leucophylla, Torr. Scorpion Weed.
Phacelia Menziesii, Torr. Wild Heliotrope.
Philadelphus Lewisii, Pursh. Wild Syringa.
Phleum alpinum, L. Mountain Timothy.
Phlox Hoodii, Rich. Moss Pink; Moss Phlox.
Phlox longifolia, Nutt. Sweet William.
Phragmites communis, Trin. Cane Grass; Reed Grass.
Physaria didymocarpa, Gray. Bladder Pod.
Picea alba, Link. White Spruce.
Picea Engelmanni, Engelm. Engelmann's Spruce.
Pinus albicaulis, Engelm. Nut Pine; Pitch Pine; Alpine Pine.
Pinus flexilis, James. White Pine; Nut Pine.
Pinus monticola, Dougl. White Pine; Little Sugar Pine.
Pinus Murrayana, Murr. Lodgepole Pine.
Pinus ponderosa, Dougl. Yellow Pine; Missoula Pine.
Pinus scopulorum, Lemmon. Bull Pine; Black Pine; Scrub Pine.
Plantago Asiatica, L. and *P. major, L. Plantain.
Plantago Patagonica gnaphalioides, Gray. Ribgrass.
Polemonium cæruleum, Gray. Jacob's Ladder; Skunkweed.
***Polygonum Convolvulus**, L. Wild Buckwheat; Bindweed.
Populus angustifolia, James. Narrow-leaved Cottonwood.
Populus balsamifera, L. Balm of Gilead; Balm.
Populus deltoides, Marsh. Wide-leaved or River Cottonwood.
Populus tremuloides, Michx. Quaking Asp; Aspen Poplar.

Potamogeton spp. Fishweed.
Pteris aquilina, L. Brake Fern.
Potentilla spp. Five-finger.
Potentilla fruticosa, L. Yellow Rose.
Prunus Americana, Marsh. Wild Plum.
Prunus demissa, Walp. Choke Cherry.
Pyrola uliginosa, Torr. Wintergreen.
Pseudotsuga mucronata, Sudw. Red Fir; Douglas Fir.
Psoralea esculenta, Pursh. Indian Turnip; Bread-root; Pomme Blanche or Pomme de Prairie (French Voyageur).
Pyrus sambucifolia, Cham. & Schl. Mountain Ash.
Ranunculus spp. Buttercup.
Ribes Americanum, Mill. Black Currant.
Ribes aureum, Pursh. Yellow Currant.
Ribes cereum, Dougl. and **R. viscosissimum,** Pursh. Sticky or Viscid Currant.
Ribes setosum, Lindl. Wild Gooseberry.
Rhus Rydbergii, Small and **R. Toxicodendron,** L. Poison Oak.
Rhus trilobata, Nutt. Sweet Sumac.
Rosa spp. Wild Rose.
Rubus Nutkanus, Moc. Salmonberry; Shadberry.
Rubus strigosus, Michx. Wild Red Raspberry.
Rudbeckia laciniata, L. Black-eyed Susan; Cone-flower; Nigger-head.
Rudbeckia occidentalis, Nutt. Nigger-head.
***Rumex crispus,** L. and **R. salicifolius,** Weinm, Dock.
Rumex venosus, Pursh. Sour Greens; Wild Begonia; Wild Hydrangea.
Sagittaria arifolia, Nutt. Arrow-leaf; White Water Lily; Swan or Swamp Potato; Wappatoo (Ind.).
Salix spp. Willow.
Salix Mackenziana, Barratt. Diamond Willow.
Salsola Kali Tragus, Moq. Russian Thistle.
Sambucus glauca, Nutt. Elder; Elderberry.
Saponaria Vaccaria, L. Cockle; Cow Cockle.
Sarcobatus vermiculatus, Torr. Greasewood.
Scirpus lacustris occidentalis, Wats. Bulrush; Tule.
Shepherdia argentea, Nutt. Buffalo Berry; Bull-berry; Graisse de Boeuf (Fr.).
***Sisymbrium altissimum,** L. Tumbling Mustard.

Sisymbrium incisum, Engelm. and **S. canescens**, Nutt. Tansy Mustard.
Sisymbrium officinale, Scop. Hedge Mustard.
Sisyrinchium spp. Blue-eyed Grass.
Smilacina spp. False Solomon's Seal; Wild Lily of the Valley.
Solanum nigrum, L. Deadly Nightshade.
Solanum triflorum, Nutt. Stinkweed; Wild Potato; Wild Tomato; Ground Cherry.
***Sonchus asper**, Vill. Yellow Thistle; Sow-thistle.
Sparganium spp. Bur-reed.
***Spergula arvensis**, L. Spurry.
Steironema ciliatum, Raf. Snake-root.
***Stellaria media**, Smith. Chickweed.
Stipa comata, F. & R. and **S. spartea**, Trin. Spear Grass; Porcupine Grass; Devil's Darning-needles.
Symphoricarpus occidentalis, Hook. June Berry; Buckbush; Stagberry; Partridge-berry.
***Symphytum officinale**, L. Comfrey.
Synthyris rubra, Benth. Kitten-tails.
Taraxacum officinale, Weber. Dandelion.
Taxus brevifolia, Nutt. Ground Hemlock; Yew.
Tellima parviflora, Hook. Star-flower; Prairie Star.
Thermopsis montana, Nutt. Yellow Snapdragon.
Thermopsis rhombifolia, Nutt. Prairie Bean; Yellow Pea.
Thlaspi alpestre, L. Sweet Alyssum.
***Thlaspi arvense**, L. Pennycress.
Thuja plicata, Don. White Cedar; Cedar.
Townsendia Parryi, Eaton. Spring Daisy; Daisy.
***Tragopogon porrifolius**, L. Salsify; Oyster Plant.
Trifolium Rydbergii, Greene. Sweet Clover.
Trifolium spp. Wild Clover, Mountain Clover.
Trillium ovatum, Pursh. Trillium; Wake Robin.
Tsuga heterophylla, Sargent. Hemlock.
Typha latifolia, L. Cat-tail; Cat-tail Flag; Bulrush.
Ulmus Americana, L. Elm; White Elm.
***Urtica gracilis**, Ait. Nettle; Stinging Nettle.
Vaccinium membranaceum, Dougl. Huckleberry.
Vaccinium scoparium, Leiberg. Red Huckleberry; Grouse-berry.
Valeriana edulis, Nutt. Tobacco Root.
***Verbascum Blattaria**, L. Moth Mullein.
***Verbascum Thapsus**, L. Mullein.

Verbena bracteosa, Michx. Ground Vervain.
Vicia Americana, Muhl. Wild Pea.
Viola adunca, Smith. Blue Violet; Common Blue Violet.
Viola Canadensis, L. White or Pink Violet.
Viola cognata, Greene. Mountain Violet.
Viola præmorsa, Dougl. Yellow Violet; Common Yellow Violet.
Vitis vulpina, L. Wild Grape; Frost Grape.
Wyethia helianthoides, Nutt. White Sunflower.
Xanthium Canadense, Mill. Cucklebur.
Xerophyllum tenax, Nutt. and **X. Douglasii,** Wats. Bear-grass; Moose Grass; Turkey's Beard; Pine Grass.
Yucca angustifolia, Pursh. Soaproot; Soapweed; Spanish Bayonet; Grass Cactus.
Zygadenus venosus, Wats. Death Camas; Lobelia.